*August, 1943*

# Abstracts from the Scientific and Technical Press

(No. 113. June, 1943)

AND

# Titles and References of Articles and Papers Selected from Publications

## (Reviewed by R.T.P.3).

TOGETHER WITH

## List of Selected Translations

(Nos. 56 and 59)

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# ABSTRACTS FROM THE SCIENTIFIC AND TECHNICAL PRESS.

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*(Prepared by R.T.P.3.)*

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Notices and abstracts from the Scientific and Technical Press are prepared primarily for the information of Scientific and Technical Staffs. Particular attention is paid to the work carried out in foreign countries, on the assumption that the more accessible British work (for example that published by the Aeronautical Research Committee) is already known to these Staffs.

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Note.—As far as possible, the country of origin quoted in the items refers to the original source.

*The Effect of Compressibility on Thin Slightly Cambered Profiles at Subsonic Speed.* (W. Hantzsche and H. Wendt, Z.A.M.M., Vol. 22, No. 2, April, 1942, pp. 72-86.) (113/1 Germany.)

The calculation of a steady two-dimensional potential gas flow in the subsonic region can be carried out by a method of successive approximations as shown by Pauzen (1913) and Rayleigh (1916): This corresponds to a development of the potential or stream function in terms of the Mach number, the first approximation being thus that of incompressible flow.

The second and third approximations are applicable to arbitrary profiles and angles of incidence provided the Mach number is small. It would be difficult to calculate the flow for higher Mach numbers by this method, since a large number of steps would be required and the labour involved become excessive.

Prandtl (1927) and Glanert (1928) have given an approximation for all subcritical velocities, provided the additional velocities are small compared with the stream velocity (thin profiles at a small incidence). In this case the differential equation for the potential and stream functions assumes the incompressible form of the affine transformation of an independent variable. Following a suggestion by Busemann, the authors have developed a method of successive approximations for the stream function, the first step corresponding to the Prandtl-Glanert approximation. For this purpose, the stream function is developed in terms of a parameter characterising the deviation of the given profile as regards thickness, curvature coincidence from a line profile at zero incidence. The first term of the series represents the undisturbed parallel flow. With the addition of the second term we obtain the Prandtl approximation, whilst the third term allows for finite thickness of profile. The method is applied by the authors to the calculation of the maximum additional velocity for an ellipse (symmetrical flow) and the lift of a Joukousky aerofoil.

The results show that the compressibility effects, taking into account thickness, curvature and incidence of the profile, increase at a slightly greater rate than is given by the Prandtl estimate.

*Measurement of the Aerodynamic Forces on Small Wing Models Undergoing Vibration (Combined Flapping and Twist).* (E. V. Holst, L.F.F., Vol. 20, No. 5, 16/6/43, pp. 137-146.) (113/2 Germany.)

The article is of interest as giving for the first time accurate measurements on vibrating wings at low Reynolds numbers ($Re \sim 1{,}000$).

The experiments were carried out on a model insect wing, made of balsa wood and ground very thin. The surface is of elliptic plan, slightly cambered, 32 mm. long with a maximum chord of 8 mm. and weighs 19 milligram.

The axis about which the vibration takes place is parallel to the longitudinal axis of the wing, but displaced towards the leading edge and passes approximately through the $\frac{1}{3}$ chord position at the maximum width.

The wing is supported on a framework made of 0.2 mm. steel wire, flapping and twisting motion being effected by means of a double crank. The whole system is mounted on a single torsion wire by means of which the thrust (drag) and lift can be determined in succession by a null method.

A most ingenious method for recording the torque is adopted. The driving shaft operating the crank system is split, the coupling consisting of a brass cylinder suspended in an oil bath. The relative velocity between the oil container and the central cylinder is a measure of the viscous torque transmitted and can be obtained by direct calibration.

The average thrust and lift forces of the vibrating wing are of the order of 20 milligram and consistent measurements to within a fraction of a milligram can be obtained on the torsion balance, provided the pertinent factors are kept constant (of these the most important are the frequency of the vibration and the velocity of the incident airstream).

The torque measurements, on the other hand, although reasonably consistent, suffer from the fact that they include the friction in the driving links. The load on the links is partly due to inertia and partly aerodynamic. The friction due to inertia loads can be determined easily by a separate experiment and a suitable allowance made.

The friction due to aerodynamic loads is difficult to determine exactly and no correction has been applied. The author estimates that the recorded torques are throughout about 25 per cent. too high for this reason.

All the experiments were carried out at a constant flapping angle of 68° (total angular deflection between extreme positions).

The twist amplitude of the wing about the flapping axis could be varied between 0 and 150°, the corresponding crank being sloped for this purpose.

Both twist and flap are of the same period but displaced 90° in phase, the tests covering frequencies of 10, 15, 20 and 25 vibrations/sec. respectively.

Measurements were taken both under static conditions and in the presence of an incident wind.

($v \doteq 50$ and 100 cm./sec. respectively.)

In the latter case, the axis of the vibrating wing projected through a hole in the walls of a miniature wind tunnel (6 cm. diameter), the whole of the supporting framework and recording gear being outside the tunnel.

In the case of orthodox aircraft, the thrust and lift producing organs are sharply differentiated (propeller and fixed wings). With a vibrating wing, however, both thrust and lift can be produced by the same mechanism, the inclination of the resultant air force being controllable over wide limits, even if the amplitudes of flap and twist remain constant.

As already stated, in the model tested by the author, the twist of the blade is 90° out of phase with the flapping. The mean or zero position of the wing with regard to the flapping plane is however arbitrary and this angle $\tau$ is one of the factors influencing the resultant force.

Two other factors are the angle $\psi$ between the flapping plane and the incident flow and the angle $\alpha$ which the profile makes with the incident flow.

The author investigated the following combinations:—

(1) $\psi=90°$, $\alpha=0°$, $\tau=90°$.
(2) $\psi=70°$, $\alpha=20°$, $\tau=90°$.
(3) $\psi=45°$, $\alpha=45°$, $\tau=90°$.
(4) $\psi=90°$, $\alpha=20°$, $\tau=70°$.
(5) $\psi=90°$, $\alpha=45°$, $\tau=45°$.
(6) $\psi=70°$, $\alpha=0°$, $\tau=20°$.

Each of these settings was tested for various amplitudes of twist (0 to 140°), vibration frequencies (10 to 25 sec.) and wind speeds (0 to 100 cm./sec.), the flapping angle being constant throughout (68°).

The results are expressed in terms of non-dimensional parameters, defined as follows:—

$$\text{Thrust coefficient } k_s=\frac{S}{\frac{1}{2}\rho u^2 F}$$

$$\text{Lift coefficient } k_a=\frac{A}{\frac{1}{2}\rho u^2 F}$$

$$\text{Torque coefficient } k_1=\frac{M}{\frac{1}{2}\rho u^2 F}$$

$$\text{Thrust efficiency } \eta_s=(k_s/k_1)\,\lambda$$

$$\text{Static thrust performance } \xi=k_s/(2k_1)^{2/3}$$

where

$S$ = thrust.
$A$ = lift.
$M$ = torque.
$u$ = mean tip speed of wing due to flapping.
$v$ = incident air speed.
$\lambda$ = speed ratio $v/u$.
$F$ = area swept during one complete flapping.

## Discussion of Results.

(1) $\psi=90°$, $\alpha=0°$, $\tau=90°$.

This symmetrical vibration produces thrust only, the motion resembling that of a propeller.

Plotted on a $X$ basis (amplitude of twist) with frequency $n$ as parameter, the $k_s$ curves are roughly parabolic, a maximum value of .08 being reached at $X=90°$.

Under static conditions (absence of incident wind) the frequency has very little effect. In the presence of an incident wind, the $k_s$ curves separate in the order of their frequency, the separation being the more marked, the higher $v$.

Plotted on a $\lambda$ basis, $k_s$ diminishes almost linearly with $\lambda$, the steepness of the curves increasing as the parameter $X$ increases.

Optimum thrust efficiency ($\eta_s=.45$, not allowing for friction) occurs at $\lambda=.5$ and $X=90°$.

Under static conditions, $\eta_s$ max. is about .4 at $X=120°$.

[In the case of insect flight, considerably higher thrust efficiencies are no doubt possible, the wing in this case being flexible and set at the optimum incidence during each phase of the motion.]

(2) $\psi=70°$, $\alpha=20°$, $\tau=90°$.

The plane of flapping now makes an angle of 20° with the incident air stream. Both thrust and lift are produced, the relative proportions of each depending on $X$ and $\lambda$. It is thus possible to direct the resultant air force in almost any required direction.

For any given value of $\lambda$, the resultant force becomes a maximum for a given value of $X$ which decreases as $\lambda$ increases:—

| | | | | |
|---|---|---|---|---|
| $\lambda$ | 0 | .4 | .8 | 1.0 |
| $X$ | 100° | 70° | 50° | 40° |
| $k_a$ | .025 | .06 | .11 | .15 |
| $k_s$ | .07 | .05 | .01 | −.01 |

Whilst, just as in Case 1, $k_s$ diminishes with increasing $\lambda$, the slope being roughly proportional to $X$, the reverse holds for $k_a$.

Thus, a large amplitude of twist is beneficial for producing thrust but the lift coefficient becomes highest at small amplitudes.

The power absorbed by the vibration is practically identical with that of the previous case, *i.e.*, the high lift forces do not require extra work. The thrust efficiency curves are not markedly affected, apart from being compressed into a smaller $\lambda$ range. The optimum thrust efficiency is unaltered.

(3) $\psi=45°$, $\alpha=45°$, $\tau=90°$.

The lift coefficient increases still further whilst the thrust is reduced. The maximum resultant force (split up into thrust and lift components) is given in the following table:—

| | | | |
|---|---|---|---|
| $\lambda$ | 0 | .4 | .6 |
| $X$ | 100° | 90° | 70° |
| $k_a$ | .065 | .115 | .150 |
| $k_s$ | .065 | .02 | −.025 |

The thrust efficiencies are considerably reduced (optimum value=.28, uncorrected for friction) and the range over which a positive thrust can be produced is shortened still further ($\lambda$=0 to .5).

(4) $\psi=90°$, $\alpha=20°$, $\tau=70°$.

In this case the incident air stream is perpendicular to the flapping plane, lift and thrust being produced by a change in the zero position of the wing, the mean position now making an angle of 70° with the flapping plane.

The incidence $\alpha$ is thus the same as in Case (2) considered above. The thrust coefficients are, however, appreciably less, whilst the lift coefficients somewhat higher.

The optimum thrust efficiency is reduced to .2 at $\lambda$=.30.

The maximum resultant force components are given below:—

| | | | | |
|---|---|---|---|---|
| $\lambda$ | 0 | .4 | .6 | .8 |
| $X$ | 100° | 70° | 70° | 60° |
| $k_a$ | .055 | .08 | .10 | .12 |
| $k_s$ | .07 | .035 | .01 | −.015 |

(5) $\psi=90°$, $\alpha=45°$, $\tau=45°$.

Practically no thrust is produced, whilst the lift is no greater than in Case (4).

The reason for this marked difference in behaviour is investigated by the author. It appears that in Cases (1)-(3), the resultant forces are mainly due to the circulation round the profile, whilst in (4) and (5) the drag of the aerofoil plays an important part (broadside motion during part of stroke). This explains the much greater efficiency of the former type of vibration.

(6) $\psi=70^\circ$, $\alpha=0^\circ$, $\tau=20^\circ$.

This type of vibration is of special interest since an appreciable lift is produced, although the mean blade incidence is zero. At the same time the thrust coefficient differs only little from Case (1).

The inclination of the flapping plane, whilst retaining zero mean incidence causes a difference in the effective angle of incidence in the up and down strokes, resulting in a lift component which is negative unless $X < 30^\circ$.

There are thus three possible ways of producing a lifting force with a vibrating wing system:—

(*a*) Tilting of flapping plane, wing twist symmetrical with regard to plane ((2) and (3) above).

(*b*) Flapping plane normal to incident wind, wing twist unsymmetrical ((4) and (5) above).

(*c*) Flapping plane inclined, any twist symmetrical with regard to incident wind ((6) above).

A large scale mechanical imitation of the flapping flight of birds or insects is not feasible. On account of the close connection with helicopter problems, however, the vibrating wing is of great theoretical interest. This aspect of the problem will be dealt with by the author in a subsequent paper.

*Device for the Automatic Limitation of the Aircraft Acceleration in a Vertical Direction.* (Potez Patent No. 733,589, Patent Series No. 4, p. 26; Flugsport, Vol. 35, No. 9, 19/5/43.) (113/3 France.)

PRINCIPAL CLAIMS.

Device for the automatic limitation of the vertical acceleration of aircraft consisting of a split control rod system consisting of two parts capable of undergoing mutual displacement along the same axis and held together by a tension spring, characterised by the fact that the ends of the control rods facing each other are fitted with pivoted cross bars, which serve as attachment for the tension spring and floating link respectively, which are thus placed on opposite sides of the control rod centre line.

At the floating link end, the cross bars are provided with right angled extension pieces to which inertia masses are attached.

A vertical acceleration of the aircraft thus causes an extension or contraction of the spring coupling and the corresponding change in the length of the control rod systems causes a corresponding change in the elevator deflection. The inertia device only becomes effective if the aircraft is undergoing vertical acceleration and reduces the possible elevator deflection corresponding to a given control stick deflection. If the aircraft is flying steadily, full deflection is restored.

*Device for the Dynamic Stabilisation of Aircraft.* (Junkers Patent No. 733,588, Patent Series No. 4, pp. 25-26; Flugsport, Vol. 35, No. 9, 19/5/43.) (113/4 Germany.)

The basic feature of the patent consists in the introduction of a phase lag between the operation of the elevator and the displacement of the aircraft with the object of damping out longitudinal oscillations rapidly. If $T$=periodic time of such oscillations, the optimum phase lag is about $T/4$, *e.g.*, maximum elevator deflection in a downward direction occurs $T/4$ seconds after the maximum vertical acceleration of the aircraft or at the instant of zero acceleration.

This is achieved by coupling the elevator control rod to an elastically suspended mass capable of executing vibrations in a vertical direction, these vibrations being transmitted by means of a ratchet to a flywheel the axis of rotation of which is at right angles to the longitudinal axis of the aircraft.

Instead of having separate oscillating and rotating masses, the desired effect can also be produced by utilising parts of the existing control rod and elevator systems.

(Since only a digest of the patent is given, the constructional details are not clear. It is of interest to note that a somewhat similar device appears to be fitted to the Soviet Lagg 3 Fighter (see R.T.P. Translation No. 1822).)

*Vision, Hearing and Aeronautical Design.* (L. D. Carson, W. R. Miles and S. S. Stevens, J. Aeron. Sc., Vol. 10, No. 4, April, 1943, pp. 127-130.) (113/5 U.S.A.)

VISION.

It is desirable that pilots, observers and engineers should be placed as near as possible to the aircraft windows. This not only increases the angle of vision, but it is also generally easier to provide the requisite transparent area free from opaque accessories. At the same time, blemishes or scratches in the window, being out of focus, are less bothersome. For this reason turrets in which the guns are mounted at the side and rather low down are preferable to the orthodox type in which the gunner is placed behind the gun. In the latter case, it is difficult to reduce the distance between eye and window (aiming panel) below 29 inches (9 inches from eye to gunsight and 20 inches between sight and aiming panel). The field of vision in this case is only about 28° (tunnel vision) and may possibly be obstructed moreover by the gun structure and window frames. With lateral guns a much closer position to the front panel should generally be possible for the gunner.

Special attention should be paid to the instrument lighting, especially at night. Excessive illumination has serious effects on the eye adaptation for night vision. For this reason the illuminated area should be restricted to the utmost and only red light used (600 $\mu\mu$). It is well known that the tendency to air sickness is reduced, if visual contact with the ground can be maintained.

Many troop carrying gliders suffer from this defect with the result that the fighting efficiency of the men after landing may be seriously affected.

HEARING.

Both propeller slipstream and engine noise depend on the horse-power, and with the larger power plants now coming into general use, the noise problem becomes serious.

Even if the engine and propeller could be silenced, the noise associated with the turbulent air stream passing over the fuselage is very considerable. Thus it is almost impossible to hold a conversation inside a glider towed at 150 m.p.h., the noise level being of the order of 115 decibel.

The most important practical effect of aircraft noise is the masking of communications. Articulation tests have shown that with standard military interphone equipment a listener is only able to understand about 50 per cent. of the spoken words in the presence of a background noise of 120 db. Matters can be improved by the provision of absorbent material which, although not reducing the overall noise level appreciably, does cut down the harmful high frequency components and facilitate conversation. Another remedy consists in improving the response characteristic of the microphone and earphone (high fidelity) and in shielding these instruments as far as possible from extraneous sounds.

The oxygen mask provides facilities for microphone shielding which is still often neglected. The earphone and the ear of the listener can be shielded by means of an acoustic socket forming a tight seal against the side of the head.

Both seeing and hearing, if accompanied by prolonged attentive effort, causes fatigue and loss of efficiency of the crew. Elaborate precautions are taken to ensure the proper function of the aircraft mechanism under modern arduous condition of operation. The authors make a plea that at least equal attention be paid to the physiological requirements of the flying personnel.

*True Air Speed Indicator.* (R. D. Gibson, U.S.A. Patent No. 2, 318,153.) (113/6 U.S.A.)

The normal air speed indicator measures the velocity head $\frac{1}{2}\rho V^2$ and its indications therefore depend on the density $\rho$ as well as on the relative air speed $V$.

If such an instrument has been calibrated under standard ground level conditions ($p=760$ mm., $T=288°$ $C_A$), the true air speed at pressure $p$ and temperature $T$ is obtained by multiplying the indicated air speed by the factor

$$\sqrt{760/p} \times \sqrt{T/288} \quad . \quad . \quad . \quad . \quad .. \quad (1)$$

The invention of the author consists in applying this correction automatically by means of an electrical circuit, the true air speed being recorded on a special type of watt meter.

For this purpose the normal air speed indicator controls a rheostat ($R1$) in series with the fixed coil (3) of the watt meter and a battery. Coil (3) is of low resistance compared with the rheostat, so that the current passing through this circuit is determined mainly by the position of the variable contact on the rheostat.

It is convenient to design the rheostat and linkage mechanism such that the current $C_3$ through coil (3) is directly proportional to the indicated air speed. The necessary linkage mechanism is not described, but reference is made to known designs which could be utilised for the purpose (U.S.A. Patents 2,178,422 and 2,137,194 are quoted as examples).

The moving coil (4) of the watt meter is shunted with a second rheostat ($R2$) controlled by the barometric pressure (altimeter) and connected in series with a third rheostat ($R3$) similarly controlled by an air temperature meter. The whole circuit is fed by the same battery already supplying the fixed coil (4). The resistance of ($R2$) is relatively low compared with ($R3$) and (4) and varies inversely as the square root of the pressure. (U.S.A. Patent No. 2,251,498 is quoted as an example for producing the necessary linkage.)

Rheostat ($R3$) has a relatively high resistance and therefore controls the total current $C_1$ flowing through the circuit containing ($R2$) and (4) in parallel.

($R3$) is controlled by a temperature indicator in such a way that the total current $C_1$ varies directly as the square root of the absolute temperature.

We thus have

$$R_2=K_2\sqrt{760/\rho}$$
$$C_1=K_3\sqrt{T/288}$$

Since ($R2$) is small compared with (4), nearly all the current $C_1$ passes through $R2$, producing a voltage drop $C_1R_2$, which corresponds to the voltage applied to the moving coil.

The current $C_2$ passing through the moving coil is therefore given by

$$C_2=K_4C_1R_2=K_5\sqrt{760/\rho} \; . \; \sqrt{T/288}$$

The indication of the watt meter is the product $C_2C_3$ and corresponds therefore to

$$K\sqrt{760/\rho} \times \sqrt{T/288} \times \text{indicated air speed.}$$

The density correction required by equation (1) above has thus been incorporated automatically in the watt meter reading, the scale of which gives true air speed.

*A Method for Rapid Estimation of Helicopter Performance.* (Q. Wald, J. Aeronautical Sciences, Vol. 10, No. 4, April, 1943, pp. 131-135.) (113/7 U.S.A.)

Several papers are available which treat the analysis of rotating wing aircraft with considerable rigour and completeness. While these treatments are satisfactory for exhaustive analyses of specific helicopters, they are exceedingly complex. Since simple methods of performance estimation are available for aeroplanes, it is believed that a comparable system for helicopters should prove useful for comparative performance studies, preliminary estimation of characteristics of proposed designs, and determination of the effects of small changes in design. Frequently, only limited data are available for studies of this type, making elaborate analyses impossible or undesirable. The present report proposes a system of performance estimation which, it is hoped, will fulfil the need. The method is relatively simple and rapid.

The method is based on the conception of the rotor as an actuator disc and the well-known momentum relations for an actuator disc. All of the major variables in design and operation are taken into account. Comparisons have indicated that the results obtained by this system are good approximations to the results of more elaborate analysis.

*A Tabular Method of Propeller Blade Stress Analysis.* (Joseph Stuart, Journal of the Aeronautical Sciences, Vol. 10, No. 4, April, 1943, pp. 115-118.) (113/8 U.S.A.)

A tabular, trial-and-error method of evaluating the steady bending stresses in a rotating propeller blade is developed and examples of the application are given. The bending moment at a shank section of the blade is estimated and, by tabular integration, the corresponding radial bending moment distribution is calculated. Additional trials with appropriately revised shank section bending moment estimates are made until the correct distribution is found, having the physically required moment value of zero at the blade tip.

Tilted blades and blades whose section centres of gravity do not in general fall on the blade axis are shown to be readily analysed. Because the final analysis can be quickly checked on a calculating machine and because the method is easily learned, versatile and fast, its general adoption by the propeller industry is advocated.

*General Equations for the Analysis of Elliptical Rings.* (D. O. Dommasch, J. Aeronautical Sciences, Vol. 10, No. 4, April, 1943, pp. 119-126.) (113/9 U.S.A.)

The analysis of bulkhead rings is at best a tedious process, and it is felt that any simplifications will be of help to the aircraft structural engineer.

Of the several methods of analysis available, that outlined in N.A.C.A. Technical Report No. 509 (1934) seems to be the simplest and most widely used. This paper is based on the general method of the N.A.C.A. report and presents, in particular, the application of the report to elliptical and circular frames. In addition, some general simplifications based on symmetry and load conditions are presented.

No attempt has been made to break down the analysis into a number of specific solutions, but rather simplifications of the basic equations are presented which apply to any loading condition.

A set of curves is presented at the end of this article from which the length, moment of length, and moment of inertia of the length of an ellipse may be determined.

*General Instability of Monocoque Cylinders.* (N. S. Hoff, J. Aeron. Science, Vol. 10, No. 4, April, 1943, pp. 105-114, 130.) (113/10 U.S.A.)

General instability is defined as the simultaneous buckling of the longitudinal and transverse reinforcing elements of a monocoque structure. There are several types of instability satisfying this definition which differ markedly in the distortion pattern and value of the critical load.

Types already described in literature include:—

1. *Flattening in Compression.*—In this case the original circular rings distort to ellipses and the originally straight stringers to sine curves of one or more half wave lengths.

2. *Diamond Pattern in Compression.*—The deflections are sinusoidal in both the longitudinal and circumferential directions and usually consist of several half waves in either direction.

(Type 1 is a special case of the diamond pattern when there are four half waves in the circumferential direction.)

3. *Flattening in Bending.*—The structure undergoes considerable elastic deformation under a pure bending moment and collapses suddenly when the flattening exceeds a certain value.

4. *Inward Bulge in Bending.*—The bulge develops symmetrically to the most highly stressed fibres in compression, the tension side of the structure remaining smooth.

Of the above types No. 1 and 3 are of like practical interest to the aircraft designer since they entail a stringer-ring-skin combination not likely to occur in practice.

The buckling load of the diamond pattern (type 2) of general instability has been calculated by a number of authors, the actual monocoque being replaced by an equivalent orthotropic shell possessing suitable bending rigidity distributed in the longitudinal and circumferential directions. Agreement with practice is reasonably good, provided experimental values for the stiffness are included.

Many attempts have been made to apply such buckling formulæ to the calculation of the critical stress under bending, it being assumed that this stress must be substantially the same as that in compression if the wave formation occurs only in close proximity of the most highly stressed compression fibre.

Agreement with practice is, however, very poor, the experimental critical stress being always considerably lower and reaching in some cases only 1/10 of the predicted value.

The author suggests that this is mainly due to the diamond type of distortion (on which the theory is based) not being retained when bending takes place. For this reason, a type of distortion known to occur in certain cases of bending (inward bulge, type 4) is investigated theoretically, the buckling load being calculated by the Rayleigh-Ritz-Timoshenko method, the strain energy stored in the sheet being first neglected. Although in some cases the experimental buckling load was in fair agreement with the theoretical prediction, in others the calculated values were less than 1/9 of the practical critical load.

In the present paper, the author revises his original theory to allow for the effect of the covering sheet. A simple formula is derived, which, although it is based on a series of assumptions gives reasonable agreement with practice provided experimental values for the wave form of the buckle (inward bulge) are available.

Instructions for carrying out the necessary calculations are given in detail.

*Mobile Unit for the Periodic Cleansing of the Lubricating System of Machine Tools.* (Flugsport, Vol. 35, No. 9, 19/5/43, pp. 111-112.) (113/11 Germany.)

Modern machine tools are provided with two lubricating systems, one of which supplies lubricating oil to the gears and bearings whilst the other handles the cooling oil supplied to the tool.

In the past such machines were lubricated by the operator in a rather haphazard manner and insufficient attention was paid to the removal of oil sludge. This sludge contains minute particles of metal which in course of time cause serious troubles in the bearings and gears.

It is now recognised that the proper maintenance of such tools should be in the hands of a special staff and in order to facilitate this, the Junkers firm have designed a special mobile unit containing all the necessary tools as well as supplies of fresh oils. Of special interest is an electrically heated tank of cleansing fluid which can be pumped through the oil tanks and supply pipes of the machine tool to ensure the complete removal of sludge and dirt prior to refilling with new oil.

Needless to say, the old oil is also drawn off by a pump carried on the unit and the supplies collected in this manner are subsequently regenerated. By having all the pump circuits integral with the unit, the cleansing operation can be carried out very quickly and the truck dimensions are such that mobility in the shop is ensured.

*Plexiglass—Properties and Fabrication.* (Reference Sheet No. 7-8, Flugsport, Vol. 35, No. 9, 19/5/43, pp. 112a-b.) (113/12 Germany.)

Plexiglass is a thermoplastic of the acryl resin class and is available in plate form in a series of standard sizes ranging in thickness from 1 mm. to 8 mm. and in superficial area from 600 × 400 mm. to 1,600 × 1,100 mm.

The following table gives some of the physical constants:—

| | | |
|---|---|---|
| Density ... | 1.19 | |
| *E* ... | 30,000 | |
| Ultimate tensile +40°C. ... | > 450 | kg./cm.² |
| +20°C. ... | > 600 | ,, |
| −40°C. ... | > 850 | ,, |
| −70°C. ... | > 1,000 | ,, |
| Extension ... | > 2.5% | |
| Creep strength ... | 300 | kg./cm.² |
| Crushing strength ... | 1,200 | ,, |
| Bending strength ... | 1,000 | ,, |
| Impact strength | | |
| Plane +20°C. ... | > 15 | cm. kg./cm² |
| Notched +20°C. ... | > 1.5 | ,, |
| Plane −60°C. ... | > 15 | ,, |
| Notched −60°C. ... | > 1.5 | ,, |
| *Coefficient of thermal expansion* ... | $82 \times 10^{-6}$ | |

Both creep and notch sensitivity must be considered when designing stressed parts. Attention must also be given to the possibility of stress-corrosion in the presence of organic solvents such as petrol and turpentine.

Single directions for cutting, milling, turning, boring and polishing the material are given. All the ordinary machine tools are suitable for these processes, especially those employed in wood working. Care must be taken to prevent overheating the materials and the worked surface must be cooled with water, compressed air or a non-lubricating cutting fluid.

Since no amount of subsequent polishing can replace the surface produced by the makers, it is essential that a suitable cover of paper or paste be provided for those parts not in contact with the tool.

Plexiglass can be easily moulded, either by laying the sheet (previously softened by warming to 120-150°C.) over a former and pulling down the edges or by blowing. The latter process gives the better optical surface.

The very high coefficient of thermal expansion of plexiglass (over three times that of aluminium) calls for special care in the installation. It is essential that stresses be avoided as they may lead to corrosion cracks which are detrimental to clear vision. On account of the high notch sensitivity, care must be taken to avoid all sharp corners. The usual procedure is to recess the glass slightly along the edge and grip it between two metal plates (above and below) fitted with rubber pads which are tightened by means of a screw passing through a well rounded slot in the glass. Sufficient space must be left between the edge of the recess and the metal plates to allow for expansion.

*The Ju. 87 Equipped for Medical Flight Research.* (H. V. Diningshofen, Flugsport, Vol. 35, No. 9, 19/5/43, pp. 108-111.) (113/13 Germany.)

The experiments were concerned mainly with the effects of acceleration on the human organism and covered more than 200 flights, the author, who is a well known doctor, acting as pilot throughout.

By flying tight spirals during a dive it is easy to obtain centrifugal acceleration of the order of 8 g. for periods up to 5 seconds. Under these conditions the airspeed of the Ju. 87 does not exceed 200 m.p.h. and the control forces are relatively low. There is also a complete absence of vibration and the author is enthusiastic about the ease of handling of the particular aircraft, making it admirably suited for the investigation in hand.

For the experiments, the Ju. 87 carried two passengers, test subject and observer. The former is normally seated in an upright position, facing the direction of flight. The observer faces him, with his back to the direction of flight. A Siemens hot cathode X-ray apparatus (fed from an accumulator battery through a special transformer) is placed immediately behind the test subject, who carries a fluorescent screen strapped to his chest. In this manner the observer can examine the variation in blood content of the heart and lungs of the test subject during various manœuvres. The X-ray set is sufficiently powerful to enable photographic reproduction at the relatively short exposure time of 1.5 seconds.

The facial expression of the test subject is recorded independently on a cine film.

About 200 test flights covering 22 different subjects were carried out, the highest acceleration being 8.5 g. for 3 seconds.

It is interesting to note that by adopting a crouching attitude, both pilot and observer withstood this acceleration without disturbance of vision.

In the upright position and completely relaxed, all the test subjects could withstand 4 g. for a period of 5 seconds without any ill effects.

The following table gives the acceleration limits on a percentage basis:—

| % of Subjects. | Misty Sight. | Blackout. | Collapse. |
|---|---|---|---|
| 80 | 5 g. | 5.5 g. | 6 g. |
| 50 | 6 g. | 6.75 g. | 7.5 g. |
| 20 | 6.5 g. | 7.5 g. | 8.0 g. |

Provided the acceleration has not lasted longer than 5 seconds, the subject recovers consciousness within 2-3 seconds after acceleration has been reduced below 3 g.

The disturbance level can be raised about 2 g. if the subjects adopts a crouching attitude with full muscular contraction. About two-thirds of the subjects tested were capable to withstand acceleration of the order of 8-9 g. by this means, without any disturbance of vision for periods up to 5 seconds.

Much higher limits are made possible if a prone position is adopted. Centrifugal tests have shown that under these conditions up to 15 g. can be withstood for 2 minutes, although breathing became very difficult.

The X-ray photographs show that the so-called acceleration collapse in its most severe and dangerous form is due to a complete failure of the blood circulation. Under the action of the centrifugal force, the blood is drained away from the heart and accumulates in the lower blood vessels, especially the legs. When this accumulation exceeds a certain amount the heart delivery ceases and the lungs are no longer fed with blood. For the relatively short exposure times and limited g. values occurring in aerial combat, however, this complete failure of the heart pumping only occurs rarely. In the majority of cases, the main blood circulation is maintained. The rate of blood supply to the eyes and brain is however insufficient to maintain proper functioning. Under these conditions, collapse occurs although the X-rays show that both heart and lungs are still filled with blood. By adopting a crouching attitude, the work required to raise the blood to the brain is reduced and a minimum supply can be maintained for a short period.

Considering that already at 7 g., the blood has a density corresponding to that of liquid iron, the difficulties of maintaining even a minimum blood circulation for any length of time can be realised.

It is interesting to note that with lack of oxygen (imminent altitude sickness) the resistance to acceleration drops rapidly and collapse may occur in 2-3 seconds at 3 g.

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## LIST OF SELECTED TRANSLATIONS.

No. 56.

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Lists of selected translations have appeared in this publication since September, 1938.

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### Theory and Practice of Warfare.

*Training and General Strategy.*

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| 1 | 9828 | U.S.A. ... | *Office of War Information on U.S. Aircraft.* (R. H. Wood, Am. Av., Vol. 6, No. 11, 1/11/42, pp. 1 and 16.) |
| 2 | 9877 | U.S.A. ... | *Popular Names of the U.S. Military Aircraft.* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 20.) |
| 3 | 9887 | U.S.A. ... | *The Master Weapon—The Aeroplane Sets the Pace in Modern Tactics.* (J. F. C. Fuller, Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942.) |
| 4 | 9890 | U.S.A. ... | *Attack on Japan.* (H. Nickerson, Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, pp. 283-286.) |
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| 7 | 10149 | Africa ... | *Africa as an Air Base.* (N. Macmillan, Aeronautics, Vol. 8, No. 2, March, 1943, pp. 28-32.) |
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| 17 | 10468 | G.B. ... ... | *Hurricanes as Tank Busters.* (Inter. Avia., No. 862, 27/3/43, p. 21.) |
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| 23 | 9813 | U.S.A. ... | *Portable Metal Runway Laid by Royal Engineers on N. African Airfield (Photo).* (Am. Av., Vol. 6, No. 19, 1/3/43, p. 22.) |
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| 69 | 10062 | U.S.A. | ... | *Curtiss Dive Bombers* (14 *Years of Development*). (Curtiss Flyleaf, Vol. 25, No. 4, Sept.-Oct., 1942, pp. 10-13.) |
| 70 | 10076 | U.S.A. | ... | *The "Sentinel" for Army Co-operative Work* (*Photograph*) (*Built by the Vultee Aircraft Inc.*). (Mech. Eng., Vol. 65, No. 1, Jan., 1943, p. 51.) |
| 71 | 10078 | U.S.A. | ... | *Curtiss S.B. 2 C-1—Helldiver* (*Photograph*). (Curtiss Flyleaf, Vol. 25, No. 5, Nov.-Dec., 1942, p. 6.) |
| 72 | 10081 | U.S.A. | ... | *Curtiss Wright Aircraft*, 1943 (*Photograph*). (Curtiss Flyleaf, Vol. 25, No. 5, Nov.-Dec., 1942, pp. 16-17.) |
| 73 | 10148 | U.S.A. | ... | *Vought-Sikorsky Helicopter* (*with Pontoons, Photograph*). (Aeronautics, Vol. 8, No. 2, March, 1943, p. 73.) |
| 74 | 10154 | U.S.A. | ... | *Lockheed Vega Ventura.* (Aeronautics, Vol. 8, No. 2, March, 1943, pp. 48-49.) |
| 75 | 10227 | U.S.A. | ... | *Thunderbolt Fighter Aircraft.* (Engineer, Vol. 175, No. 4,557, 14/5/43, p. 398.) |
| 76 | 10251 | Mexico | ... | *Mexican Plastic Plywood Light Plane "Tezinthan"* (*Photograph*). (Aero Digest, Vol. 42, No. 3, March, 1943, p. 118.) |
| 77 | 10262 | U.S.A. | ... | *The Bell "Airacobra"* (*Including Sketches of Wing Panel, etc.*). (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 256-257.) |
| 78 | 10305 | U.S.A. | ... | *High Wing Curtiss O-52* (*Photograph*). (Flying, Vol. 32, No. 3, March, 1943, p. 46.) |
| 79 | 10307 | U.S.A. | ... | *Boeing P.T.* 17 (*Stearman*) *Trainer* (*Photograph*). (Flying, Vol. 32, No. 3, March, 1943, p. 48.) |
| 80 | 10309 | U.S.A. | ... | *North American "Mustang"* (*P.S.* 1) (*Photograph*). (Flying, Vol. 32, No. 3, March, 1943, p. 50.) |
| 81 | 10310 | U.S.A. | ... | *Curtiss "Helldiver"* (*S.B.2C.*) (*Silhouette*). (Flying, Vol. 32, No. 3, March, 1943, p. 50.) |
| 82 | 10314 | U.S.A. | ... | *The Lockheed "Hudson" Trainer AT-18* (*Photograph*). (Flying, Vol. 32, No. 3, March, 1943, p. 60.) |
| 83 | 10315 | U.S.A. | ... | *Vultee Vengeance* (*A-31*) *Dive Bomber* (*Photograph*). (Flying, Vol. 32, No. 3, March, 1943, p. 61.) |
| 84 | 10328 | U.S.A. | ... | *North American B-25 Bomber* (*Photo*). (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 92.) |
| 85 | 10338 | U.S.A. | ... | *Stimson-Vega "Sentinel" and "Reliant"* (*Liaison and Trainer*) (*Photo*). (Canadian Aviation, Vol. 15, No. 12, Dec., 1942, p. 160.) |
| 86 | 10341 | U.S.A. | ... | *Twin-Engine Planes to Train Bomber Crews, AT Series* (*Silhouettes*). (Aviation, Vol. 41, No. 11, Nov., 1942, p. 100.) |
| 87 | 10366 | U.S.A. | ... | *Vought-Sikorsky F4U Corsair* (*Photograph*). (Aviation, Vol. 41, No. 11, Nov., 1942, p. 189.) |
| 88 | 10379 | U.S.A. | ... | *American Aircraft and Their Combat Performance.* (Aviation, Vol. 41, No. 11, Nov., 1942, pp. 92-93 and 275-276.) |
| 89 | 10404 | U.S.A. | ... | *Sikorsky Helicopter* (*Photograph*). (Autom. Ind., Vol. 88, No. 5, 1/3/43, p. 42.) |

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| 90 | 10418 | U.S.A. ... | *Plywood Primary Trainers for Army, Ryan P.T.-25.* (Autom. Ind., Vol. 88, No. 1, 1/1/43, pp. 24-25 and 54.) |
| 91 | 10457 | U.S.A. ... | *Boeing 17E and 17F (Fortress II).* (Inter. Avia., No. 862, 27/3/43, pp. 14-15.) |
| 92 | 10459 | U.S.A. ... | *New Version of Douglas DB-7 (Havoc and Boston).* (Inter. Avia., No. 862, 27/3/43, pp. 15-16.) |
| 93 | 10460 | U.S.A. ... | *Bell P-39 Airacobra.* (Inter. Avia., No. 862, 27/3/43, p. 17.) |
| 94 | 10462 | U.S.A. ... | *Martin 167 Maryland Light Bomber.* (Inter. Avia., No. 862, 27/3/43, p. 16.) |
| 95 | 10463 | U.S.A. ... | *Curtiss Helldiver.* (Inter. Avia., No. 862, 27/3/43, pp. I and 16.) |
| 96 | 10464 | U.S.A. ... | *Vultee Vengeance Dive Bomber.* (Inter. Avia., No. 862, 27/3/43, p. 16.) |
| 97 | 10471 | U.S.A. ... | *Boeing A.T.-15 Advanced Trainer.* (Inter. Avia., No. 862, 27/3/43, p. I.) |
| 98 | 10474 | U.S.A. ... | *Noordwyn U.C.-64 (Photograph).* (American Aviation, Vol. 6, No. 21, p. 52.) |
| 99 | 10562 | U.S.A. ... | *Curtiss A-25 U.S. Army Dive Bomber (Photo).* (U.S. Air Services, Vol. 28, No. 2, Feb., 1943, p. 36.) |
| 100 | 10589 | U.S.A. ... | *Lockheed Lightnings (P-38) in Africa.* (W. J. Hoelle, Flying, Vol. 32, No. 5, May, 1943, pp. 24-25 and 136.) |
| 101 | 10597 | U.S.A./ Germany ... | *North American Mustang, Focke-Wulf 190 and Me. 109 (Silhouettes).* (Flying, Vol. 32, No. 5, May, 1943, p. 67.) |
| 102 | 10598 | U.S.A. and G.B.. ... | *Curtiss "Warhawk" and Avro Lancaster (Silhouettes).* (Flying, Vol. 32, No. 5, May, 1943, p. 68.) |
| 103 | 9806 | U.S.A. ... | *Fairchild Plywood Advanced Trainer.* (Canadian Aviation, Vol. 16, No. 1, Jan., 1943, p. 104.) |
| 104 | 9811 | U.S.A. ... | *Curtiss A-25 Army "Helldiver" (Photo).* (Am. Av., Vol. 6, No. 19, 1/3/43, p. 46.) |
| 105 | 9812 | U.S.A. ... | *Vought-Sikorsky Helicopter V.S.-300.* (Am. Av., Vol. 6, No. 19, 1/3/43, p. 44.) |
| 106 | 9821 | U.S.A. ... | *Inspecting Liberator (B-24) Heavy Bombers.* (Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 40-41.) |
| 107 | 9826 | U.S.A. ... | *The Consolidated C-87 (Photograph).* (Autom. Ind., Vol. 88, No. 2, 15/1/43, p. 48.) |
| 108 | 9829 | U.S.A. ... | *Flying Fortress (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 8.) |
| 109 | 9831 | U.S.A. ... | *North American P-51 "Mustang" (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 13.) |
| 110 | 9833 | U.S.A. ... | *Martin B-26 (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 16.) |
| 111 | 9847 | U.S.A. ... | *Ryan Plywood Trainer (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 48.) |
| 112 | 9857 | U.S.A. ... | *New R.A.F. Types—The Martin Maryland, Martin Marauder, Martin Baltimore.* (Airc. Eng., Vol. 15, No. 170, April, 1943, pp. 103-105 and 114.) |
| 113 | 9883 | U.S.A. ... | *Grumman T.B.F.-1 Avenger (Photograph).* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 80.) |

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| 114 | 9894 | U.S.A. ... | *American Maryland Bomber in Egypt (Photo).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, p. 302.) |
| 115 | 9974 | U.S.A. ... | *Stimson L-S Vultee's Liaison Plane (Photograph).* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 19.) |
| 116 | 9978 | U.S.A. ... | *Curtiss-Wright's Scout Observation Plane SO3 C-1, The Seamew (Photograph).* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 27.) |
| 117 | 9989 | U.S.A. ... | *P-47 Thunderbolt (Photograph).* (Commercial Aviation, Vol. 4, No. 12, Dec., 1942, p. 86.) |
| 118 | 9991 | U.S.A. ... | *New Canso (Catalina) (Photograph).* (Commercial Aviation, Vol. 4, No. 12, Dec., 1942, p. 90.) |
| 119 | 9993 | U.S.A. ... | *Fairchild Plywood Trainer.* (Commercial Aviation, Vol. 4, No. 12, Dec., 1942, p. 102.) |
| | | | *Military Types Aircraft (Germany).* |
| 120 | 9832 | Germany ... | *German Focke-Wulf 190 (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 13.) |
| 121 | 9938 | Germany ... | *Messerschmitt 110, Details of Germany's Mass Produced Fighter.* (J. E. Thompson, Paper Presented by the S.A.W.E.). |
| 122 | 10147 | Germany & U.S.S.R. ... | *New German and Russian Aircraft on Russian Front Me. 115 and Heinkel 117.* (Aeronautics, Vol. 8, No. 2, March, 1943, p. 73.) |
| 123 | 10265 | Germany ... | *The Messerschmitt 210 A-1.* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 267-268, 389-399.) |
| 124 | 10312 | Germany ... | *Focke-Wulf F.W. 189 (Silhouette).* (Flying, Vol. 32, No. 3, March, 1943, p. 51.) |
| 125 | 10377 | Germany ... | *New Allied and Axis Planes.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 261.) |
| 126 | 10453 | Germany ... | *Messerschmitt Me. 210 Long Range Fighter.* (Inter. Avia., No. 862, 27/3/43, pp. 8-9.) |
| 127 | 10553 | Germany ... | *New German Aircraft.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 35.) |
| 128 | 10573 | Germany ... | *Me. 109 and Me. 110 (Sectional Drawings).* (Motor Schau., Vol. 7, No. 3, March, 1943, pp. 108-109.) |
| 129 | 10592 | Germany ... | *Messerschmitt Me. 201 A1 (Drawing).* (Flying, Vol. 32, No. 5, May, 1943, p. 45.) |
| 130 | 10603 | Germany ... | *Junkers Ju. 90.* (Flying, Vol. 32, No. 5, May, 1943, p. 80.) |
| | | | *Military Types Aircraft (Japan).* |
| 131 | 9830 | Japan ... | *Japanese OO Fighter (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 10.) |
| 132 | 9896 | Germany and Japan ... | *Characteristics of Enemy Aircraft (German and Japanese).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, pp. 321-322.) |
| 133 | 10308 | Japan ... | *Mitsubishi Zero (Revised Photograph).* (Flying, Vol. 32, No. 3, March, 1943, p. 49.) |
| | | | *Military Types Aircraft (Italy).* |
| 134 | 10084 | Italy ... ... | *Piaggio P. 108 Long Range Bomber (Photo).* (Luftwissen, Vol. 10, No. 3, March, 1943, p. 68.) |

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| | | | | *Troop Transport and Ambulance Planes.* |
| 135 | 9816 | U.S.A. | ... | *Curtiss Caravan C. 76 Transport.* (Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 26-27.) |
| 136 | 9865 | U.S.A. | ... | *Lockheed Constellation (Photograph)* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 21.) |
| 137 | 9876 | U.S.A. | ... | *The New Lockheed Constellation Four-Engined Transport C-69.* (Am. Av., Vol. 6, No. 16, 15/1/43, pp. 15 and 23.) |
| 138 | 9878 | G.B. .... | ... | *Hydroplane Used by the R.A.F. for Rescue Work (Photograph).* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 26.) |
| 139 | 10060 | U.S.A. | ... | *Curtiss Caravan Transport.* (Curtiss Flyleaf, Vol. 25, No. 4, Sept.-Oct., 1942, pp. 3-7.) |
| 140 | 10080 | U.S.A. | ... | *Curtiss Commando Twin-Engine Transport (Photograph of Spacious Fuselage).* (Curtiss Flyleaf, Vol. 25, No. 5, Nov.-Dec., 1942, pp. 8-10.) |
| 141 | 10082 | U.S.A. | ... | *Curtiss Caravan C-76 Wooden Cargo Transport.* (Curtiss Flyleaf, Vol. 25, No. 5, Nov.-Dec., 1942, pp. 18-19.) |
| 142 | 10249 | U.S.A. | ... | *Douglas "Sky Train" Military Transport (Photograph).* (Aero Digest, Vol. 42, No. 3, March, 1943, p. 113.) |
| 143 | 10300 | U.S.A. | ... | *Lockheed Constellation.* (P. Pierce, Flying, Vol. 32, No. 3, March, 1943, pp. 35 and 126.) |
| 144 | 10330 | U.S.A. | ... | *Consolidated C-87 Army Transport (Photo).* (Canadian Av., Vol. 15, No. 12, Dec. 12, p. 164.) |
| 145 | 10405 | U.S.A. | ... | *Consolidated P4Y-1 Flying Boat (Model 31) (Photograph).* (Autom. Ind., Vol. 88, No. 5, 1/3/43, p. 43.) |
| 146 | 10423 | U.S.A. | ... | *Air Ambulance for Navy Fliers (Piper) (Photograph).* (Autom. Ind., Vol. 88, No. 1, 1/1/43, p. 50.) |
| 147 | 10458 | U.S.A. | ... | *Consolidated 31 Flying Boat (Military Version).* (Inter. Avia., No. 862, 27/3/43, pp. I and 15.) |
| 148 | 10461 | U.S.A. | ... | *Douglas Transports (C47, C53, C54).* (Inter. Avia., No. 862, 27/3/43, p. 16.) |
| 149 | 10469 | G.B. ... | ... | *Armstrong Whitworth Ensign (Transport Plane).* (Inter. Avia., No. 862, 27/3/43, p. 28.) |
| 150 | 10470 | Germany | ... | *Messerschmitt Me. 323 Transport (Photo).* (Inter. Avia., No. 862, 27/3/43, p. I.) |
| 151 | 10556 | U.S.A. | ... | *America's Biggest Transport Plane the "Constellation" (Photo).* (U.S. Air Services, Vol. 28, No. 2, Feb., 1943, pp. 16-17 and 44.) |
| 152 | 10561 | U.S.A. | ... | *Curtiss "Caravan" All Wood Transport (Photo).* (U.S. Air Services, Vol. 28, No. 2, Feb., 1943, p. 40.) |
| | | | | *Gliders.* |
| 153 | 9781 | U.S.A. | ... | *Waco Troop-Carrying Glider (Photo).* (Autom. Ind., Vol. 87, No. 5, 1/9/42, p. 52.) |
| 154 | 9782 | U.S.A. | ... | *The C.G. 4a 15-Seater Glider Used by Army Air Forces (Photograph).* (Autom. Ind., Vol. 87, No. 5, 1/9/42, p. 58.) |

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| 155 | 9866 | U.S.A. | ... | *Waco C.G.-4 Glider Inloading Jeep (Photograph).* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 28.) |
| 156 | 10074 | U.S.A. | ... | *Cargo Glider Pick-Up.* (R. C. du Pont, Mech. Eng., Vol. 65, No. 1, Jan., 1943, pp. 35-39.) |
| 157 | 10145 | France | ... | *French Glider S.O.P.-1.* (Aeronautics, Vol. 8, No. 2, March, 1943, p. 59.) |
| 158 | 10278 | U.S.A. | ... | *The New Boeing Glider C.G.-4 (Photograph).* (U.S. Air Services, Vol. 27, No. 12, Dec., 1942, p. 17.) |
| 159 | 10465 | U.S.A. | ... | *Seaworthy Troop-Carrying Glider Bristol XLQ-1.* (Inter. Avia., No. 862, 27/3/43, pp. I and 17.) |
| 160 | 10472 | U.S.A. | ... | *U.S. Navy's Seaplane Glider XLRQ-1.* (American Aviation, Vol. 6, No. 21, 1/4/43, p. 16.) |
| 161 | 10557 | U.S.A. | ... | *The Glider in War and Peace.* (R. S. Findley, U.S. Air Services, Vol. 28, No. 2, Feb., 1943, pp. 24 and 44.) |
| | | | | *Fleet Air Arm.* |
| 162 | 9804 | G.B. ... | ... | *" Seafire " Taking-off from Aircraft Carrier (Photo).* (Canadian Aviation, Vol. 16, No. 1, Jan., 1943, p. 64.) |
| 163 | 9867 | U.S.A. | ... | *Naval Air Transport Service.* (Am. Av., Vol. 6, No. 17, 1/2/43, pp. 18 and 28.) |
| 164 | 9893 | U.S.A. | ... | *Wings for the Navy (Photographs of Representative American Naval Aircraft).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, pp. 293-300.) |
| 165 | 10079 | U.S.A. | ... | *Curtiss S.O. 3 C-1 Seagull (Photograph).* (Curtiss Flyleaf, Vol. 25, No. 5, Nov.-Dec., 1942, p. 6.) |
| 166 | 10260 | U.S.A. | ... | *Curtiss " Seagull " (S.O. 3 C-1) Scout Observation Plane for Fleet Air Arm (Photograph).* (Aero Digest, Vol. 42, No. 3, March, 1943, p. 242.) |
| 167 | 10279 | U.S.A. | ... | *The Brewster Navy " Buccaneer " (Photograph).* (U.S. Air Services, Vol. 27, No. 12, Dec., 1942, p. 32.) |
| 168 | 10304 | U.S.A. | ... | *U.S. Aircraft Carriers.* (F. Tupper, Flying, Vol. 32, No. 3, March, 1943, pp. 42-44 and 139.) |
| 169 | 10367 | U.S.A. | ... | *U.S. Navy K Type Blimp for Naval Coastal Patrol.* (E. H. Forbes, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 197-199.) |
| 170 | 10373 | U.S.A. | ... | *S.O.R.-1Combat Plane for U.S. Navy (Ryan).* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 251.) |
| 171 | 10564 | Germany | ... | *Early Types of German U Boats.* (Motor Schau., Vol. 7, No. 2, Feb., 1943, pp. 46-48.) |
| 172 | 10590 | Canada | ... | *Aircraft Carriers.* (B. Gruenwald, Flying, Vol. 32, No. 5, May, 1943, pp. 39-41.) |
| 173 | 10601 | U.S.A. | ... | *Naval Version of Vega " Ventura " (PV-1).* (Flying, Vol. 32, No. 5, May, 1943, p. 71.) |
| | | | | *A.R.P. and A.A.* |
| 174 | 9886 | U.S.A. | | *105 mm. Howitzer on Self-Propelled Armoured Mount (Photo).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, p. 265.) |
| 175 | 9892 | U.S.A. | ... | *Air Raid Defence.* (G. J. B. Fisher, Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, pp. 290-292.) |

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| 176 | 9897 | U.S.A. | ... | *Dustproof Cover for 40 mm. Anti-Aircraft Gun (Photo).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, p. 317.) |
| 177 | 9898 | U.S.A. | ... | *Covers for 155 mm. and 105 mm. Howitzers (Photo).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, pp. 318-319.) |
| 178 | 10236 | G.B. ... | ... | *A Method of Demonstrating the Identification of War Gases.* (H. W. Keenan and R. S. Law, Chem. and Industry, Vol. 62, No. 20, 15/5/43, pp. 182-184.) |
| 179 | 10244 | U.S.A. | ... | *Protection of Civilians from Vesicant Agents.* (T. F. Bradley and others, Ind. Eng. and Chem. (News Ed.), Vol. 21, No. 6, March, 1943, pp. 373-375.) |
| 180 | 10331 | Canada | ... | *Canada's Aircraft Detection Corps (Spotters).* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 164.) |

## Aero and Hydrodynamics.

*General Aerofoil Theory.*

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| 181 | 10109 | Holland | ... | *Effect of a Rotating Cylinder Placed in the Nose of an Aerofoil on its Aerodynamic Characteristics.* (E. B. Wolff and C. Koning, Rykstudiedienst Voor Luchvaart, Vol. 3, 1925, Report 96a; Vol. 4, 1927, Reports 98a, 105a and 130a.) |
| 182 | 10179 | Germany | ... | *Aerodynamic Force on a Harmonically Vibrating Wing in a Supersonic Field of Flow (Two-Dimensional Case).* (S. Borbely, Z.A.M.M., Vol. 22, No. 4, Aug., 1942, pp. 190-205.) |
| 183 | 10203 | Germany | ... | *The Theory of the Lifting Wing.* (I. Nikuradse and E. Mohr, L.F.F., Vol. 20, No. 2, 27/2/43, pp. 48-56.) |
| 187 | 10560 | U.S.A. | ... | *Glenn Martin Graphic Solution of the Flutter Problem.* (U.S. Air Services, Vol. 28, No. 2, Feb., 1943, p. 33.) |

*Laminar and Turbulent Flow.*

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| 188 | 10476 | U.S.A. | ... | *Heat Transfer and Pressure Drop in Annuli.* (E. S. Davis, A.S.M.E. Preprint, April 26-28, 1943, pp. 1-5.) |

*Wind Tunnels and Research.*

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| 191 | 10008 | U.S.A. | ... | *Survey of Papers Presented at the Eleventh Annual Meeting of the Institute of Aeronautical Sciences.* (Autom. Ind., Vol. 88, No. 4, 15/2/43, pp. 24-26, 42 and 78.) |
| 192 | 10083 | U.S.A. | ... | *Curtiss 700 Miles per Hour Wind Tunnel (including Cutaway Perspective Drawing).* (Curtiss Flyleaf, Vol. 25, No. 5, Nov.-Dec., 1942, pp. 22-23.) |
| 193 | 10276 | U.S.A. | ... | *New U.S.A. Wind Tunnels.* (Aero Digest, Vol. 42, No. 3, March, 1943, p. 428.) |
| 194 | 10374 | U.S.A. | ... | *N.A.C.A.'s New Research Programme.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 251.) |
| 195 | 10375 | U.S.A. | ... | *New North American Wind Tunnel.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 252.) |

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| | | | *General Hydrodynamics.* |
| 196 | 9946 | U.S.A. ... | *Some Aspects of Water Loads Problem.* (Paper Presented by the S.A.W.E.) |
| 197 | 10028 | U.S.A. ... | *Performance and Selection of Mechanical Draft Cooling Towers.* (J. Lichtenstein, A.S.M.E. Preprint, April 26-28, 1943.) |
| 198 | 10035 | U.S.A. ... | *Graphical Solution of Fluid Friction Function Problem (Discussion).* (E. S. Dennison, J. App. Mech., Vol. 10, No. 1, March, 1943, pp. 51-52.) |
| 199 | 10133 | G.B. ... ... | *Theory of the Sea Waves.* (P. J. H. Unna, Nature, Vol. 151, No. 3,834, 24/4/43, pp. 479-480.) |
| 200 | 10178 | Germany ... | *Field of Flow Due to Slow Rotation of Two Eccentric Cylinders in a Viscous Fluid.* (W. Muller, Z.A.M.M., Vol. 22, No. 4, Aug., 1942, pp. 177-189.) |
| 201 | 10204 | Germany ... | *Influence of Cross-Sectional Area of the Surge Chamber on the Fluctuation of the Water Level, During Inflow Control of Hydraulic Turbines.* (W. Richter, Ing. Archiv., Vol. 13, No. 6, 1943, pp. 331-342.) |
| 202 | 10238 | G.B. ... ... | *Breakwaters (Contd.).* (R. R. Minikin, Engineering, Vol. 155, No. 4,035, 14/5/43, pp. 381-382.) |
| | | | *Flow in Tubes and Pipes.* |
| 203 | 10026 | U.S.A. ... | *Heat Transfer to a Fluid Flowing Periodically at Low Frequencies in a Vertical Tube.* (R. C. Martinelli and others, A.S.M.E. Preprint, April 26-28, 1943.) |
| 204 | 10031 | U.S.A. ... | *Relationship Between Reynolds Number and Velocity Distribution in a Pipe.* (L. S. Rhodes, J. App. Mech., Vol. 10, No. 1, March, 1943, pp. 21-22.) |

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| | | | *Civil Aviation and Air Cargo.* |
| 205 | 9815 | U.S.A. ... | *Freight Transport by Air in Latin America (Partially Cut by Censor).* (J. P. Zandt, Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 24-25, 84-85.) |
| 206 | 10090 | Germany ... | *The First Towed Glider Flights* (1919-1920). (M. Bohm, Luftwissen, Vol. 10, No. 3, March, 1943, pp. 86-87.) |
| 207 | 10144 | G.B. ... ... | *Air Travel*—1950. (D. C. Greenwood, Aeronautics, Vol. 8, No. 2, March, 1943, pp. 56-57.) |
| 208 | 10247 | U.S.A. ... | *Commercial Aviation After the War (Review of New Manufacturing Technique).* (B. C. Boulton, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 111-113, 138-140 and 386-398.) |
| 209 | 10269 | U.S.A. ... | *Some Observations on the Post-War Planning of the Aircraft Industry.* (S. Siggia, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 368 and 405-406.) |
| 210 | 10294 | Canada ... | *Land Planes or Flying Boats for Cargo?* (T. P. Hall, Vol. 32, No. 3, March, 1943, pp. 20-21 and 124.) |

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| 211 | 10346 | U.S.A. ... | *The Future of Water-Based Planes, VI.* (F. T. Courtney, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 122-123, 284 and 288.) |
| 212 | 10370 | U.S.A. ... | *Cargo Planes for World Trade.* (G. F. Bauer, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 213-217 and 280.) |
| 213 | 10394 | U.S.A. ... | *Requirements in Air Cargo Carriers (Symposium of Papers).* (Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 14-18.) |
| 214 | 10424 | U.S.A. ... | *Air Cargo Stimulated by Urgencies of War (Article Incomplete).* (Autom. Ind., Vol. 88, No. 1, 1/1/43, pp. 36-37 and 68-72.) |
| 215 | 10493 | G.B. ... | *Post-War Civil Aviation.* (Engineer, Vol. 175, No. 4,559, 28/5/43, p. 436.) |
| 216 | 10495 | U.S.A. ... | *Industrial Air Control.* (M. Ingles, Sci. Am., Vol. 168, No. 3, March, 1943, pp. 104-106.) |
| 217 | 10509 | G.B. ... | *Aviation After the War.* (Engineer, Vol. 175, No. 4,558, 21/5/43, p. 410.) |
| 218 | 10552 | G.B. ... | *Post-War Aviation.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 34.) |
| | | | ***Civil and Special Aircraft Types.*** |
| 219 | 9803 | U.S.A. ... | *Lockheed "Excalibur" Commercial Landplane Under Development.* (Canadian Aviation, Vol. 16, No. 1, Jan., 1943, p. 56.) |
| 220 | 9835 | U.S.A. ... | *New Version of the "Flying Wing" Patented.* (D. R. Davis, Am. Av., Vol. 6, No. 11, 1/11/42, p. 16.) |
| 221 | 9983 | U.S.A. ... | *New Aeronca Cargo Plane (Photograph).* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 66.) |
| 222 | 10466 | France ... | *Mauboussin M 129, M 202, M 300 (Trainers), M 400 Cargo Plane.* (Inter. Avia., No. 862, 27/3/43, p. 19.) |
| | | | ***General Design and Construction.*** |
| 223 | 9859 | G.B. ... | *Stressed Skin Wooden Construction.* (W. Stepniewski, Airc. Eng., Vol. 15, No. 170, April, 1943, pp. 110-112.) |
| 224 | 9928 | Germany ... | *Calculation of Power Required for Operating (Variable Camber) Wing Flap.* (K. Wolf, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 53-57.) |
| 225 | 10152 | G.B. ... | *The Effect of Compromise on the Design of Aircraft.* (Aeronautics, Vol. 8, No. 2, March, 1943, pp. 42-44.) |
| 226 | 10155 | G.B. ... | *Fairey Jet Propulsion Patent.* (Aeronautics, Vol. 8, No. 2, March, 1943, p. 50.) |
| 227 | 10317 | U.S.A. ... | *The Nose of the Aerofoil.* (R. J. Hoffmann, Flying, Vol. 32, No. 3, March, 1943, pp. 63 and 149-151.) |
| 228 | 10318 | U.S.A. ... | *Steel Fuselage Panels to Replace Aluminium in Vultee Aircraft.* (Flying, Vol. 32, No. 3, March, 1943, pp. 91-92.) |
| 229 | 10343 | U.S.A. ... | *Wood Techniques Developed in Glider Construction.* (Aviation, Vol. 41, No. 11, Nov., 1942, pp. 108-112.) |

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| 231 | 10381 | Germany ... | *Stressing of Aircraft Wheels. (R.T.P. Translation No.* 1,547.) (H. Burkhardt, J. Roy. Aeron. Sci., Vol. 47, No. 389, May, 1943, pp. 133-137.) |
| 232 | 10382 | U.S.S.R. ... | *Plastics and Their Application to Aircraft Construction. (R.T.P. Translation No.* 1,600.) (J. Γ. Zhibitsky, J. Roy. Aeron. Sci., Vol. 47, No. 389, May, 1943, pp. 138-143.) |
| 233 | 10538 | G.B. ... ... | *Stressed Skin Wooden Construction (Contd.).* (W. Stepniewski, Airc. Eng., Vol. 15, No. 171, May, 1943, pp. 126-131.) |
| 234 | 10604 | Canada ... | *Non-Skid Tyre for Icy Landings.* (Flying, Vol. 32, No. 5, May, 1943, p. 116.) |
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| 235 | 9915 | U.S.A. ... | *Soc. of Aeron. Weight Engs. Year Book,* 1933. (Vol. 3, No. 1, 1943.) |
| 236 | 9916 | U.S.A. ... | *Soc. of Aeron. Weight Engs. Year Book,* 1942. (Vol. 2, No. 1, 1942.) |
| 237 | 9929 | U.S.A. ... | *Aeroplane Weight and Balance Control.* (S. R. Shatto, Papers Presented by S.A.W.E.) |
| 238 | 9930 | U.S.A. ... | *Aircraft Accessories—A Weighty Problem.* (E. C. Roberts, Papers Presented by S.A.W.E.) |
| 239 | 9931 | U.S.A. ... | *Weight Engineer and the Flutter Problem.* (P. E. Bisch, Papers Presented by S.A.W.E.) |
| 240 | 9932 | U.S.A. ... | *Relationship of Identification Numbers to Weight and Cost Control.* (D. R. Watson, Papers Presented by S.A.W.E.) |
| 241 | 9934 | U.S.A. ... | *Predetermination of Weight Efficiency.* (D. M. Cole, and S. J. Hutchinson, Paper Presented by S.A.W.E.) |
| 242 | 9935 | U.S.A. ... | *A Practical Method for Wing Weight Estimation.* (C. R. Engleby, Paper Presented by the S.A.W.E.) |
| 243 | 9936 | U.S.A. ... | *Aircraft Balancing and Centre of Gravity Control.* (W. A. Senior, Paper Presented by the S.A.W.E.) |
| 244 | 9937 | U.S.A. ... | *Calculations of Landing Gear and Hydraulic System Weights.* (H. W. Adams, Papers Presented by the S.A.W.E.) |
| 245 | 9939 | U.S.A. ... | *Weight Control—Aircraft Design Problems.* (E. J. Foley, Paper Presented by the S.A.W.E.) |
| 246 | 9940 | U.S.A. ... | *Will Accessories Impede Our Payload?* (L. R. Hackney, Paper Presented by S.A.W.E.) |
| 247 | 9941 | U.S.A. ... | *Weight Predictor.* (C. Merrill, Paper Presented by the S.A.W.E.) |
| 248 | 9942 | U.S.A. ... | *Organisation for Weight Control.* (J. E. Ayers, Paper Presented by the S.A.W.E.) |
| 249 | 9943 | U.S.A. ... | *Weight Saving by Cleaning Aircraft.* (R. E. Sargent, Paper Presented by the S.A.W.E.) |
| 250 | 9944 | U.S.A. ... | *Applications of Psychology to Weight Control.* (W. A: Martin, Paper Presented by the S.A.W.E.) |

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| 251 | 9945 | U.S.A. ... | *The Importance of Weight Control in Airline Operations.* (C. Froesch, Paper Presented by the S.A.W.E.) |
| 252 | 9949 | U.S.A. ... | *Weight Economy.* (J. E. Ayers, Papers Presented by the S.A.W.E.) |
| | | | *Performance and Testing.* |
| 253 | 9798 | U.S.A. ... | *Stratosphere Chamber for Testing Mechanical Parts of Aircraft and Radio.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, p. 944.) |
| 254 | 9913 | Germany ... | *Calculation of Diving Speeds.* (E. Kennel, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 51-52.) |
| 255 | 10143 | G.B. ... ... | *Performance Tests on the Junkers* 88 *A*-6. (Aeronautics, Vol. 8, No. 2, March, 1943, pp. 52-53.) |
| 256 | 10340 | U.S.A. ... | *Factors Controlling Aircraft Design and Combat Performance.* (N. F. Silsbee, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 96-99 and 307-320.) |
| 257 | 10425 | U.S.A. ... | *Flight Performance Recorded Automatically in Ground Station.* (*Cut by Censor.*) (Autom. Ind., Vol. 88, No. 1, 1/1/43, p. 38.) |
| 258 | 10596 | Canada ... | *Dead Reckoning Navigation.* (E. L. Collins, Flying, Vol. 32, No. 5, May, 1943, pp. 60-66 and 132.) |
| | | | *Equipment, including Controls.* |
| 259 | 9807 | Canada ... | *New Fluorescent Lamp Ballast for Lighting of Aircraft Instruments.* (Canadian Aviation, Vol. 16, No. 1, Jan., 1943, p. 100.) |
| 260 | 9879 | U.S.A. ... | *New Simplified Brake Valve.* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 47.) |
| 261 | 9882 | U.S.A. ... | *New Dust-Tight Relay for Aircraft.* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 47.) |
| 262 | 9970 | U.S.A. ... | *Bevel Gears in Aircraft.* (A. H. Candee, A.S.M.E., Preprint, Oct. Meeting, 1942.) |
| 263 | 9975 | U.S.A. ... | *Portable Steel Runways.* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 24.) |
| 264 | 9980 | U.S.A. ... | *Bird-Proof Windshields.* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 54.) |
| 265 | 10002 | U.S.A. ... | *Windshield Protects Pilots from Birds.* (Autom. Ind., Vol. 88, No. 4, 15/2/43, p. 50.) |
| 266 | 10015 | U.S.A. ... | *Crash-Proof Fuel Tanks.* (J. W. Baird, Preprint, National Aeron. Meeting of the S.A.E., March 12-13, 1942.) |
| 267 | 10089 | Germany ... | *The Development of Electrical Equipment in Aircraft.* (E. Ruhlemann, Luftwissen, Vol. 10, No. 3, March, 1943, pp. 83-85.) |
| 268 | 10146 | G.B. ... ... | *The Icing of Aircraft.* (Aeronautics, Vol. 8, No. 2, March, 1943, pp. 60-61.) |
| 269 | 10156 | G.B. ... ... | *New Automatic Aircraft Control System (Sperry Patent).* (Aeronautics, Vol. 8, No. 2, March, 1943, p. 51.) |
| 270 | 10259 | U.S.A. ... | *Electrical Protective Devices for Aircraft.* (J. C. Lebens, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 229-231.) |
| 271 | 10273 | U.S.A. ... | *New Windshield Glass, Safe Against Bird Crashes.* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 404-405.) |

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| 272 | 10335 | Canada ... | *Aircraft Fuel Tank Cap Assembly.* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 144.) |
| | | | *Airfields and Maintenance.* |
| 273 | 9801 | Canada ... | *New Airport Made on an Ontario Pasture (Photo).* (Canadian Aviation, Vol. 16, No. 1, Jan., 1943, p. 45.) |
| 274 | 9824 | U.S.A. ... | *New Portable Hydraulic Aeroplane Lift.* (Autom. Ind., Vol. 88, No. 2, 15/1/43, p. 45.) |
| 275 | 9846 | U.S.A. ... | *Plywood Hangar (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 48.) |
| 276 | 9979 | U.S.A. ... | *Tyre Remover—New Device.* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 49.) |
| 277 | 10277 | U.S.A. ... | *Switches for Airport Runway Lighting.* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 432-434.) |
| 278 | 10329 | Canada ... | *Maintenance of Plexiglas Sections on Aircraft.* (Canadian Av., Vol. 15, No. 12, Dec., 1942, pp. 116-117 and 122.) |
| 279 | 10336 | Canada ... | *Extending Ladder for Servicing of Aircraft.* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 148.) |
| 280 | 10442 | G.B. ... ... | *Aerodrome Abstracts, Compiled by the Dept. of Scientific and Industrial Research, Abstracts Nos. 42-58.* (Vol. 2, No. 3, 1943.) |
| 281 | 10489 | G.B. ... ... | *Land Drainage Machinery (I).* (Engineer, Vol. 175, No. 4,559, 28/5/42, pp. 420-421.) |
| | | | *Airscrews and Helicopters.* |
| 282 | 9836 | U.S.A. ... | *New Propeller having Two Single Blades Revolving in Opposite Directions for Horizontal Lifting.* (G. W. Tidd, Am. Av., Vol. 6, No. 11, 1/11/42, p. 16.) |
| 283 | 9871 | U.S.A. ... | *Increased Production of Hollow Steel Propeller Blade.* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 51.) |
| 284 | 9873 | U.S.A. ... | *Hamilton Counter-Rotating Propeller.* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 52.) |
| 285 | 9976 | U.S.A. ... | *Sikorsky Helicopter.* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 24.) |
| 286 | 9999 | U.S.A. ... | *V.D.M. Propeller Pitch Charging Mechanism.* (Autom. Ind., Vol. 88, No. 4, 15/2/42, pp. 40-41.) |
| 287 | 10057 | G.B. ... ... | *Improvements in Marine Propeller Bossing Design.* (Mech. World, Vol. 113, No. 2,931, 5/3/43, p. 260.) |
| 288 | 10085 | Germany ... | *Methods for Balancing Airscrews.* (H. Oschatz, Luftwissen, Vol. 10, No. 3, March, 1943, pp. 69-72.) |
| 289 | 10086 | Germany ... | *The Coupling of Airscrew Blades in V.P. Mechanism.* (W. Nitzsche, Luftwissen, Vol. 10, No. 3, March, 1943, pp. 74-77.) |
| 290 | 10354 | U.S.A. ... | *Co-Axial Electric Propeller (Developed by Curtiss-Wright).* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 153.) |
| 291 | 10378 | U.S.A. ... | *Special Propeller for Trainer Planes.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 261.) |

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| 292 | 10422 | U.S.A. | ... | *Dual Rotation Propeller with Hydraulic Pitch Control (Six-Bladed) (Photograph).* (Autom. Ind., Vol. 88, No. 1, 1/1/43, p. 45.) |
| 293 | 10558 | U.S.A. | ... | *New Counter Rotating Constant Speed Propeller.* (U.S. Air Services, Vol. 28, No. 2, Feb., 1943, p. 28.) |
| 294 | 10602 | Canada | ... | *Two-Place Helicopter (XR-4) (Photo).* (Flying, Vol. 32, No. 5, May, 1943, p. 71.) |

## Engines and Accessories.

*Named Types.*

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| 295 | 9818 | G.B. ... | ... | *Rolls Royce Merlin* 61. (M. W. Bourdon, Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 34-35 and 70.) |
| 296 | 9827 | Japan | ... | *Japanese Engine Removed from Aircraft After Crashing (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 4.) |
| 297 | 9981 | U.S.A. | ... | *Lycomings New Flat Geared Engine (Six-Cylinder, Horizontally Opposed Model of* 210 *h.p. (Photograph).* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 58.) |
| 298 | 10052 | G.B. ... | ... | *Diesel Marine Machinery, Harland and Wolff Engine. (Paper Presented to the Inst. of Mech. Engrs.).* (C. C. Pounder, Mech. World, Vol. 113, No. 2,931, 5/3/43, pp. 239-242.) |
| 299 | 10087 | Germany | ... | *Aircraft Diesel Engine.* (Luftwissen, Vol. 10, No. 3, March, 1943, pp. 77-79.) |
| 300 | 10088 | Germany | ... | *Historical Development of Siemens and B.M.W. Aircraft Engines.* (H. Lohner, Luftwissen, Vol. 10, No. 3, March, 1943, pp. 80-82.) |
| 301 | 10098 | G.B. ... | ... | *Plastics in the Wright Cyclone Engine.* (Plastics, Vol. 7, No. 72, May, 1943, p. 213.) |
| 302 | 10271 | U.S.A. | ... | *Lycomings New Six-Cylinder* 210 *h.p. Horizontally Opposed Engine.* (Aero Digest, Vol. 42, No. 3, March, 1943, p. 374.) |
| 303 | 10371 | Germany | ... | *Design Details of B.M.W.* 801 *A Engine.* (M. V. Cave, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 228-229 and 291-299.) |
| 304 | 10399 | U.S.A. | ... | *A New Development in Two-Stroke Diesels (Sulzer).* (Antom. Ind., Vol. 88, No. 5, 1/3/43, pp. 30-31 and 47.) |
| 305 | 10426 | U.S.A. | ... | *New Model Carburettor for Twin Wasp Engine.* (Autom. Ind., Vol. 88, No. 1, 1/1/43, p. 76.) |
| 306 | 10563 | U.S.A. | ... | *Twin-Row* 1,250 *h.p. Pratt and Whitney "Wasps" (Photo).* (U.S. Air Services, Vol. 28, No. 2, Feb., 1943, p. 18.) |
| 307 | 10566 | Germany | ... | *Development of the D.B.* 601 *Aero Engine.* (Motor Schau., Vol. 7, No. 2, Feb., 1943, pp. 58-60.) |
| 308 | 10572 | Germany | ... | *The Development of the Diesel Engine.* (Motor Schau., Vol. 7, No. 3, March, 1943, pp. 105-107.) |
| 309 | 10588 | Canada | ... | *The Allison Liquid-Cooled Engine.* (W. Levenor, Flying, Vol. 32, No. 5, May, 1943, pp. 28-31 and 84-92.) |

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| 310 | 9780 | U.S.A. ... | *Variable Thrust Line Engine (Photo).* (Autom. Ind., Vol. 87, No. 5, 1/9/42, p. 50.) |
| 311 | 9822 | U.S.A. ... | *Interchangeable Power Plants for British Bombers.* (M. W. Bourdon, Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 42-43.) |
| 312 | 10019 | U.S.A. ... | *Co-Designing Aircraft Power Plants.* (H. Karcher, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.) |
| 313 | 10020 | U.S.A. ... | *General Aspects of Aircraft Power Plant Installation.* (T. Hammen, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.) |
| 314 | 10033 | U.S.A. ... | *Harmonic Coefficients of Engine Torque Curves.* (F. Porter, J. App. Mech., Vol. 10, No. 1, March, 1943, pp. 38-48.) |
| 315 | 10263 | U.S.A. ... | *Diesel Auxiliary Power Unit for Large Aircraft.* (E. M. Wilson, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 244-251.) |
| 316 | 10268 | U.S.A. ... | *An Evaluation of Engine Types.* (E. M. Lester, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 364, 374, 417-424.) |
| 317 | 10355 | U.S.A. ... | *Wright Uses Plastic Engine Parts to Save Aluminium.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 53.) |
| 318 | 10526 | G.B. ... ... | *Hydraulically Operated Clutches.* (R. Waring-Brown, Mech. World, Vol. 113, No. 2,940, 7/5/43, pp. 489-491 and 499.) |
| 319 | 10567 | Germany ... | *Model Aircraft Petrol Engine.* (A. Thusius, Motor Schau., Vol. 7, No. 2, Feb., 1943, pp. 61-64.) |
| | | | *Testing and Efficiency.* |
| 320 | 9783 | U.S.A. ... | *Fundamentals of Good Carburization.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, pp. 849-855.) |
| 321 | 9845 | U.S.A. ... | *Wright Co. Conducts Cold Weather Engine Tests.* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 48.) |
| 322 | 9901 | U.S.A. ... | *Volumetric Efficiency for I.C. Engines.* (P. H. Schweitzer, Autom. Eng., Vol. 33, No. 434, March, 1942, pp. 107-108.) |
| 323 | 9909 | Germany ... | *Measures for Ensuring the Reliability of Aircraft Engines.* (H. Konba, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 38-42.) |
| 324 | 9911 | Germany ... | *Measurement of Piston Temperature Under Load.* (W. Glaser, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 44-49.) |
| 325 | 9972 | U.S.A. ... | *On the Definition of Volumetric Efficiency.* (P. H. Schweitzer, A.S.M.E. Preprint, Nov. Meeting, 1942.) |
| 326 | 10298 | Canada ... | *Engines and Altitudes.* (R. Sydney, Flying, Vol. 32, No. 3, March, 1943, pp. 30-32 and 80-82.) |
| 327 | 10319 | U.S.A. ... | *Sub-Zero Test Cell for Engine Tests.* (Flying, Vol. 32, No. 3, March, 1943, p. 94.) |
| 328 | 10430 | G.B. ... ... | *The Conditioning of Bearing Surfaces.* (H. Higinbotham, Mech. World, Vol. 113, No. 2,941, 14/5/43, pp. 535-537.) |

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| | | | *Drives, Piston Rings, etc.* |
| 329 | 9855 | G.B. ... | ... *Electrical Indicator Drives—Methods of Synchronizing Cathode Ray Oscillograph Engine Indicators.* (J. G. G. Hempson, Airc. Eng., Vol. 17, No. 170, April, 1943, pp. 98-99.) |
| 330 | 10016 | U.S.A. | ... *Piston Rings and Oil Control in Two-Cycle High Output Diesel Engines.* (F. G. Shoemaker and R. Allbright, A.S.M.E. Preprint, Oil and Gas Power Conference, June 17-19, 1942.) |
| 331 | 10017 | U.S.A. | ... *Solutions for Diesel Piston Problems.* (F. Zollner, A.S.M.E. Preprint, Oil and Gas Power Conference.) |
| 332 | 10018 | U.S.A. | ... *Intake Systems for Aircraft Engines.* (C. T. Doman, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.) |
| 333 | 10058 | G.B. ... | ... *General Requirements of A.C. Motor Starters.* (Mech. World, Vol. 113, No. 2,931, 5/3/43, pp. 256-259.) |
| 334 | 10094 | G.B. ... | ... *New Plastic Cylinder for Servo Unit.* (Plastics, Vol. 7, No. 72, May, 1943, pp. 194-195.) |
| 335 | 10097 | G.B. ... | ... *Ultra-Centrifuge with Plastic Rotor.* (Plastics, Vol. 7, No. 72, May, 1942, pp. 212-213.) |
| 336 | 10025 | U.S.A. | ... *Cooling Characteristics of Steel and Aluminium Finned Cylinders for In-Line Air-Cooled Engines.* (M. Piry, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.) |
| 337 | 10369 | U.S.A. | ... *Piston Rings in Aircraft Engine Maintenance.* (P. S. Lane, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 205-207 and 339.) |
| 338 | 10400 | U.S.A. | ... *Electronic Variable Speed Drive.* (S. D. Fendley, Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 32-33 and 51.) |
| 339 | 10540 | G.B. ... | ... *Carburettor Air Scoops.* (F. C. Mock, Airc. Eng., Vol. 15, No. 171, May, 1943, pp. 135-143.) |
| | | | *Bearings.* |
| 340 | 10385 | G.B. ... | ... *Fixing Bearings.* (Metal Industry, Vol. 62, No. 21, 21/5/43, p. 324.) |
| 341 | 10450 | G.B. ... | ... *Ball and Roller Bearings (Collection of Abstracts on (1) Design and Applications, (2) Materials and Production, (3) Friction and Lubrication).* (I.A.E. Reports, No. 11, Nov., 1942.) |
| 342 | 10549 | G.B. ... | ... *Roller Bearings.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 30.) |
| | | | *Turbines, Pumps, Boilers.* |
| 343 | 9823 | U.S.A. | ... *Hamilton-Whitfield Blower.* (Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 44 and 82.) |
| 344 | 9849 | G.B. ... | ... *The Internal Combustion Turbine.* (C. C. Pounder, Vol. 113, No. 2,936, 9/4/43, p. 379.) |
| 345 | 9966 | G.B. ... | ... *Large Forced Circulation Boiler (Contd.).* (Engineer, Vol. 175, No. 4,556, 7/5/43, pp. 377-378.) |
| 346 | 10045 | G.B. ... | ... *The Boiler Water Treatment.* (Mech. World, Vol. 113, No. 2,934, 26/3/42, p. 327.) |

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| 347 | 10049 | G.B. ... | ... *The Power Station Boiler House.* (Mech. World, Vol. 113, No. 2,934, 26/3/43, pp. 322-324.) |
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| 350 | 10527 | G.B. ... | ... *Compressed Air Venturi Ejectors and Blowers.* (P. J. Finn, Mech. World, Vol. 113, No. 2,940, 7/5/43, pp. 494-496.) |
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| 355 | 10053 | G.B. ... | ... *Utilisation of Waste Fuels.* (Mech. World, Vol. 113, No. 2,931, 5/3/43, p. 242.) |
| 356 | 10289 | G.B. ... | ... *World Production of Petroleum and its Substitutes —Rough Estimates for* 1942. (The Petroleum Times, Vol. 47, No. 1,194, 1/5/43, p. 210.) |
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## Theory of Elasticity

## (Stresses, Fatigue Strength, Vibration Resistance of Materials).

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| 391 | 10021 | U.S.A. | ... *Improving the Fatigue Strength of Engine Parts.* (J. O. Almen, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.) |
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| 394 | 10032 | U.S.A. | ... *Oscillations of Suspension Bridges.* (H. Reissner, J. App. Mech., Vol. 10, No. 1, March, 1943, pp. 23-32.) |
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| 404 | 10480 | U.S.A. ... | *The Strength of Cylindrical Dies.* (G. Sachs and J. D. Lubahn, A.S.M.E. Preprint, Paper to be presented at June Meeting, 16 and 18 June, 1943.) |
| 405 | 10490 | G.B. ... ... | *Welding Contraction and Locked-up Stresses.* (Engineer, Vol. 175, No. 4,559, 28/5/43, pp. 423-425.) |
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## Materials.

### *A. Properties.*

*General Properties of Some Materials.*

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| 415 | 10197 | G.B. ... ... | *Inverse Segregation—A Study of Alloys of Wide Solidification Range.* (M. L. Samuels and others, Metal Industry, Vol. 62, No. 20, 14/5/42, pp. 311-313.) |
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| 421 | 10515 | G.B. ... ... | *Marine Corrosion.* (Engineer, Vol. 175, No. 4,558, 21/5/43, pp. 415-416.) |
| 422 | 10520 | G.B. ... ... | *Frictional Properties of Metallic Films.* (T. P. Hughes, Nature, Vol. 151, No. 3,836, 8/5/43, pp. 533-534.) |
| 423 | 10528 | G.B. ... ... | *Crystal Structure and Wear-Resisting Properties of Metals.* (Mech. World, Vol. 113, No. 2,940, 7/5/43, pp. 498-499.) |
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| 433 | 10240 | G.B. ... ... | *The Microstructure of Lead-Bearing Steels.* (Engineering, Vol. 155, No. 4,035, p. 388.) |
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| 435 | 10482 | G.B. ... ... | *Effect of Iron on Brass.* (Science Library, Bibliographical Series, No. 588, 10/3/43.) |
| 436 | 10506 | G.B. ... ... | *The Iron and Steel Institute—Annual Meeting and Proceedings.* (Engineer, Vol. 175, No. 4,558, 21/5/43, pp. 404-405.) |
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| 441 | 10057 | G.B. ... | ... *Melting Aluminium Borings and Turnings.* (Mech. World, Vol. 113, No. 2,931, 5/3/43, p. 255.) |
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| 477 | 10499 | U.S.A. | ... | *C.R. 39 Transparent Plastic of High Abrasion Resistance.* (Sci. Am., Vol. 168, No. 3, March, 1943, p. 124.) |

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| 531 | 10159 | G.B. ... ... | *Deoxidation with Beryllium.* (Sheet Metal Industry, Vol. 17, No. 193, May, 1943, p. 876.) |
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| 543 | 10120 | G.B. ... ... | *A Development in Welded Fabrication.* (Mech. World, Vol. 113, No. 2,938, 23/4/43, p. 441.) |
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| 560 | 10124 | G.B. ... ... | *Machining with Coated Abrasives.* (Machinery, Vol. 62, No. 1,593, 22/4/43, p. 429.) |
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| 562 | 10165 | G.B. ... ... | *Cold and Hot Rolling of Metals (Contd.). (R.T.P. Translation No. 1,735.)* (O. Enicke and K. H. Lucas, Sheet Metal Industry, Vol. 17, No. 193, May, 1943, pp. 800-804.) |
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| 564 | 10492 | G.B. ... ... | *Surface Finish and Function of Parts (with Discussion).* (G. Schlessinger, Vol. 175, No. 4,559, 28/5/43, pp. 429-430 and 434-436.) |

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| 571 | 10121 | G.B. ... | ... *Small Quantity Gear Cutting.* (Mech. World, Vol. 113, No. 2,938, 23/4/43, pp. 448-450.) |
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| 578 | 10396 | U.S.A. | ... *Some Recent Developments in Sheet Metal Fabrication (Dies, etc.).* (P. L. Smith and V. L. Brooks, Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 22-23 and 53.) |
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| 586 | 10320 | Canada | ... *Electric Gun for Riveting.* (Flying, Vol. 32, No. 3, March, 1943, p. 94.) |
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| 598 | 10421 | U.S.A. | ... *North American New Boring Tool.* (Autom. Ind., Vol. 88, No. 1, 1/1/43, pp. 42 and 72.) |
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| | | | *Testing, Crack Detection.* |
| 599 | 9851 | G.B. ... | ... *Testing Heat Insulating Materials at the N.P.L.* (Mech. World, Vol. 113, No. 2,936, 9/4/43, p. 382.) |
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| 604 | 10523 | G.B. ... | ... *The Mechanical Testing of Materials with Special Reference to the Testing of Welds.* (V. E. Green, Engineering Inspection, Vol. 8, No. 1, Spring, 1943, pp. 24-28 and 36.) |
| 605 | 10525 | G.B. ... | ... *The Fabrication and Testing of Fusion Welded Pressure Vessels.* (S. H. Griffiths, Engineering Inspection, Vol. 8, No. 1, Spring, 1943, pp. 4-23.) |
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| 608 | 9923 | G.B. ... | ... *The Use of Infra-Red Rays.* (Machinery, Vol. 62, No. 1,588, 18/3/43, p. 287.) |
| 609 | 9927 | G.B. ... | ... *Portable X-Ray Unit.* (Machinery, Vol. 62, No. 1,588, 18/3/43, p. 300.) |
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| 611 | 10387 | G.B. ... | ... *X-Ray Analysis in Industry (Symposium of Papers).* (Metal Industry, Vol. 62, No. 21, 21/5/43, p. 327.) |
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| | | | *Flight.* |
| 614 | 10201 | Germany | ... *Evaluation of Time Records by the Simultaneous Employment of Instruments of Different Types.* (H. Knoblock, L.F.F., Vol. 20, No. 2, 27/3/43, pp. 42-45.) |
| 615 | 10352 | U.S.A. | ... *Flight Recorder to Ease Test Pilot's Job.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 149.) |
| 616 | 10372 | U.S.A. | ... *Simplified Computors' Aid Navigation.* (P. V. H. Weems, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 233-234.) |
| 617 | 10595 | Canada | ... *New Flight Test Recorder.* (L. C. Thomas, Flying, Vol. 32, No. 5, May, 1943, pp. 60-61, 169.) |
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| 618 | 9858 | Germany | ... *Electrical Measurement of Stresses.* (*R.T.P.3 Translation No. 1,615.*) (H. Theis, Airc. Eng., Vol. 15, No. 170, April, 1943, pp. 106-109.) |

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| 620 | 10142 | G.B. ... | ... *Theory of the Force or Torque of Soft Iron Electrical Instruments.* (C. V. Drysdale, J. Inst. Elect. Engs., Vol. 9, No. 13, Feb., 1943, pp. 79-83.) |
| 623 | 10502 | U.S.A. | ... *Electric Extensometer.* (Sci. Am., Vol. 168, No. 3, March, 1943, p. 126.) |
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| 624 | 10451 | G.B. ... | ... *An Air Flowmeter for Rates of Flow.* (L. Rosenfield, I.A.E. Reports, No. 1,943-1,945, 24/3/43, p. 36.) |
| 625 | 10505 | U.S.A. | ... *Electric Fuel Flowmeter.* (Sci. Am., Vol. 168, No. 3, March, 1943, pp. 133-134.) |
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| 626 | 9861 | G.B. ... | ... *Precision Instruments for Engineers.* (Airc. Eng., Vol. 15, No. 170, April, 1943, pp. 120-121.) |
| 627 | 9906 | G.B. ... | ... *New British Precision Measuring Instruments.* (Autom. Eng., Vol. 33, No. 434, March, 1942, pp. 123-125.) |
| 628 | 10000 | U.S.A. | ... *New Apparatus for Vibration Studies.* (Autom. Ind., Vol. 88, No. 4, 15/2/43, pp. 44-45 and 90.) |
| 629 | 10115 | U.S.A. | ... *The Rolling Ball Viscometer.* (R. M. Hubbard and G. G. Brown, Ind. and Eng. Chem. (Anal. Ed.), Vol. 15, No. 3, 15/3/43, pp. 212-218.) |
| 630 | 10406 | G.B. ... | ... *Stroboscopic Equipment.* (G. Windred, Engineering, Vol. 155, No. 4,036, May 21, 1943, pp. 401-402.) |
| 631 | 10431 | U.S.A. | ... *Mass Spectrometer for Quantitive Analysis of Refinery Gases.* (Nat. Pet. News, Vol. 35, No. 12, 24/3/43, p. 14.) |

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*Organisation and Control.*

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| 633 | 10064 | U.S.A. | ... *War Production in 1943.* (L. R. Boulware, Mech. Eng., Vol. 65, No. 2, Feb., 1943, p. 99.) |
| 634 | 10075 | U.S.A. | ... *Organisation as a Project in Human Engineering.* (P. Pigors, Mech. Eng., Vol. 65, No. 1, Jan., 1943, pp. 40-41.) |
| 635 | 10112 | G.B. ... | ... *Plant Maintenance.* (Engineering, Vol. 155, No. 4,034, 7/5/43, p. 372.) |
| 636 | 10116 | G.B. ... | ... *Running Trials and Acceptance Tests in a New Factory.* (J. V. Brittain, Mech. World, Vol. 113, No. 2,938, 23/4/43, pp. 431-432.) |
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| 639 | 10198 | G.B. ... | ... *Production Control Booklet, issued by British Standards Inst., B.S.I.* 100, *Pt. I* (1943). (Metal Industry, Vol. 62, No. 20, 14/5/43, p. 313.) |
| 640 | 10242 | G.B. ... | ... *Post-War Reconstruction Employers' Need for Organisation.* (Engineering, Vol. 155, No. 4,035, 14/5/43, pp. 383-384.) |
| 641 | 10257 | U.S.A. | ... *Curtiss-Wright's Shop Priority Control System.* (W. J. Shepherd, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 216-220 and 382.) |
| 642 | 10267 | Germany | ... *Directory of Aircraft Manufacturers.* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 283-362 and 424.) |
| 643 | 10290 | G.B. ... | ... *High Speed in the Wartime Production Shop.* (G. Schlesinger, J. Inst. Prod. Engs., Vol. 22, No. 4, April, 1943, pp. 137-167.) |
| 644 | 10380 | U.S.A. | ... *Sub-Contracting as a Permanent Policy.* (Aviation, Vol. 41, No. 11, Nov., 1942, pp. 189 and 336-339.) |
| 645 | 10417 | U.S.A. | ... *Quality Control at Bendix.* (J. Geschelin, Autom. Ind., Vol. 88, No. 1, 1/1/43, pp. 18-23 and 44.) |
| 646 | 10419 | U.S.A. | ... *Conservation of Critical Materials, Man-Hours v. Machine Time.* (Autom. Ind., Vol. 88, No. 1, 1/1/43, pp. 26-29 and 64.) |
| 647 | 10524 | G.B. ... | ... *A Brief Summary of Some Simple Methods of Quality Control.* (A. S. Wharton, Engineering Inspection, Vol. 8, No. 1, Spring, 1943, pp. 29-36.) |
| 648 | 10543 | G.B. ... | ... *Sampling Inspection and Quality Determination.* (H. Rissik, Airc. Eng., Vol. 15, No. 171, May, 1943, pp. 149-152.) |
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| 650 | 9820 | U.S.A. | ... *Training Workers for High Precision Work at Adel Precision Products Corp.* (Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 30-31, 80 and 81.) |
| 651 | 9965 | G.B. ... | ... *University Education and Research in America.* (Engineer, Vol. 175, 4,556, 7/5/43, pp. 375-376.) |
| 652 | 10063 | U.S.A. | ... *The New Curtiss-Wright Research Laboratory (with Photographs of Altitude Chamber).* (Curtiss Fly-leaf, Vol. 25, No. 4, Sept.-Oct., 1942, pp. 21-23.) |
| 653 | 10070 | U.S.A. | ... *Industrial Psychology—Industrial Relations.* (I. Knickerbocker, Mech. Eng., Vol. 65, No. 2, Feb., 1943, pp. 137-138.) |
| 654 | 10077 | U.S.A. | ... *Mobile Training Units Equipped by Curtiss to Train Aircraft Mechanics.* (S. Spaulding, Curtiss Fly-leaf, Vol. 25, No. 5, Nov.-Dec., 1942, pp. 3-5.) |
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| 657 | 10428 | G.B. ... ... | *Practical Points on Training Welders.* (W. J. Thaw, Mech. World, Vol. 113, No. 2,941, 14/5/43, pp. 517-519.) |
| 658 | 10517 | G.B. ... ... | *Conservation of Scientific and Technical Periodicals.* (Nature, Vol. 151, No. 3,836, 8/5/43, pp. 512-513.) |
| 659 | 10518 | G.B. ... ... | *News and Views from the Scientific Front.* (R. Gregory, Nature, Vol. 151, No. 3,836, 8/5/43, pp. 517-519.) |
| 660 | 10548 | G.B. ... ... | *Education for Industry. XIV, Chemists' Training and Entry.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 23.) |
| 661 | 10578 | U.S.A. ... | *The American Engineer and the War Effort.* (A. A. Potter, Mech. Eng., Vol. 65, No. 4, April, 1943, pp. 251-252 and 258.) |

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| 663 | 9872 | U.S.A. ... | *Mass Production at the Consolidated Aircraft Corp. (Photograph).* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 52.) |
| 664 | 9875 | U.S.A. ... | *Canadian Aircraft Production.* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 56.) |
| 665 | 9881 | U.S.A. ... | *Glenn Martin P.B.M.-3 Mariners on the Assembly Line (Photograph).* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 48.) |
| 666 | 9884 | U.S.A. ... | *Mass Production of Waco CG-4A Gliders (Photograph).* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 51.) |
| 667 | 9885 | U.S.A. ... | *Mass Production of Grumman Fighters.* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 54.) |
| 668 | 9982 | U.S.A. ... | *Ford's 15-Passenger Troop Carrying Gliders and New Glueing Process in Their Manufacture.* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 60.) |
| 669 | 10022 | U.S.A. ... | *A Method of Applying Production Design to Aircraft.* (H. Harrison, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.) |
| 670 | 10252 | U.S.A. ... | *Aircraft Industry in Latin America.* (W. R. Douglas, Aero Digest, Vol. 43, No. 3, March, 1943, pp. 118-120 and 400-403.) |
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| 672 | 10256 | U.S.A. ... | *Fabrication of Aircraft Surfaces on Moving Assembly Lines.* (F. M. Reck, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 207-215.) |

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| 674 | 10303 | G.B. ... ... | *Lancaster Production.* (Flying, Vol. 32, No. 3, March, 1943, p. 41.) |
| 675 | 10321 | Canada ... | *Assembly Line of AT-16 Advanced Trainers (Photo).* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 55.) |
| 676 | 10322 | G.B. ... ... | *De Havilland's Production of New "Mosquito."* (Canadian Av., Vol. 15, No. 12, Dec., 1942, pp. 60-61 and 100.) |
| 677 | 10323 | Canada ... | *Fairchild "Cornell" Trainer (Production).* (Canadian Av., Vol. 15, No. 12, Dec., 1942, pp. 62-63.) |
| 678 | 10324 | U.S.A. ... | *Boeing's at Work on New Catalina.* (Canadian Av., Vol. 15, No. 12, Dec., 1942, pp. 64-65.) |
| 679 | 10325 | Canada ... | *Consolidated Catalina Manufactured by Canadian Vickers (Photo).* (Canadian Av., Vol. 15, No. 12, Dec., 1942, pp. 71-72 and 98-99.) |
| 680 | 10326 | G.B. ... ... | *Lancaster Components Manufactured by Ottawa Car, Ltd.* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 74.) |
| 681 | 10393 | U.S.A. ... | *The Production of Giant Planes.* (H. Woodhead, Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 9 and 50-51.) |
| 682 | 10401 | U.S.S.R. ... | *Yak-1 (1-26) Fighters on the Assembly Line.* (Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 9 and 50-51.) |
| 683 | 10403 | U.S.A. ... | *Power-Driven Assembly Line Applied to Aircraft Fabrication (Photograph).* (Autom. Ind., Vol. 88, No. 5, 1/3/43, p. 40.) |
| 684 | 10491 | U.S.A. ... | *North American Aircraft Assembly Plant at Texas.* (Engineer, Vol. 175, No. 4,559, 28/5/43, pp. 425-426.) |
| 685 | 10587 | Canada ... | *Willow Run Aircraft Plant.* (R. Stewart, Flying, Vol. 32, No. 5, May, 1943, pp. 21-23 and 150.) |
| | | | *Engines, Propellers Production Methods.* |
| 686 | 9814 | U.S.A. ... | *One-Piece Hollow Steel Propeller Blades (Production Methods).* (J. Geschelin, Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 18-22.) |
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| 688 | 9995 | U.S.A. ... | *Mass Production of Stromberg Injection Carburettor.* (J. Geschelin, Autom. Ind., Vol. 88, No. 4, 15/2/43, pp. 18-22.) |
| 689 | 10353 | U.S.A. ... | *Short Cuts Speed Propeller Production.* (Aviation, Vol. 41, No. 11, Nov., 1942, pp. 151 and 320.) |
| 690 | 10398 | U.S.A. ... | *Mass Production of Aircraft Engine Cylinder Heads (Casting Processes, etc.).* (Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 26-29 and 47.) |

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| 691 | 8969 | U.S.A. ... | *Gang Riveting—A New Method of Riveting Employed by Curtiss Wright Corporation.* (Curtiss Flyleaf, Vol. 25, No. 4, Sept.-Oct., 1942, p. 19.) |
| 692 | 9900 | U.S.A. ... | *New Technique for Producing Formed Parts in Sheet Metals (Cecostamping).* (Autom. Eng., Vol. 33, No. 434, March, 1942, pp. 104-106.) |
| 693 | 9922 | G.B. ... ... | *The Manufacture of Nose Containers for Mortar Bombs.* (Machinery, Vol. 62, No. 1,588, 18/3/43, pp. 281-285.) |
| 694 | 9957 | G.B. ... ... | *Importance of Sand Control in Foundry Work.* (F. A. Allen, Metal Industry, Vol. 62, No. 19, 7/5/43, pp. 293-294.) |
| 695 | 9987 | Canada .. | *Forged Cylinder Heads and New Rapid Techniques in Manufacture.* (Commercial Aviation, Vol. 4, No. 12, Dec., 1942, p. 74.) |
| 696 | 9988 | Canada .. | *Reproduction of Templates by the Transphoto Process.* (Commercial Aviation, Vol. 4, No. 12, Dec., 1942, pp. 75-76.) |
| 697 | 9996 | U.S.A. ... | *Position Charts to Help Inexperienced Workers (Details given of Parts, Tools Required, etc.).* (Autom. Ind., Vol. 88, No. 4, 15/2/43, p. 23.) |
| 698 | 10166 | G.B. ... ... | *Plant and Process Problems (Contd.).* (D. G. P. Patterson, Sheet Metal Industry, Vol. 17, No. 193, May, 1943, pp. 803-807.) |
| 699 | 10193 | U.S.A. ... | *Possible Industrial Utilization of Starch Esters.* (J. W. Mullen and E. Paesu, Ind. and Eng. Chem., Vol. 35, No. 3, March, 1943, pp. 381-384.) |
| 700 | 10266 | Germany ... | *Production Short Cuts (Rivet Squeezer, Lofting Device, Router, etc.).* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 272-278.) |
| 701 | 10332 | U.S.A. ... | *Tube Bending in Bell Aircraft, Ltd.* (Canadian Aviation, Vol. 15, No. 12, Dec., 1942, pp. 124-128.) |
| 702 | 10333 | U.S.A. ... | *Removal of Broken Drills, Reamers, etc., from Drilled Holes (Pratt and Whitney Aircraft).* (Canadian Aviation, Vol. 15, No. 12, Dec., 1942, pp. 130-138.) |
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| 703 | 9848 | G.B. ... ... | *The Practical Control of Quality in Welding.* (W. J. Thaw, Mech. World, Vol. 115, No. 2,926, 9/4/43, pp. 375-378.) |
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| | | | | *Machine Tools.* |
| 708 | 10125 | G.B. ... | ... | *The Steinle Centreless Thread Generator.* (Machinery, Vol. 62, No. 1,593, 22/4/43, pp. 430-434.) |
| 709 | 10261 | U.S.A. | ... | *Maintenance Steps to Prolong Instrument Life.* (T. A. Cohen, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 244-251.) |
| 710 | 10274 | U.S.A. | ... | *Vultee Automatic Rivet Injector.* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 406-407.) |
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| | | | | *War Plants.* |
| 712 | 9838 | U.S.A. | ... | *New Clinip Assembly Plant in Arizona.* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 56.) |
| 713 | 9843 | U.S.A. | ... | *Successful Camouflage for U.S. War Plants and Army Installations Developed by U.S. Army Engineers.* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 47.) |
| 714 | 10122 | G.B. ... | ... | *The Willow Run Bomber Plant.* (Machinery, Vol. 62, No. 1,593, 22/4/43, pp. 421-427.) |
| 715 | 10283 | U.S.A. | ... | *Method of Fire Hazard (Classification of Building Materials).* (A. J. Steiner, A.S.T.M. Bulletin, No. 121, March, 1943, pp. 19-22.) |
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| 717 | 9960 | G.B. ... | ... | *Segregation and Reclamation of Scrap.* (L. S. Deitz, Metal Industry, Vol. 62, No. 19, 7/5/43, pp. 295-296.) |
| 718 | 10007 | U.S.A. | ... | *Vegas Scrap Conservation Programme.* (Autom. Ind., Vol. 88, No. 4, 15/2/43, pp. 36-37 and 84-88.) |
| 719 | 10061 | U.S.A. | ... | *Curtiss Wright Salvage Scheme.* (Curtiss Flyleaf, Vol. 25, No. 4, Sept.-Oct., 1942, pp. 8-9.) |
| 720 | 10291 | G.B. ... | ... | *The Reclamation of Porous Castings (Technical Bulletin, April,* 1943). (E. J. H. Jones, J. Inst. Prod. Engs., Vol. 22, No. 4, April, 1943.) |
| 721 | 10583 | U.S.A. | ... | *Scrap-Saving Methods Support the War Effort.* (B. D. Kunkle, Mech. Eng., Vol. 65, No. 4, April, 1943, pp. 267-273.) |
| | | | | *Workers' Welfare.* |
| 722 | 9840 | U.S.A. | ... | *Indirect Mercury Lighting in Industrial Plants.* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 39.) |

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| 724 | 10050 | U.S.A. | ... *The Use and Planning of Works Music (Paper Presented A.S.M.E.).* (H. Burris-Meyer, Mech. World, Vol. 113, No. 2,934, 26/3/43, pp. 338-339.) |
| 725 | 10073 | U.S.A. | ... *Music in Industry.* (H. Burris-Meyer, Mech. Eng., Vol. 65, No. 1, Jan., 1943, pp. 31-34.) |
| 726 | 10117 | G.B. ... | ... *Modern Developments in Heating.* (F. Buckingham, Mech. World, Vol. 113, No. 2,938, 23/4/43, pp. 433-436.) |
| 727 | 10196 | G.B. ... | ... *Health in the Magnesium Industry.* (H. R. Gay, Metal Industry, Vol. 62, No. 20, 14/5/43, pp. 309-310.) |
| 728 | 10229 | U.S.A. | ... *Explosion Hazards in the Chemical Industry.* (T. A. Cohen, Ind. Eng. and Chem. (News Ed.), Vol. 21, No. 5, March 10, 1943.) |
| 729 | 10475 | U.S.A. | ... *Safety in Army Ordnance Establishments.* (C. Field, A.S.M.E. Preprints, April 26-28, 1943, pp. 1-7.) |
| 730 | 10545 | G.B. ... | ... *Safety Precautions in British Factories.* (W. Garrett, Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 10.) |
| 731 | 10547 | G.B. ... | ... *Music in Factories.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 22.) |

*Women in Industry.*

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| 732 | 10091 | Germany | ... *Women in German Aircraft Industry (Photo).* (Luftwissen, Vol. 10, No. 3, March, 1943, p. 87.) |
| 733 | 10253 | U.S.A. | ... *The Influence of Women on Aircraft Production Methods.* (W. G. Tuttle, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 142-143 and 195-199.) |

## Land and Water Transport.

*Trucks and Trailers.*

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| 734 | 9842 | U.S.A. | ... *Huge Trucks for Hauling Bomber Parts (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 40.) |
| 735 | 9868 | U.S.A. | ... *Motorized Lift Truck.* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 48.) |
| 736 | 9904 | U.S.A. | ... *Tractor-Trailer Combination for Transporting Aircraft Parts.* (Autom. Eng., Vol. 33, No. 434, March, 1942, p. 116.) |
| 737 | 10565 | Germany | ... *Details of Caterpillar Tracks for Heavy Rescue Army Lorry.* (C. Rabe, Motor Schau., Vol. 7, No. 2, Feb., 1943, pp. 54-57.) |
| 738 | 10569 | Germany | ... *Heavy Caterpillar Trucks for the German Army Fitted with Rescue Winch.* (C. Rabe, Motor Schau., Vol. 7, No. 3, March, 1943, pp. 90-94.) |

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| | | | *Tanks.* |
| 739 | 9888 | U.S.A. ... | *Women Repairing a 28-Ton M.3 Medium Tank.* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, p. 276.) |
| 740 | 9891 | G.B. ... ... | *British Covenanter Tanks in Mass Production (Photo).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, p. 289.) |
| 741 | 9895 | U.S.A. ... | *30-Ton Medium Tank, M.4 (Two Views).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, p. 306.) |
| 742 | 10003 | U.S.A. ... | *Cardillac M.S. Light Tank (Photograph).* (Autom. Ind., Vol. 88, No. 4, 15/2/43, p. 52.) |
| 743 | 10055 | G.B. ... ... | *Constructional Methods and Materials for Pickling Tanks.* (A. J. T. Eyles, Mech. World, Vol. 113, No. 2,931, 5/3/43, p. 247.) |
| 744 | 10113 | G.B. ... ... | *Structural Failure of the Welded Tanker "Schenectady."* (Engineering, Vol. 155, No. 4,034, 7/5/43, p. 376.) |
| 745 | 10402 | U.S.A. ... | *America's M.7 Tank (Photograph).* (Autom. Ind., Vol. 88, No. 5, 1/3/43, p. 39.) |
| | | | *Electric and Gas-Driven Vehicles.* |
| 746 | 9994 | U.S.A. ... | *Interchangeability of Parts for Army Vehicles.* (E. L. Warner, Autom. Ind., Vol. 88, No. 4, 15/2/42, pp. 17 and 76-78.) |
| 747 | 10171 | G.B. ... ... | *Battery Electric Vehicles.* (J. W. Macfarlane, Sheet Metal Industry, Vol. 17, No. 193, pp. 856-859 and 862.) |
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