

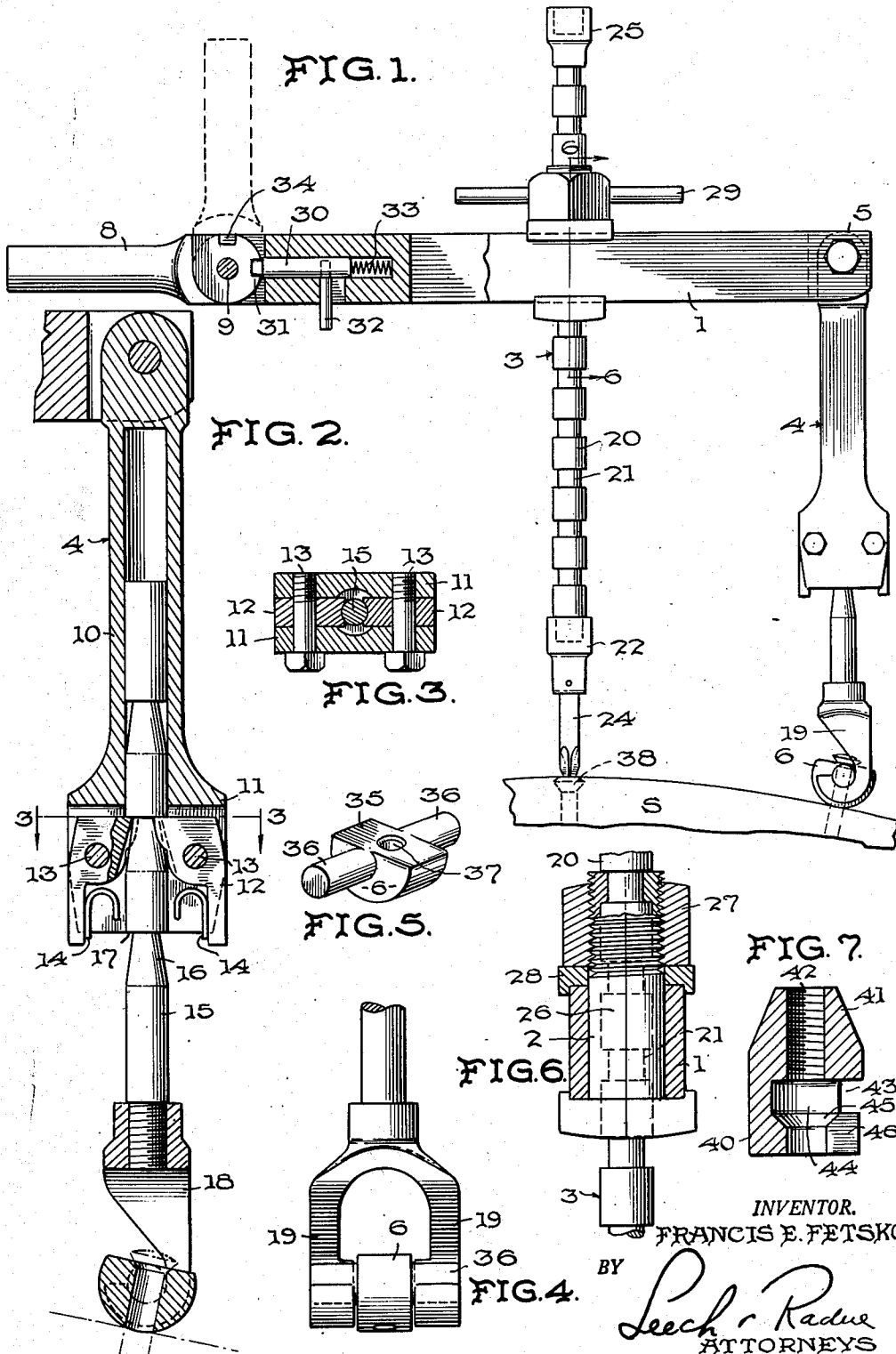
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SCREW REMOVING TOOL

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SCREW REMOVING TOOL

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4 Claims. (Cl. 144—32)

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This invention relates to a screw removing tool which is adapted to be used most advantageously on surfaces having a plurality of screws therein, such as airplane wings or fuselage sections.

Many times in removing screws by the ordinary hand screw driver, screws which are difficult to remove cause the person operating the screw driver to let same slip and destroy the slot in the screw head so that the screw driver then will not engage the screw head properly. In such a case it is generally necessary to use some special means to remove this screw. This invention makes it possible to remove such screws with a minimum of effort and time.

In view of the above, one of the objects of this invention is to provide a tool for removing screws which are difficult to remove using an ordinary hand screw driver.

Another object of this invention is the provision of a tool having one support member anchored to the surface from which the screw is to be removed, this anchored support member acting as the steadying member for a pivotally mounted lever attached thereto which carries the screw driver.

Still another object is the provision of a screw removing tool having adjustable support members so arranged that the optimum operating angles between parts may be maintained when there is considerable curvature of the surface in which the screws are secured.

Other objects and advantages of this invention will be brought out in the following specification and drawings wherein:

Fig. 1 shows the general arrangement of the tool components and the manner in which the tool is applied to a curved surface for removing a screw;

Fig. 2 is a vertical section through the anchor arm assembly;

Fig. 3 is a horizontal section taken along line 3—3 of Fig. 2;

Fig. 4 is a side elevation of the anchor arm and anchor trunnion assembly;

Fig. 5 is a perspective view of the anchor trunnion;

Fig. 6 is a vertical section taken along line 6—6 of Fig. 1; and

Fig. 7 is a vertical section of a modified anchor arm.

As shown in Fig. 1, the tool comprises a lever 1 having a slotted portion 2, best shown in Fig. 6, in which a screw removing unit 3 is slidably mounted. An anchor arm assembly 4 is pivotally mounted about pin 5 at one extremity of lever 1, 55

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and carries at its outer end anchor trunnion 6. A handle 8 is pivotally mounted on pin 9 at one end of lever 1.

Referring to Fig. 2, the anchor arm assembly 4 comprises a tubular support 10 having a lower U-shaped head 11. Two locking members 12 are pivotally mounted between the sides of head 11 on pins 13 as shown in Fig. 3 and are held in the closed position by abutment springs 14. A rod member 15 having tapered notched portions 16 is slidably mounted within the tubular support 10 and is held in position by the locking members 12 which engage shoulder 17 formed on rod 15 by the notched portion 16. The outer end of rod 15 is threadedly connected to bifurcated anchor 18 having spaced hook portions 19 extending downwardly therefrom to receive an anchor member or trunnion 6.

The screw removing assembly 3 as shown in Fig. 1 comprises a tool rod 20 having circular recessed portions 21 which form a series of adjusting steps. A tool receiving member 22 is fixed to the lower end of tool rod 20 and carries a suitable tool bit 24. Socket member 25 is secured to the upper end of tool rod 20 and is adapted to receive a handle member for rotating the rod. As shown in Fig. 6, tool rod 20 extends through slot 2 and is held in position by a locking means comprising a split sleeve 26 having its inner surface shaped to conform to the stepped portions of the rod 20 and having a lower flanged portion adapted to extend over the lower edges of the lever 1 as shown. The upper end of the split sleeve 26 is threaded to receive a nut 27 which engages a flanged bushing 28 loosely fitted over the threads and in engagement with the slotted portion of lever 1 and acts to hold the assembly in the desired position.

As shown in Fig. 1, the handle 8 is pivotally mounted on pin 9 and is held locked in the extended position by means of a locking bar 30 which engages a notch 31 in the handle 8. An operating pin 32 is secured to locking bar 30 for actuating same against the pressure of a coil spring 33. Another notch 34 is provided for locking handle 8 in the upright position as shown by the dotted lines of Fig. 1.

Referring to Fig. 5, anchor trunnion 6 comprises an enlarged semicylindrical portion 35 having a transverse bore 37 extending radially therethrough and support arms 36 extending from either side thereof. As shown in Fig. 4, the ratio of the diameter of the semicircular portion of trunnion 6 to the supporting arms 36 is such that when it is placed in the hook portions 19

of anchor member 18 the lower portion of 35
extends below the lowest point of hook members
19. This makes it possible to secure the trunnion
member 6 to a surface and introduce the hook
portions 19 of the anchor arm beneath the sup-
port members 36 and allow the anchor arm to
rotate freely about members 36.

In Fig. 7 there is shown a modified anchor
arm which comprises a cylindrical section 40
having a tapered upper portion 41 and threaded
bore 42 adapted to threadedly engage rod 15. A
transverse notch 43 extends far enough inward
to connect with an enlarged screw head receiv-
ing socket 44 which has a tapered portion 45
shaped to conform to the screw head. A verti-
cal slot forming the face 46 is cut to allow the
anchoring screw to enter the screw head receiv-
ing socket 44. This modified anchor arm in ef-
fect takes the place of the anchor flange 18 and
trunnion 6. This anchor member is especially
adapted for use on flat surfaces although it could
be used on other surfaces.

In use, the screw removing tool is set up as
shown in Fig. 1 upon a surface S containing a
plurality of screws which are to be removed. In
the event that the workmen have trouble remov-
ing a screw, such as that shown at 38, the screw
nearest 38 is removed and then used to secure
anchor trunnion 6 to surface S. After the an-
chor trunnion is secured to the surface, the an-
chor arm assembly 4 is connected to the trunnion
6 by positioning hook-like portions 19 under
arms 36 and is adjusted to the proper height by
pressing inwardly on the lower portion of lock
members 12 so as to disengage them from shoul-
der 17 and thereby allow free sliding movement
of rod 15 within the tubular member 19. After
ascertaining the correct height, the lock mem-
bers are allowed to engage the rod and hold it
in the desired position.

In order to position the screw removing as-
sembly 3, nut 27 is loosened with the aid of han-
dle 29 so as to free bushing 23 and the lower
flange of sleeve 26 from tight contact with the
side portions of the slotted section of lever 1.
The screw removing unit is then slid along until
tool bit 24 is directly over the screw 38. If after
positioning the tool bit 24 over the screw 38 it is
necessary to adjust the height of the unit to
maintain the proper angular relationship be-
tween tool components, the nut 27 is removed,
the bushing 23 is removed and the split sleeve 26
extended outwardly so that the raised portion
on the inner face of the sleeve will clear the
stepped portions 21 on tool rod 20. When the
rod 20 is free to slide within the split sleeve, the
proper height may be determined and the split
sleeve then engaged with the stepped portions of
rod 20 and locked in position by the assembly of
member 28 over the split sleeve and the tighten-
ing of same by means of nut 27.

It is very important that the proper angular
relationship of the tool components be main-
tained for best results. Obviously the most de-
sirable relationship of the components will be
such that the force applied by the lever will
cause the screw removing assembly 3 to exert a
turning movement having a downward compo-
nent of force directed along a line coincident with
the central vertical axis of the screw.

After setting up the tool as mentioned above,
the handle 8 is placed in a horizontal position
as shown and force is applied downwardly at
this point while the tool bit 24 is rotated by
means of a handle which is adapted to be re-

ceived by socket member 25 and thus the screw
38 is removed.

From the description of the tool in use it will
appear that the most favorable position of the
screw removing unit with respect to the remain-
der of the tool can be obtained on either a curved
or flat surface by virtue of the adjustable height
of the screw removing assembly 3 and the an-
chor arm assembly 4 as well as the rotatability
of the anchor arm about the anchor trunnion 6.
These three adjustable features when combined
with the slidable mounting of the screw remov-
ing assembly 3 make it possible to maintain the
proper working angle and direction of force re-
gardless of the type of surface being worked
upon.

The success of operation of this tool does not
depend upon the multiplication of forces by
means of levers but rather on the maintaining
of the tool components in such a relationship
that the force applied by the screw removing
assembly 3 is directed downwardly in a line co-
incident with the central vertical axis of the
screw. When the force is thus directed and the
tool bit held firmly in position screw removing is
easy and rapid.

The details of construction of the particular
embodiment of the invention herein illustrated
and described are not to be taken as limiting the
scope of the invention since the device may be
constructed in many forms.

What I claim is novel and desire to secure by
Letters Patent of the United States is:

1. A screw removing tool adapted to remove
screws from surfaces which may be flat, curved,
or irregular, comprising a slotted lever, a pivot-
ally mounted anchor arm carried by said lever,
the anchor arm being bifurcated to provide hook
portions on the lower end, an anchor member
adapted to be secured to the surface from which
the screws are to be removed, said anchor mem-
ber comprising a semicylindrical portion having
a bore transversely extending therethrough
adapted to receive an anchoring screw and a
support arm extending from each end thereof,
said arms being rotatably engaged by the anchor
arm hook portions, and a screw removing assem-
bly slidably carried in the slotted portion of the
aforementioned lever.

2. A screw removing tool adapted to remove
screws from surfaces which may be either flat,
curved, or irregular, comprising a slotted lever,
a tubular support pivotally carried by said lever,
said support having a lower U-shaped head por-
tion, a pair of spring biased locking members
supported within said U-shaped head portion,
a notched rod slidable in the tubular support
and held in locked position by aforesaid lock-
ing members, an anchor arm secured to the
notched rod, said anchor arm having depend-
ing hook portions, an anchor trunnion having
a bore extending therethrough adapted to re-
ceive an anchoring screw pivotally engaged by
the aforementioned hook portions to serve as
the means for anchoring the tool to a given
surface, a screw removing assembly slidably po-
sitioned in the slotted portion of said lever, said
screw removing assembly including a notched
screw head engaging member, a pair of split
sleeves adapted to interfit with the notched por-
tion of said engaging member, and means for
holding said split sleeves in contact with said
engaging member and securing said engaging
member with respect to the slotted lever sec-
tion, and a handle pivotally mounted on the

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end portion of said lever opposite to that of the aforesaid tubular support.

3. The tool as described in claim 2 wherein the anchor trunnion comprises a semicylindrical portion having a bore radially extending there-through, and a support arm extending from each side of said semicylindrical member, the support arms being rotatably engaged by the hook portions of the anchor arm.

4. The tool as described in claim 1 wherein the semicylindrical center portion of the anchor member has a diameter greater than that of the supporting arms so that upon engagement of the hook portions of the anchor arm with the support arms the hook portions will not bear against the surface to which the trunnion is anchored.

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