

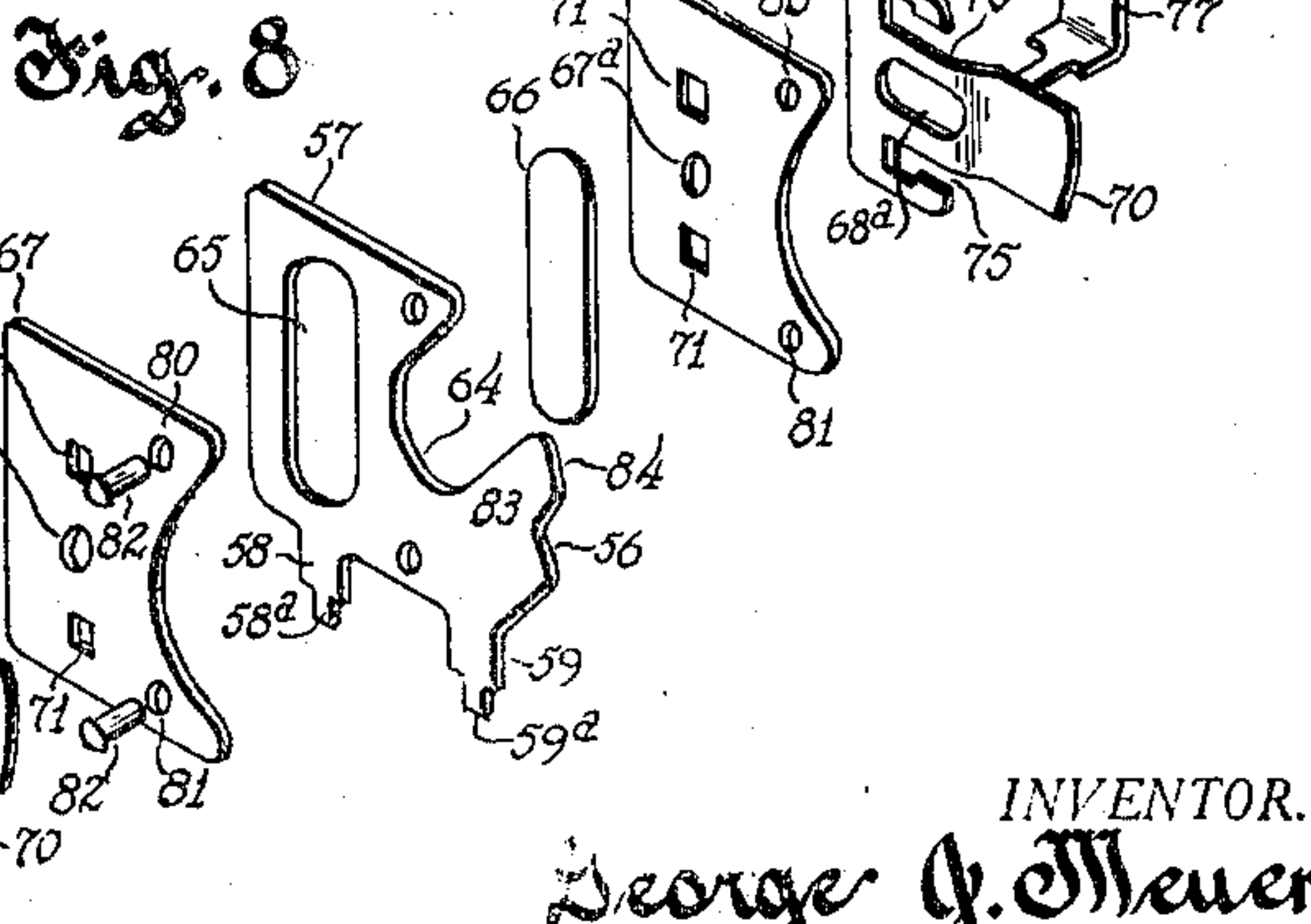
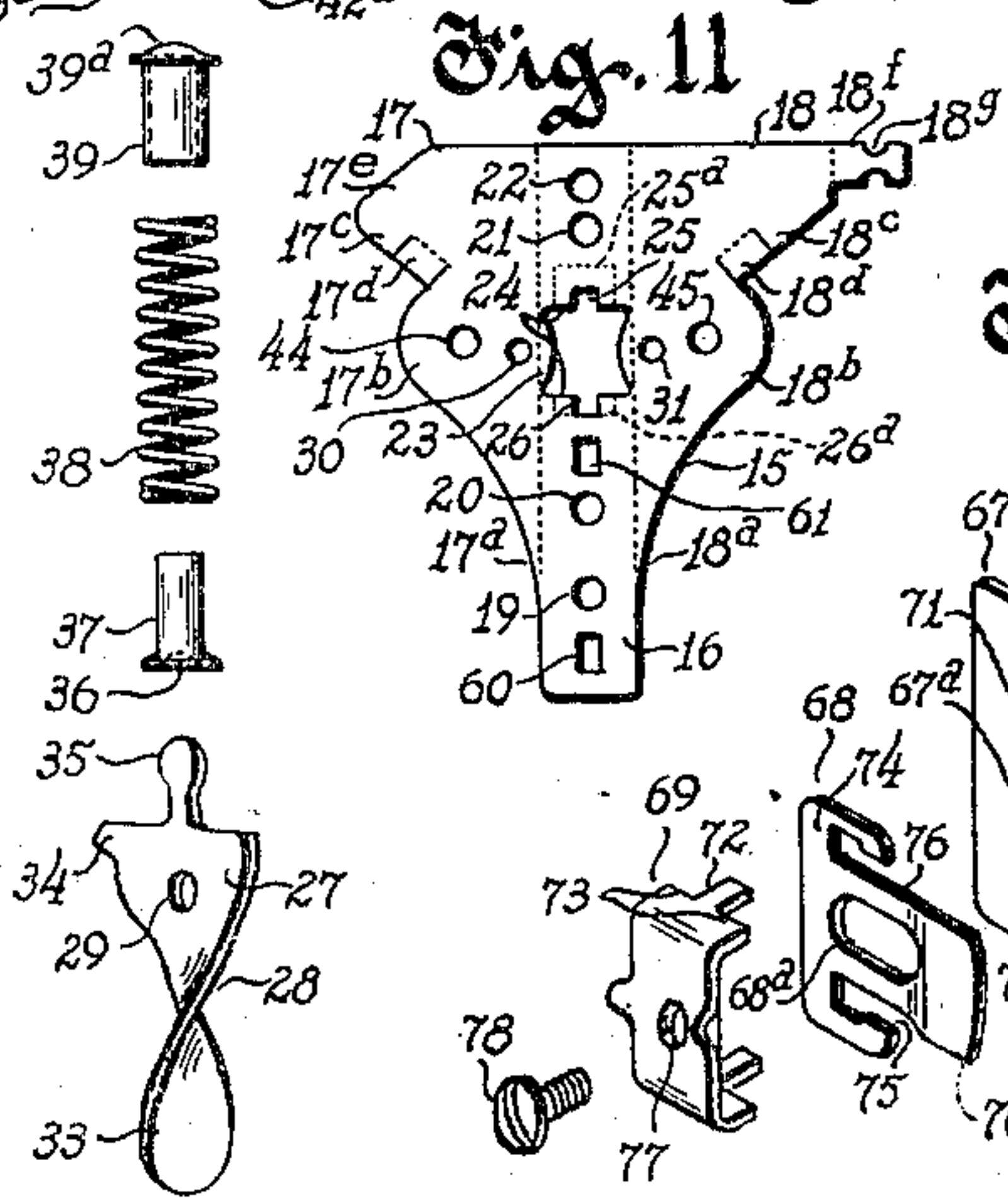
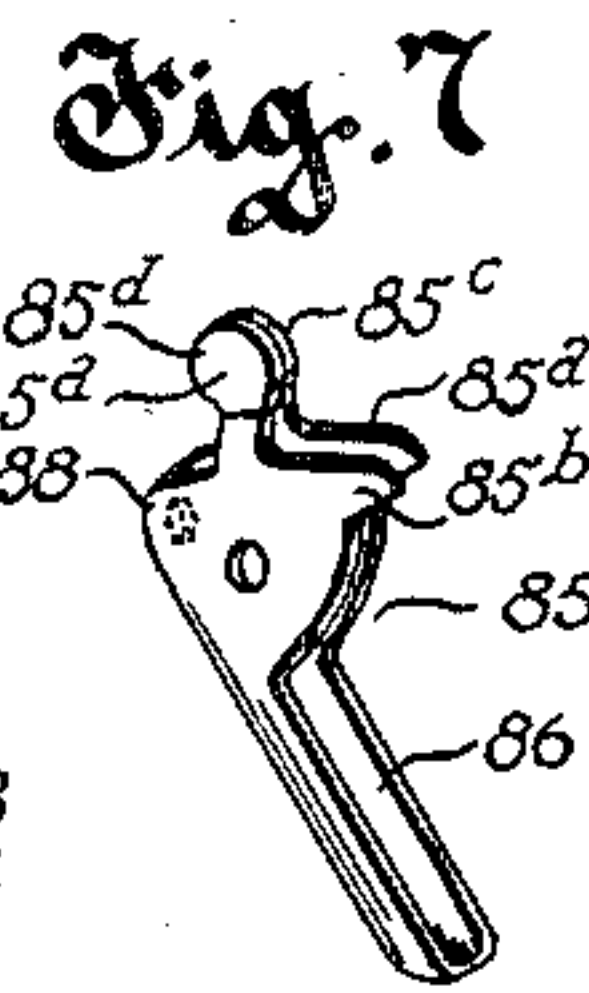
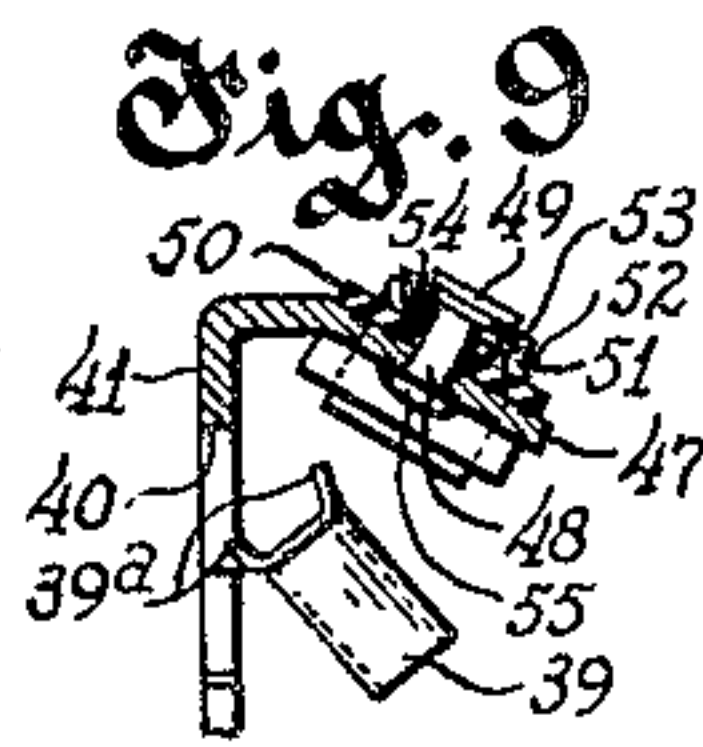
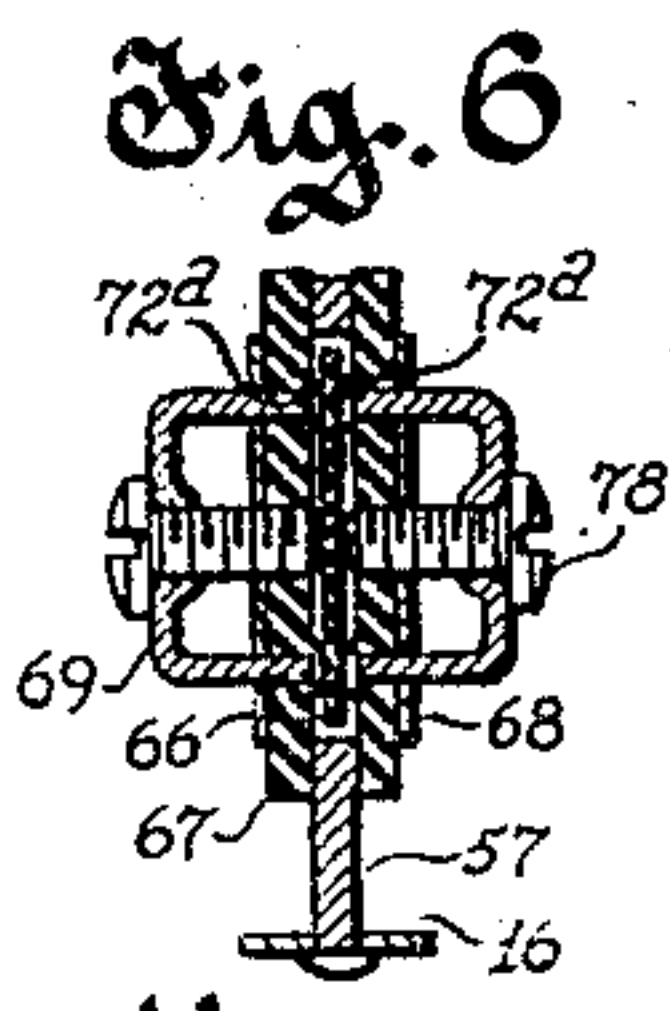
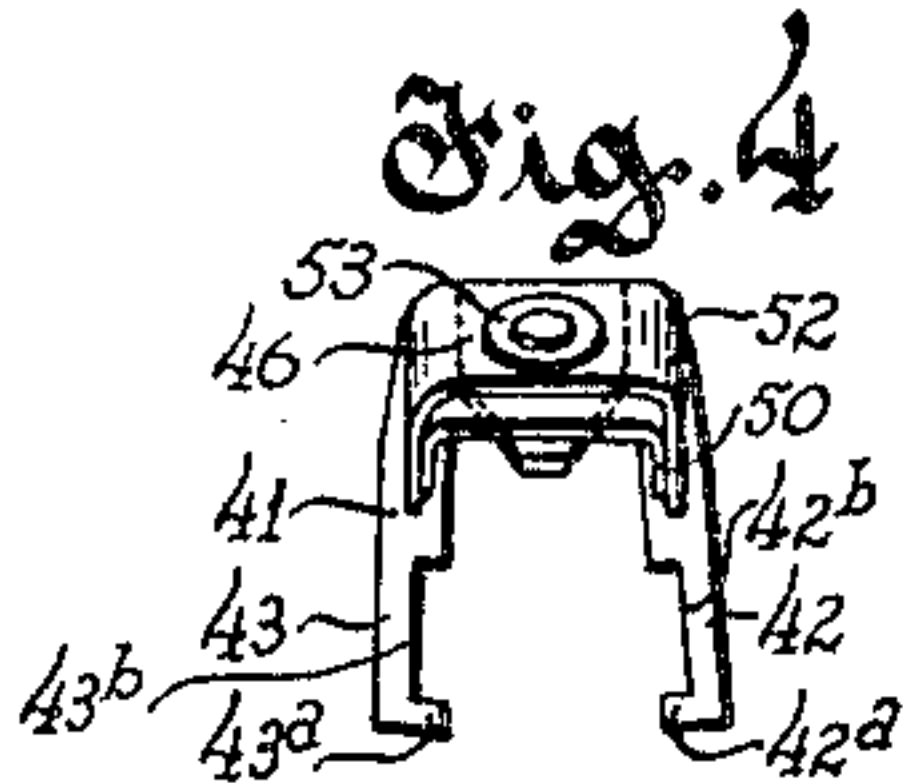
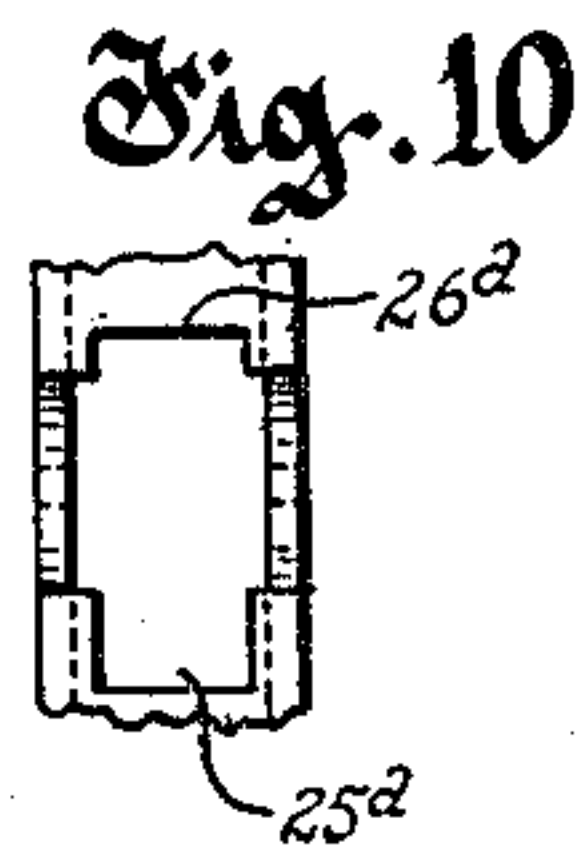
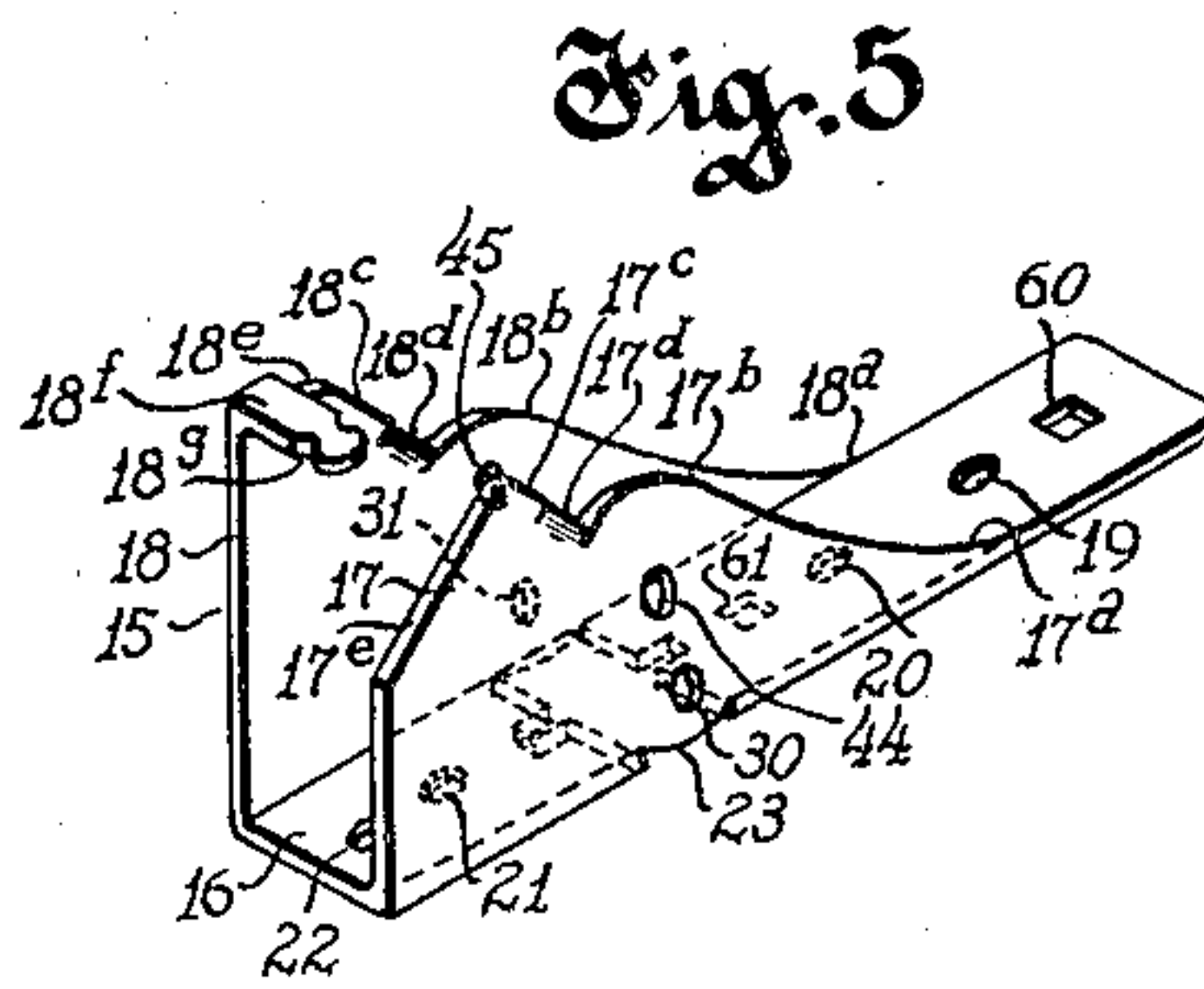
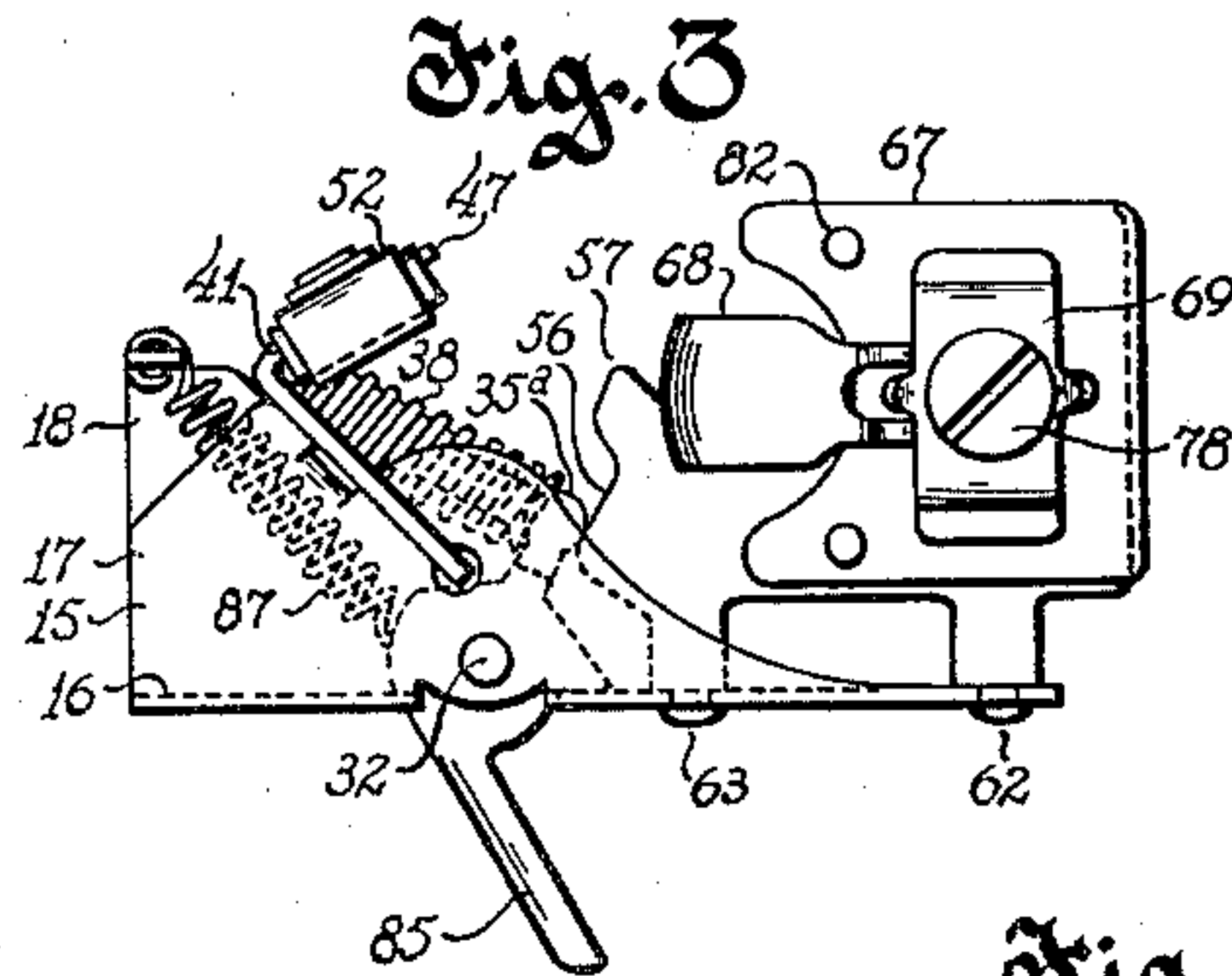
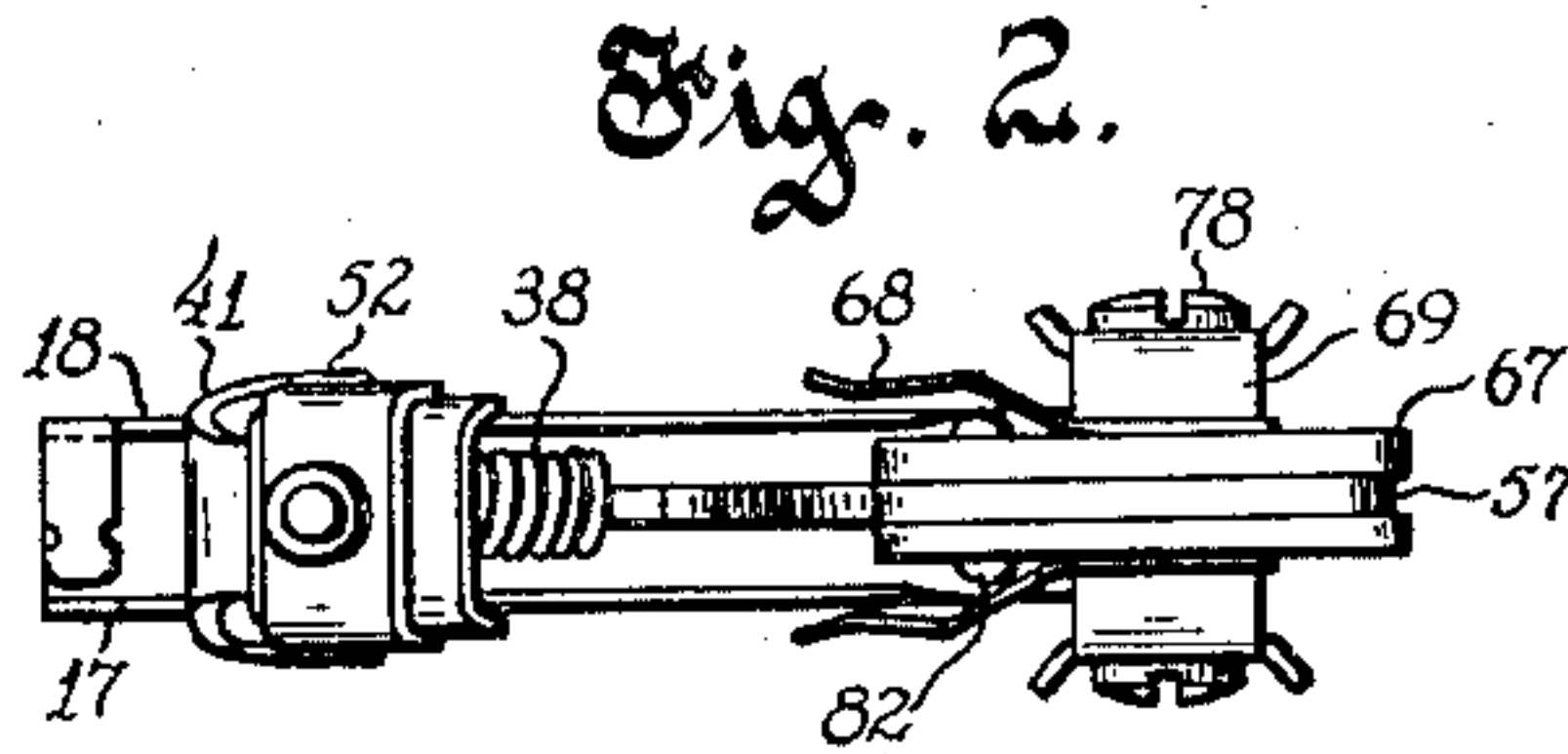
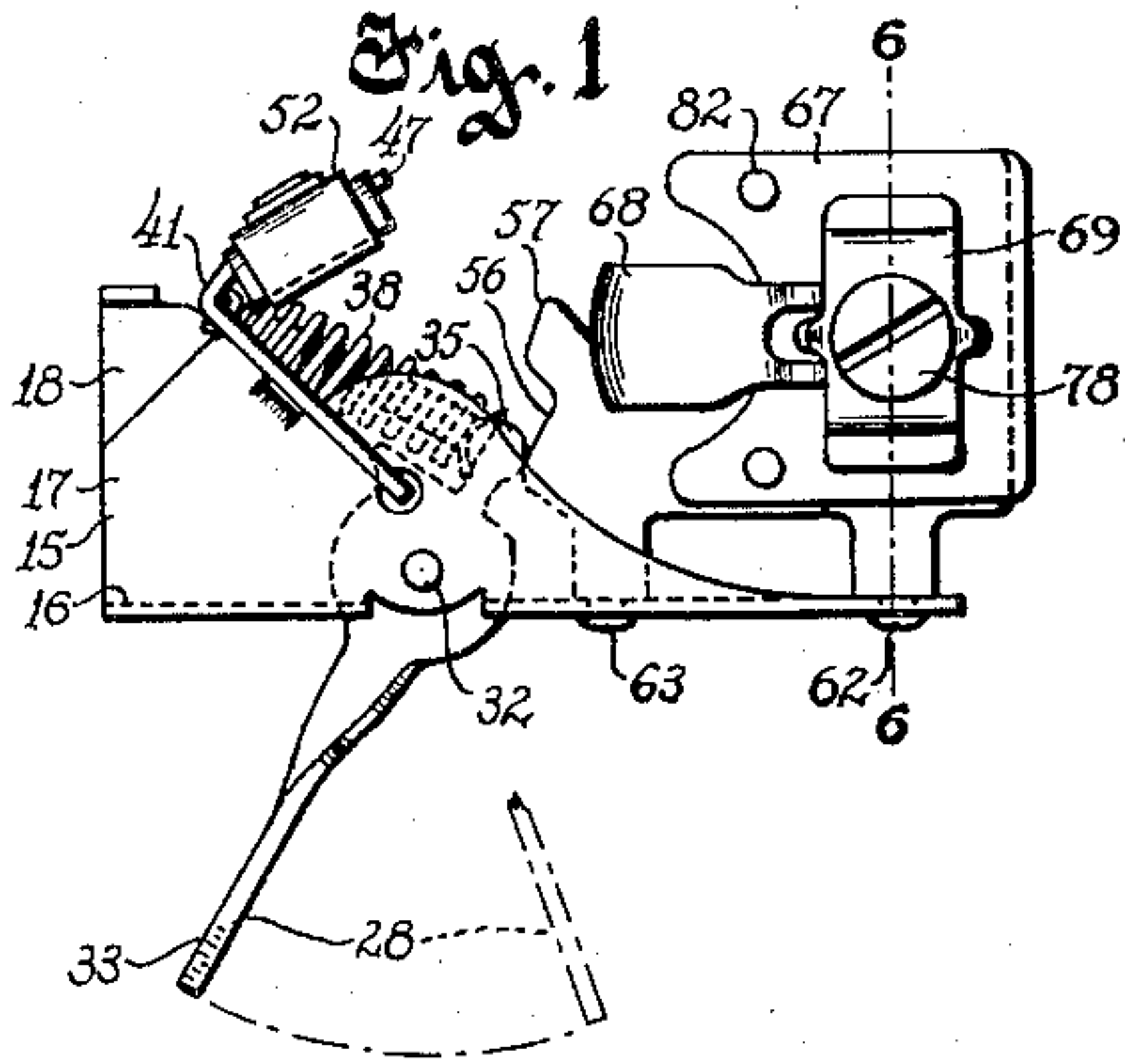
Oct. 7, 1930.

G. J. MEUER

1,777,525

ELECTRIC SNAP SWITCH

Filed June 8, 1929



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UNITED STATES PATENT OFFICE

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ELECTRIC SNAP SWITCH

Application filed June 8, 1929. Serial No. 369,443.

This invention relates to improvements in electric snap switches, and the invention more particularly relates to tool handle switches having actuating means of the toggle-lever or trigger type.

An object of the invention is to provide an improved and simplified snap switch of the aforementioned character.

Another object is to improve the details of construction and operation of tool handle snap switches whereby the several parts thereof may be readily and cheaply assembled, and in which the switch parts are not likely to get out of order.

Another and more specific object is to provide a novel type of stationary contacts and mounting means therefor.

Another object is to provide an improved carrier for the oscillatable contactor of the switch, together with novel means for insuring substantially positive initial actuation of the latter, whereby sticking or "freezing" of the switch parts is obviated.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawings illustrate certain embodiments of the invention which will now be described, it being understood that various changes may be made in certain of the details of construction of the devices illustrated without departing from the scope of the appended claims.

In the drawings, Figure 1 is a side elevation of a tool handle snap switch of the toggle type constructed in accordance with my invention.

Fig. 2 is a top plan view of the switch shown in Fig. 1.

Fig. 3 is a view similar to Fig. 1, but showing a slightly modified form of actuating lever having a return spring.

Fig. 4 is a view, partly in plan and partly in perspective, showing in separated relation the movable elements of the switch illustrated in Fig. 1.

Fig. 5 is a perspective view of the switch frame shown in Fig. 1.

Fig. 6 is a vertical section on the line 6-6 of Fig. 1.

Fig. 7 is a perspective view of the actuating lever shown in Fig. 3.

Fig. 8 is a perspective view of the stationary contacts and terminals and the mounting means therefor, the various parts being shown in separated relation.

Fig. 9 is a vertical sectional view of the carrier, showing the manner of securing and insulating the contactor with respect thereto.

Fig. 10 is a fragmentary bottom plan view of the frame member showing an enlargement of the guide slots to accommodate the actuating lever of Figs. 3 and 7, and

Fig. 11 is a plan view of the frame blank.

Referring to the drawings, the numeral 15 designates in general the switch frame, said frame comprising an elongated substantially rectangular base portion 16 and integral sides 17 and 18. The sides 17 and 18 preferably merge into the base portion 16 at points 17^a and 18^a spaced a predetermined distance from one end of the base portion, and said sides are provided with transversely aligned arcuate edges 17^b and 18^b, which arcuate edges terminate in angularly extending edges 17^c and 18^c forming stop shoulders for a carrier member hereinafter described. The angular edges 17^c and 18^c are each provided with a pair of short parallel slits, between which the metal of the frame is bent inwardly to provide adjacent lugs 17^d and 18^d.

The side 17 is preferably cut away at an angle, as indicated at 17^e, whereas the upper edge of the side 18 extends horizontally backward as indicated at 18^e, and is provided with an inwardly bent integral lug 18^f having a portion 18^g of reduced width for a purpose to be described. The base portion 16 is preferably provided with a plurality of tapped perforations 19, 20, 21 and 22 which are arranged in a predetermined spaced relation,—it being understood that only two of these openings will ordinarily be employed for attachment of the switch frame within the usual tubular housing or casing whereas the spacing of the openings is such as to adapt the switch to mounting in casings having various different arrangements of openings for the securing screws.

The base portion 16 is preferably cut away throughout its width to provide the substantially rectangular opening 23, and the longitudinally spaced walls 24 of said opening are provided with medial slots or notches 25 and 26 which are adapted to receive and guide the flat body portion 27 of a punched sheet metal actuating lever 28 which is provided with a pivot opening 29 adapted to register with openings 30 and 31 in the frame sides. A headed pivot pin 32 is adapted to penetrate said aligned openings, and the end of said pin is then swaged or otherwise enlarged to retain the same against displacement. As will be apparent, the slots 25 and 26 act to hold the lever 28 against lateral shifting movement.

As shown the handle or trigger portion 33 of lever 28 which projects outwardly from the frame is preferably twisted to a position at substantially right angles to the main body thereof to facilitate manipulation. The body portion 27 of said lever is provided with a lug or projection 34 to engage the frame base beyond the notch 25 for limiting oscillation of said lever in one direction. Portion 27 is further provided with a rounded projection or knob 35 which is adapted to bear against the concaved end 36 of a flanged rivet member 37 or the like. Member 37 is adapted to fit into one end of a coiled compression spring 38, and said member is normally adapted to telescope within a flanged eyelet 39 fitted into the other end of said spring.

The opposite edges 39^a of the flange upon said eyelet are preferably bent upwardly into approximate parallelism, and said edges are adapted to straddle the edge 40 of the U-shaped main body portion 41 of an oscillatable contact carrying member. Said U-shaped body portion 41 comprises a flat stamping the arms 42 and 43 of which diverge slightly to permit the inwardly extending ends 42^a and 43^a thereof to freely straddle the sides 17 and 18 of the frame,—said arms being thereupon bent edgewise toward each other to cause pivotal engagement of said ends 42^a and 43^a with openings 44 and 45 in the respective sides. It will be noted that the arms 42 and 43 are cut away, as indicated at 42^b and 43^b to accommodate the portions of said sides between said pivot openings 44 and 45 and the arcuate edges 17^b and 18^b aforescribed.

Integral with the main body portion 41 of the contact carrying member (and preferably of reduced width as indicated in dotted lines at 46 in Fig. 4) is a forwardly and downwardly extending portion 47 which is perforated to receive with a fairly close fit the shank 48 of a rivet the beveled head of which is shown at 49. Superimposed upon the portion 47 is an insulating strip 50 which is bent to substantially U-shape, said strip being

likewise perforated to provide a relatively close fit with said shank 48, and said perforation being surrounded by an upturned annular flange 51 to fit against the walls of a relatively larger perforation in a similarly shaped contactor 52. Superimposed upon the contactor 52 is an insulating disk 53 the perforation in which is provided with a downturned annular flange 54 to similarly engage the walls of the perforation in said contactor. When the parts are thus assembled the shank 48 is riveted or upset, as indicated at 55, Fig. 9, whereby said parts are secured to each other.

As shown in Fig. 1, oscillation of lever 28 in a clockwise direction is limited by engagement of the knob 35 with an abutment or shoulder 56 which is a part of the frame plate 57. Said frame plate preferably consists of a flat metallic punching having legs 58 and 59 provided with reduced end portions 58^a and 59^a adapted to penetrate correspondingly shaped perforations 60 and 61 in the base portion 16, said end portions being upset or riveted as shown at 62 and 63 to rigidly secure the frame plate to the base portion 16 of the frame.

The frame plate 57 is notched or cut away as indicated at 64 to accommodate the forward end 47 of the carrier and to provide an edge against which said end 47 is adapted to strike to limit the forward movement of the contactor. Plate 57 is further provided with a substantially elliptical perforation 65 adapted to receive a correspondingly shaped but relatively thinner insulating plate 66.

Adapted for positioning on opposite sides respectively of the frame plate are a pair of identically shaped relatively rigid insulating plates 67, each of which is adapted to respectively support duplicate contact and terminal members 68 and 69,—the contacts being adapted for positioning in reverse relation to each other to provide right and left hand flaring tips 70 for cooperation with the bridging contactor 52.

Each of the plates 67 is provided with a pair of vertically aligned substantially rectangular perforations 71 adapted to receive the reduced ends 72 of said terminal members 69 which comprise metallic strips bent to U-shape. The shoulders 73 formed by said reduced ends 72 are adapted for clamping engagement with the portions 74 of the contacts 68, said portions 74 being notched, as indicated at 75, to accommodate the ends 72 of the terminal members. Moreover, it will be noted that the neck portions 76 of the contacts are free from engagement with the terminal members, whereby maximum resiliency of said contacts is insured.

The terminal members are provided with tapped openings 77 to receive the usual binding screws 78, whereas the contacts 68 and insulating plates 67 are respectively pro-

vided with perforations 68^a and 67^a to accommodate the shanks of said binding screws. As will be noted the perforations 68^a are sufficiently large to provide free flexing of the contacts without obstruction by the respective binding screws. When the parts are thus positioned the ends 72 of the terminal members are riveted or upset against the opposite sides of the respective insulating plates, as shown at 72^a in Fig. 6, to secure said parts to each other. The insulating plates 67 are then positioned on opposite sides of the frame plate 57,—the insulating plate 66 having been inserted within the perforation 65 to prevent possible contact of the riveted ends 72^a of the terminal members or of the ends of the binding screws.

The insulating plates 67 and frame plate 57 are further provided with suitable perforations 80 and 81, respectively, to receive headed members 82, the ends of which are then upset as best shown in Fig. 2 to secure all of said parts together. It will be understood that the assembly of elements as just described is preferably effected prior to attachment of the frame plate 57 to the base portion 16 of the frame.

Frame plate 57 is likewise provided with a projection 83 having an angular edge 84 to act as an abutment for the spring 38 when the lever 28 is moved in a clockwise direction,—said abutment 84 serving in the manner of lugs 17^a as aforescribed to insure substantially positive initial actuation of the contactor 52 when the latter is to be disengaged from the stationary contacts.

While I have shown and prefer to employ the telescoping members within the spring 38 it will be apparent to those skilled in the art that the desirable results incident to the provision of lugs 17^a, 18^a and abutment surface 84 will be attained even though said telescoping members are omitted.

The switch illustrated in Fig. 3 is substantially like that shown in Figs. 1 and 2, and corresponding parts have been designated by like numerals of reference. However, the actuating lever 85 of Fig. 3 is specially designed to extend rearwardly of the switch frame in all positions of the throw thereof.

Thus as shown said lever 85 preferably comprises a blank which is stamped or formed to provide a hollow handle portion 86 having a smooth and rounded exterior surface, and the main body thereof is provided with spaced sides 85^a and 85^b (Fig. 7). Said sides are provided with projections 85^c and 85^d which engage the switch frame to limit the clockwise movement of said lever under the action of a tension spring 87, a looped end of which engages a perforation 88 in said lever.

The other looped end of spring 87 engages the reduced portion 18^e of lug 18^e on the frame, and said spring 87 is of sufficient

strength to predominate over the compression spring 38, thus biasing the switch to off position as illustrated in Fig. 3.

As shown in Fig. 7, the sides of lever 85 are offset toward each other to provide the knob 35^a for engagement with the lower end of compression spring 38. Also as shown in full lines in Fig. 10 and in dotted lines in Fig. 11, relatively wider guide slots 25^a and 26^a are provided to accommodate the increased width of the lever 85; it being noted that slot 25^a is likewise of greater depth to avoid fouling of the lower end of spring 87 when lever 85 is moved to its extreme position in a counterclockwise direction. It will be understood that when in use the tubular casing of the switch acts to limit such counterclockwise movement of the lever 85, and hence a projection similar to that employed in the switch of Fig. 1 is not required.

Also it will be apparent that if desired the lever 27 of Fig. 1 may be provided with a suitable perforation to provide for attachment of a return spring 87 between the same and the lug 18^e on the frame.

It is to be noted that the pivotal centers 30 and 44 of the actuating lever and the contact carrier are arranged out of vertical alinement, whereas the point of engagement of the knob 35 or 35^a with the lower end of spring 38 is at all times above said pivotal centers. This arrangement insures against dead centering of the movable parts of the switch.

What I claim as new and desire to secure by Letters Patent is:

1. In an electric snap switch, in combination, a stamped sheet metal frame comprising an elongated substantially rectangular base and parallel sides integral with said base, said sides having alined arcuate edge portions and pivot openings concentric with said arcuate edge portions, a contact carrying member comprising a metallic punching having a flat substantially U-shaped portion adapted to straddle the frame sides, the arms of said U-shaped portion having inwardly projecting ends adapted to enter said pivot openings upon edgewise bending of the former, an actuating lever comprising a metallic punching pivoted within said frame at a point below and to one side of the aforementioned pivot openings, said base having a slot to receive and guide said lever whereby lateral shifting movement of the latter is prevented, said lever having an end portion extending above the pivotal center of said contact carrying member, a compression spring interposed between the aforementioned end portion of said lever and said contact carrying member, and means on said frame for substantially preventing outward buckling of said spring upon movement of said actuating lever in either direction, whereby substantially positive

initial actuation of said contact carrying member in each direction is insured.

2. In an electric snap switch, in combination, a stamped sheet metal frame comprising an elongated substantially rectangular base and parallel sides integral with said base, said sides having aligned arcuate edge portions and pivot openings concentric with said arcuate edge portions, a contact carrying member comprising a metallic punching having a flat substantially U-shaped portion adapted to straddle the frame sides, the arms of said U-shaped portion having inwardly projecting ends adapted to enter said pivot openings upon edgewise bending of the former, an actuating lever comprising a metallic punching pivoted within said frame at a point below and to one side of the aforementioned pivot openings, said base having a slot to receive and guide said lever whereby lateral shifting movement of the latter is prevented, said lever having an end portion extending above the pivotal center of said contact carrying member and another end portion extending outwardly from said frame at an angle thereto to provide for manual operation thereof, said last mentioned end portion being twisted to provide for positioning thereof at substantially right angles to the main body of said lever, a compression spring interposed between the aforementioned end portion of said lever and said contact carrying member, and means on said frame for substantially preventing outward buckling of said spring upon movement of said actuating lever in either direction, whereby substantially positive initial actuation of said contact carrying member in each direction is insured.

3. In an electric snap switch, in combination, a stamped sheet metal frame having a substantially rectangular base portion and integral parallel sides, each of said sides having an intermediate arcuate edge portion and an adjacent angular edge portion forming a stop shoulder, a pair of lugs bent inwardly toward each other from the respective angular edge portions, a stamped sheet metal contact carrying member having a flat main body portion of substantially U-shape, the arms of said main body portion being adapted to straddle the sides of said frame and being bent inwardly edgewise thereof to provide for engagement of the inwardly projecting ends thereof with corresponding pivot openings in said sides, said arms being provided with cut-away portions to clear the aforementioned arcuate edge portions while providing for engagement of said main body portion with said stop shoulders, an actuating lever pivoted within said frame at a point angularly offset with respect to the pivot point of said contact member to avoid dead centering of said parts, and a compression spring interposed between said actuating lever and said contact carrying member to

provide for snap movement of the latter from each extreme position to the other upon oscillation of the former in opposite directions respectively.

4. In an electric snap switch, in combination, a stamped sheet metal frame having a substantially rectangular base portion and integral parallel sides sloping upwardly from points spaced from one end of said base portion, each of said sides having an intermediate arcuate edge portion and an adjacent angular edge portion forming a stop shoulder, a pair of lugs bent inwardly toward each other from the respective angular edge portions, a stamped sheet metal contact carrying member having a flat main body portion of substantially U-shape, the arms of said main body portion being adapted to straddle the sides of said frame and being bent inwardly edgewise thereof to provide for engagement of the inwardly projecting ends thereof with corresponding pivot openings in said sides, said arms being provided with cut-away portions to clear the aforementioned arcuate edge portions while providing for engagement of said main body portion with said stop shoulders, an actuating lever pivoted within said frame at a point angularly offset with respect to the pivot point of said contact member to avoid dead centering of said parts, and a compression spring interposed between said actuating lever and said contact carrying member to provide for snap movement of the latter from each extreme position to the other upon oscillation of the former in opposite directions respectively, said spring being engageable with said lugs to provide for substantially positive actuation of said contact carrying member from one extreme position thereof.

5. In an electric snap switch, in combination, a stamped sheet metal frame having a substantially rectangular base portion and integral parallel sides sloping upwardly from points spaced from one end of said base portion, each of said sides having an intermediate arcuate edge portion and an adjacent angular edge portion forming a stop shoulder, a pair of lugs bent inwardly toward each other from the respective angular edge portions, a stamped sheet metal contact carrying member having a flat main body portion of substantially U-shape, the arms of said main body portion being adapted to straddle the sides of said frame and being bent inwardly edgewise thereof to provide for engagement of the inwardly projecting ends thereof with corresponding pivot openings in said sides, said arms being provided with cut-away portions to clear the aforementioned arcuate edge portions while providing for engagement of said main body portion with said stop shoulders, an actuating lever pivoted within said frame at a point angularly offset with respect to the pivot point of said contact member to

avoid dead centering of said parts, a compression spring interposed between said actuating lever and said contact carrying member to provide for snap movement of the latter from each extreme position to the other upon oscillation of the former in opposite directions respectively, said spring being engageable with said lugs to provide for substantially positive actuation of said contact carrying member from one extreme position thereof, and means comprising an abutment member rigidly secured to the frame and engageable by said spring to afford substantially positive actuation of said contact carrying member from its other extreme position.

6. In an electric snap switch, in combination, a stamped sheet metal frame having a substantially rectangular base portion and integral parallel sides, each of said sides having an intermediate arcuate edge portion and an adjacent angular edge portion forming a stop shoulder, a pair of lugs bent inwardly toward each other from the respective angular edge portions, a stamped sheet metal contact carrying member having a flat main body portion of substantially U-shape, the arms of said main body portion being adapted to straddle the sides of said frame and being bent inwardly edgewise thereof to provide for engagement of the inwardly projecting ends thereof with corresponding pivot openings in said sides, said arms being provided with cut-away portions to clear the aforementioned arcuate edge portions while providing for engagement of said main body portion with said stop shoulders, an actuating lever pivoted within said frame at a point angularly offset with respect to the pivot point of said contact member to avoid dead centering of said parts, a compression spring interposed between said actuating lever and said contact carrying member to provide for snap movement of the latter from each extreme position to the other upon oscillation of the former in opposite directions respectively, and means comprising a tension spring having one end thereof attached to said lever eccentrically of the pivot point of the latter to bias the same to one extreme position.

7. In an electric snap switch, in combination, a stamped sheet metal frame having an elongated substantially rectangular base and integral parallel sides the edges of which slope upwardly from points spaced from one end of said base portion, said sides having aligned angularly extending edges forming stop shoulders, a stamped sheet metal contact carrying member having a flat main body portion of substantially U-shape the arms of which are provided with inward extensions adapted to enter aligned pivot openings in said sides upon edgewise bending of said arms, said frame base having a slot, an actuating lever pivoted within the frame and engaging

the side walls of said slot to prevent lateral shifting movement of the lever, a compression spring interposed between said actuating lever and said contact carrying member to provide for snap movement of the latter upon oscillation of the former in opposite directions respectively, said spring having telescoping members located therewithin to prevent substantial buckling thereof and to provide abutments therefor, and means comprising abutments on said frame to be engaged by said spring upon each operation of said lever to thereby positively initiate movement of said contact carrying member from each extreme position to the other.

8. In an electric snap switch, in combination, a stamped sheet metal frame having an elongated substantially rectangular base and integral parallel sides the edges of which slope upwardly from points spaced from one end of said base portion, said sides having aligned angularly extending edges forming stop shoulders, a stamped sheet metal contact carrying member having a flat main body portion of substantially U-shape the arms of which are provided with inward extensions adapted to enter aligned pivot openings in said sides upon edgewise bending of said arms, said frame base having a slot, an actuating lever pivoted within the frame and engaging the side walls of said slot to prevent lateral shifting movement of the lever, a compression spring interposed between said actuating lever and said contact carrying member to provide for snap movement of the latter upon oscillation of the former in opposite directions respectively, said spring having telescoping members located therewithin to prevent substantial buckling thereof and to provide abutments therefor, means comprising abutments on said frame to be engaged by said spring upon each operation of said lever to thereby positively initiate movement of said contact carrying member from each extreme position to the other, one of said abutments comprising a flat punched frame plate rigidly secured to said frame base perpendicularly of the latter, a pair of relatively rigid insulating plates secured to said frame plate on opposite sides of the latter, a resilient stationary contact located upon the outer side of each of said insulating plates, and a substantially U-shaped terminal member permanently secured to each of said insulating plates in clamping engagement with the respective contacts.

9. In an electric snap switch, in combination, a stamped sheet metal frame having an elongated substantially rectangular base and integral parallel sides, said sides having aligned angularly extending edges forming stop shoulders, a stamped sheet metal contact carrying member having a flat main body portion of substantially U-shape the arms

of which are provided with inward extensions adapted to enter aligned pivot openings in said sides upon edgewise bending of said arms, said frame base having a slot, an actuating lever pivoted within the frame and engaging the side walls of said slot to prevent lateral shifting movement of the lever, a compression spring interposed between said actuating lever and said contact carrying member to provide for snap movement of the latter upon oscillation of the former in opposite directions respectively, said spring having telescoping members located there-within to prevent substantial buckling thereof and to provide abutments therefor, means comprising abutments on said frame to be engaged by said spring upon each operation of said lever to thereby positively initiate movement of said contact carrying member from each extreme position to the other, one of said abutments comprising a flat punched frame plate rigidly secured to frame base perpendicularly of the latter, a pair of relatively rigid insulating plates secured to said frame plate on opposite sides of the latter, a resilient stationary contact located upon the outer side of each of said insulating plates, a substantially U-shaped terminal member permanently secured to each of said insulating plates in clamping engagement with the respective contacts, and a substantially U-shaped contact carried by but insulated from said contact carrying member and adapted for bridging engagement with said stationary contacts.

10. In an electric snap switch, in combination, a frame plate comprising a flat metal punching, said frame plate having an elongated perforation, an insulating plate adapted to fit within said perforation, a pair of insulating plates of like dimensions arranged on opposite sides of said frame plate and permanently secured thereto, each of said pair of insulating plates having a resilient contact member arranged upon the outer surface thereof, and a pair of substantially U-shaped terminal members each having reduced leg portions adapted to penetrate one of said contact members and its associated insulating plate and riveted over the latter to secure said parts in a fixed relation.

11. In an electric snap switch, in combination, a flat and relatively rigid insulating plate, a substantially T-shaped resilient contact member superimposed upon said insulating plate, a terminal member formed of strip metal and bent to substantially U-shape, the arms of said terminal member having end portions of reduced width adapted to penetrate corresponding openings in said insulating plate, the shoulders formed by said reduced end portions being adapted for clamping engagement with the respective arms of said T-shaped contact member, and said end portions being upset against said

insulating plate to permanently secure said contact and terminal members thereto.

12. In an electric snap switch, in combination a flat and relatively rigid insulating plate, a substantially T-shaped resilient contact member superimposed upon said insulating plate, a terminal member formed of strip metal and bent to substantially U-shape, the arms of said terminal member having end portions of reduced width adapted to penetrate corresponding openings in said insulating plate, the shoulders formed by said reduced end portions being adapted for clamping engagement with the respective arms of said T-shaped contact member, and said end portions being upset against said insulating plate to permanently secure said contact and terminal members thereto, the main body of said terminal member being spaced a predetermined distance from the main body of said contact member to permit flexure of the latter beneath the former.

13. In an electric snap switch, in combination, a flat and relatively rigid insulating plate, a substantially T-shaped resilient contact member superimposed upon said insulating plate, a terminal member formed of strip metal and bent to substantially U-shape, the arms of said terminal member having end portions of reduced width adapted to penetrate corresponding openings in said insulating plate, the shoulders formed by said reduced end portions being adapted for clamping engagement with the respective arms of said T-shaped contact member, said end portions being upset against said insulating plate to permanently secure said contact and terminal members thereto, said terminal member, contact member and insulating plate having registering openings, and a binding screw adapted to penetrate said openings, said screw having threaded engagement with the opening in said terminal plate.

14. In an electric snap switch, in combination, a flat and relatively rigid insulating plate, a substantially T-shaped resilient contact member superimposed upon said insulating plate, said contact member having a partially reflexed portion on an outwardly flaring end portion, a terminal member formed of strip metal and bent to substantially U-shape, the arms of said terminal member having end portions of reduced width adapted to penetrate corresponding openings in said insulating plate, the shoulders formed by said reduced end portions being adapted for clamping engagement with the respective arms of said T-shaped contact member, said end portions being upset against said insulating plate to permanently secure said contact and terminal members thereto, said terminal member, contact member and insulating plate having registering openings, and a binding screw adapted to penetrate said openings, said screw having threaded engagement with

the opening in said terminal plate, the opening in said contact member being sufficiently large to permit flexure of of the latter without obstruction by said binding screw.

5 15. As an article of manufacture, an oscillatable contact carrying member comprising a metallic punching having a flat main body portion of substantially U-shape, the arms of said U-shaped portion being initially
10 slightly divergent, said arms being provided with inwardly projecting ends and being adapted for edgewise bending into substantial parallelism whereby said member is pivotally engaged with a suitable frame, a portion extending forwardly and downwardly
15 from said main body portion, a substantially U-shaped insulating member overlying the former portion, a substantially U-shaped bridging contactor overlying said insulating
20 member, a second insulating member overlying said contactor, all of said elements having registering perforations, and a rivet member penetrating all of said perforations and acting to rigidly secure said elements to
25 each other.

16. As an article of manufacture, an oscillatable contact carrying member comprising a metallic punching having a flat main body portion of substantially U-shape, the
30 arms of said U-shaped portion being initially slightly divergent, said arms being provided with inwardly projecting ends and being adapted for edgewise bending into substantial parallelism whereby said member is pivotally engaged with a suitable frame, a portion extending forwardly and downwardly
35 from said main body portion, a substantially U-shaped insulating member overlying the former portion, a substantially U-shaped bridging contactor overlying said insulating
40 member, a second insulating member overlying said contactor, all of said elements having registering perforations, a rivet member penetrating all of said perforations and acting to rigidly secure said elements to each
45 other, the perforation in said contactor being of greater size than the other perforations, and said insulating members having abutting flanges extending within the perforation in
50 said contactor to insure against engagement of the latter with said rivet member.

In witness whereof, I have hereunto subscribed my name.

GEORGE J. MEUER.