Oct. 3, 1933. M. B. HARVEY 1,929,245

RIVETING MACHINE

Filed Nov. 9, 1932 2 Sheets-Sheet 1

FIG. I.

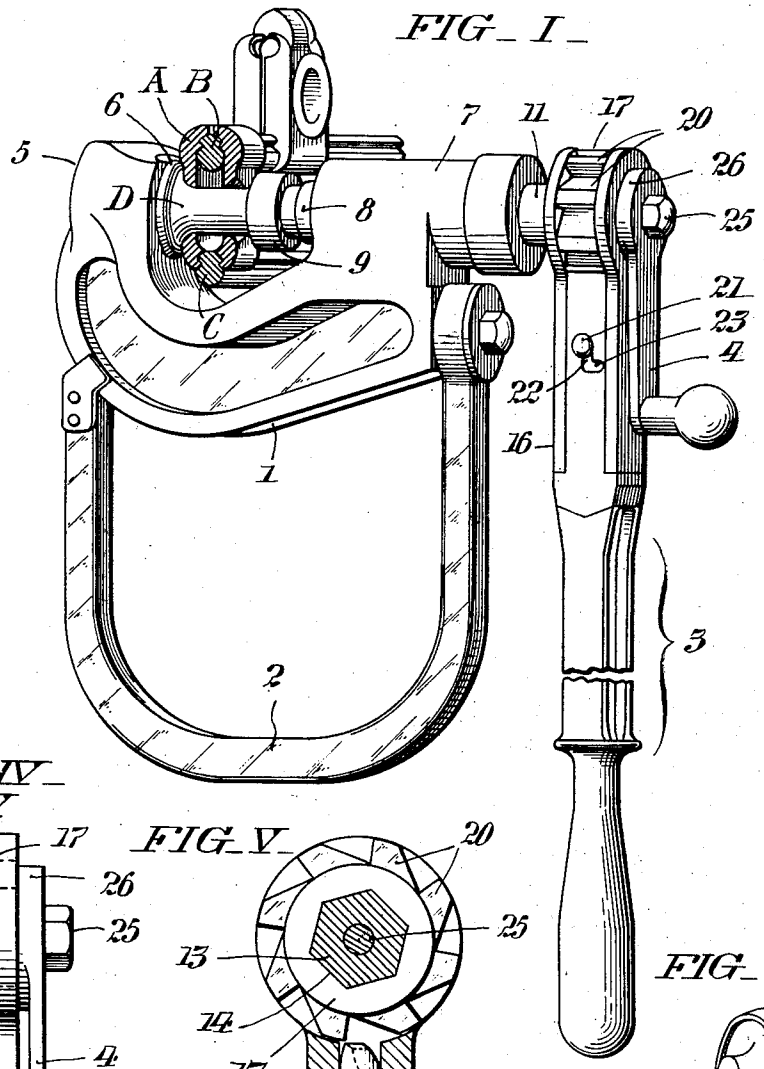


FIG. IV.

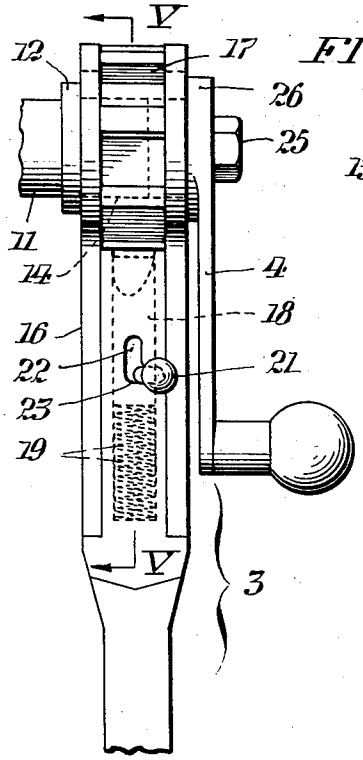


FIG. V.

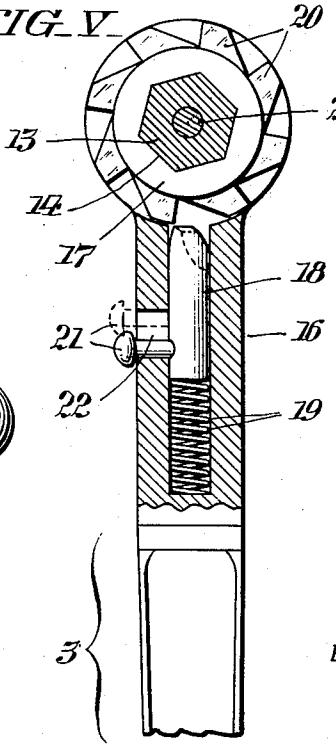


FIG. VI.

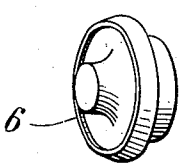
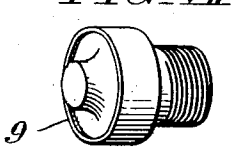


FIG. VII.



INVENTOR:
Maxwell B. Harvey,
BY Fraley & Paul
ATTORNEYS.

Oct. 3, 1933. M. B. HARVEY 1,929,245

RIVETING MACHINE

Filed Nov. 9, 1932 2 Sheets-Sheet 2

FIG. II.

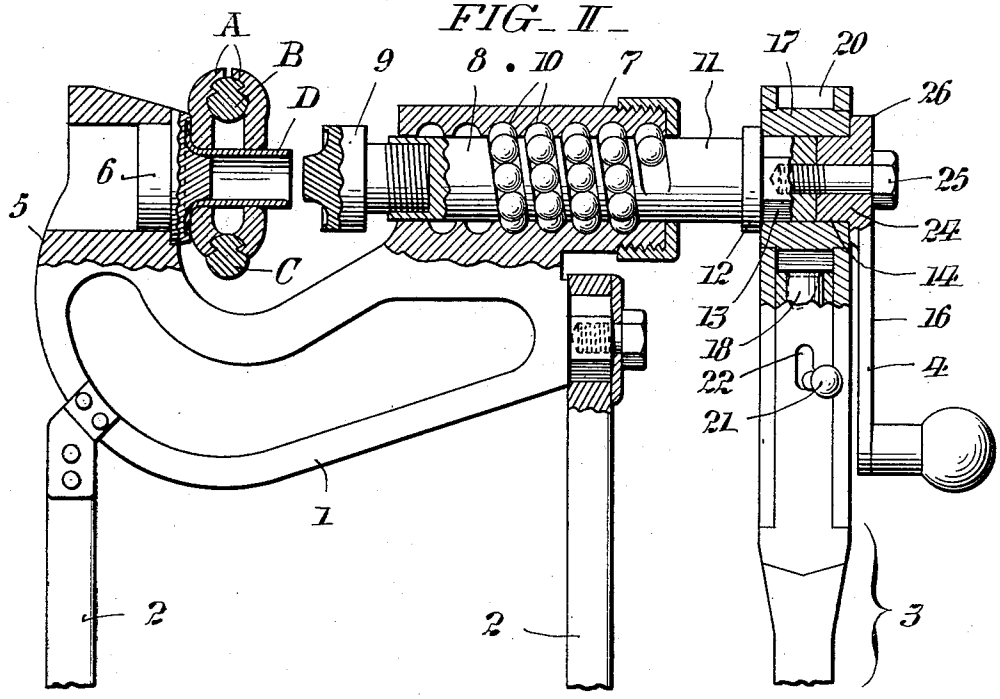
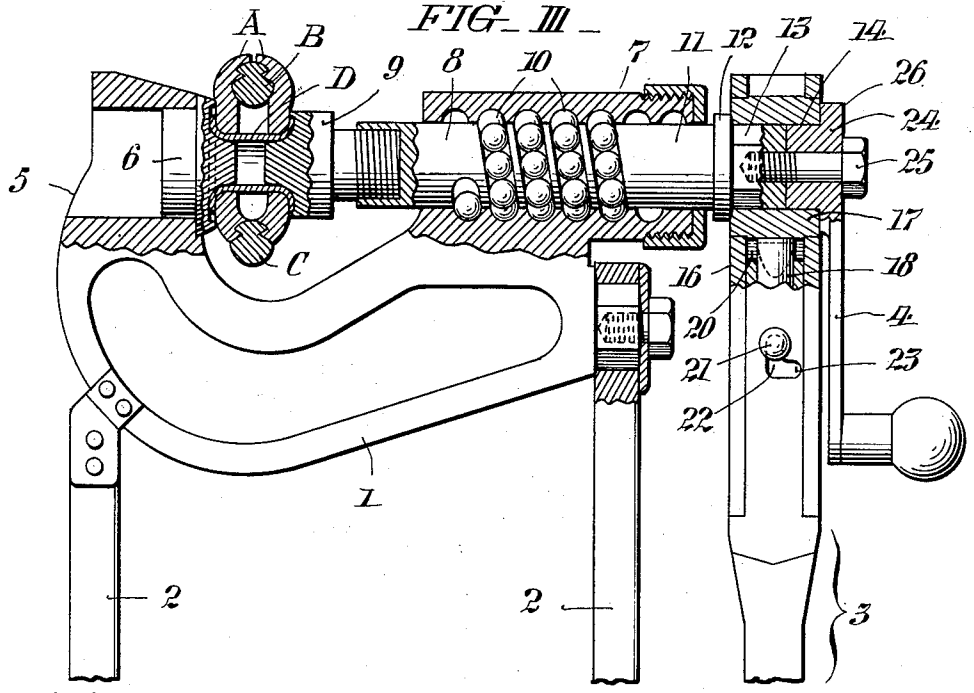


FIG. III.



WITNESSES:

Thomas W. Kerr Jr.

Hubert Fuchs

INVENTOR:

Maxwell B. Harvey,

BY Fraley & Paul

ATTORNEYS.

Patented Oct. 3, 1933

1,929,245

UNITED STATES PATENT OFFICE

1,929,245

RIVETING MACHINE

Maxwell B. Harvey, East Orange, N. J.

Application November 9, 1932. Serial No. 641,827

6 Claims. (Cl. 218—19)

My invention relates to riveting machines, and more particularly to portable machines manually operated to rivet together companion parts. The riveting machine of my invention is particularly useful in its application to rivets of ductile material such as are used for joining together trolley wire clamps on the catenary construction of electrified railways.

One object of my invention is to provide a comparatively light and compact riveting machine capable of being operated by a single person and having a plurality of handles for controlling its various functions, the handles being so located as to permit the machine to be operated with ease and facility.

Another object of the invention is to provide in such a machine a comparatively long handle for effecting slow movement of the rivet forming die while applying pressure at the rivet head, in combination with a comparatively short handle for effecting rapid movement of the rivet forming die for purposes of initial adjustment and for quick release.

Other objects and advantages characteristic of my invention will become more fully apparent from the description of one embodiment or example thereof which follows hereinafter, having reference to the accompanying drawings. Of the drawings:

Fig. I represents a perspective view of a riveting machine of my invention, showing its application to the riveting of wire clamps.

Fig. II represents an enlarged view of the upper half of the machine in side elevation, with certain portions shown in cross section, showing the positions which the parts of the machine occupy prior to the forming of a rivet.

Fig. III represents a similar view, showing the positions which the parts occupy after the rivet is formed.

Fig. IV represents an enlarged side elevation of the upper half of the ratchet wrench of the machine.

Fig. V represents an end elevation of the same with a portion shown in cross section, taken as indicated by the lines V—V of Fig. IV; and

Figs. VI and VII represent perspective views of the stationary and movable dies respectively.

With reference to Fig. I of the drawings, there is represented a riveting machine which is particularly adapted to the forming of heads on hollow rivets of ductile material for joining together trolley wire clamps. Such clamps, designated at A, are used for connecting the messenger wires B and contact wires C of the catenary construction of electrified railways. The machine is of a portable type which can be readily operated by a single person, either seated in a boatswain's chair suspended from the wire upon which he is working, or standing on an elevated platform adjacent to the wire. The machine comprises generally a yoke frame 1, having thereon a series of handles for performing different functions. One handle 2 is rigidly attached to the frame, and while it may take a variety of forms, in the present instance this handle is shown in the form of a U-shaped member joining the two ends of the yoke frame. It affords a convenient grip by which the yoke frame may be held in a horizontal position. A second handle constitutes a ratchet wrench 3 and is relatively long. A third handle 4 is in the form of a crank arm and is relatively short. The ratchet wrench 3 is interposed between the crank handle 4 and one arm of the rigid handle 2.

The yoke frame 1 has at one end 5 a stationary die 6 which though removable is inserted in such manner that it cannot rotate. The stationary die 6, shown in perspective in Fig. VI, serves to enter the preformed end of a hollow rivet D and to hold the same against rotation while the opposite end is being formed. Within the other end 7 of the yoke frame, there is a spindle 8 which removably has fitted thereto a head forming die 9. The head forming die, which is shown in perspective in Fig. VII, is disposed in opposite relation to the stationary die 6 and serves to expand the unformed end of the rivet D by a combined rotary and translatory movement. To impart this movement to the head forming die 9, the spindle 8 is in the form of a screw turning in ball bearings 10 within the cylindrical opening at the end 7 of the yoke frame 1. The spindle 8 has a portion 11 projecting outward beyond the yoke frame 1. On this portion 11 of the spindle 8 there is a collar 12 and immediately adjacent thereto a hexagonal nut 13, as shown in Fig. II, which is adapted to be engaged by a correspondingly-shaped socket 14 of the ratchet wrench 3.

The ratchet wrench 3 has thereon a head 16 bifurcated at its upper end to accommodate a ratchet wheel 17, the socket 14 of which engages the spindle 8 as previously described. Within the head 16 of the ratchet wrench 3 there is a pawl 18 normally urged by a spring 19 into engagement with the teeth 20 of the ratchet wheel 17 as clearly shown in Fig. V. The ratchet wrench 3 is of the single-acting type, and when moved back and forth operates the spindle 8

in such manner as to move the head forming die 9 towards the stationary die 6.

For the purpose of releasing the head forming die 9 after the rivet is formed, the ratchet wrench 3 has thereon means for holding the pawl 18 in inoperative position. Such means comprise a trigger or knob 21 which penetrates through a slot 22 in the head 16 as shown in Fig. IV. By pressing the knob or trigger 21 downward and moving it laterally into a recess 23 at one side of the slot 22 the pawl 18 is withdrawn from the ratchet wheel 17. In this manner the pawl 18 may be locked against the pressure of the spring 19 to maintain the ratchet wrench 3 in a neutral position.

As shown in Figs. II and III, the crank handle 4 includes a nut portion 24 of hexagonal shape which fits within the outer half of the socket 14 of the ratchet wheel 17. The nut portion 24 of the crank handle 4 is secured to the nut 13 at the end of the spindle 8 by a stud bolt 25. The head 16 of the ratchet wrench 3 is restrained against movement longitudinally of the spindle by the collar 12 on the one side and by an annular flange 26 of the crank handle 4 on the other side. Moreover, it will be apparent that the crank handle 4 turns with the ratchet wheel 17. With the ratchet wrench 3 in neutral position, however, the crank handle 4 can be operated without causing the parts of the ratchet wrench, other than the ratchet wheel 17, to turn.

The operation of the above described riveting machine is as follows. Assuming that the ratchet wrench 3 is in neutral position, that the operator is about to form the head of a rivet, and that the head forming die 9 is spaced apart from the non-rotating die 6, the operator proceeds to carry the yoke frame to a position in which its opposite dies will straddle the parts to be riveted, this position being represented in Fig. II. With one hand he grips the rigid handle 2 and with the other hand he turns the crank handle 4 to bring the head forming die 9 into engagement with the unformed end of the rivet while the preformed rivet head is seated on the stationary die 6. Thereupon, he moves the knob or trigger 21 laterally across the head 16 of the ratchet wrench 3 which permits the pawl 18, under the influence of the spring 19, to be urged into engagement with the ratchet teeth 20. By a back and forth movement of the ratchet wrench 3, the spindle 8 and its head forming die are urged forward with a screw motion. The ratchet wrench 3 affords a comparatively long arm so that ample pressure may be applied at the head forming die.

When the head of the rivet has been expanded, the ratchet wrench 3 is returned to neutral position by a downward and outward movement of the knob or trigger 21. With the ratchet wrench 3 in neutral position, the crank handle 4 is turned in such a direction as to release the head forming die 9 from its rivet. Further movement of the crank handle 4 returns the head forming die 9 to a position in which it is fully separated from the non-rotating die 6. Inasmuch as the crank handle 4 affords a relatively short arm, it will be apparent that the release of the head forming die 9, as well as its initial adjustment preparatory to forming a rivet, may be quickly effected.

While I have described one example or embodiment of my invention showing a specific form which the invention may take, it will be apparent that various changes may be made in the form of the apparatus herein described and illustrated without departing from the spirit of my invention as defined in the claims hereto annexed.

Having thus described my invention, I claim:

1. In a riveting machine, a yoke frame, a fixed die at one end of said frame, a screw at the other end of said frame having thereon a head forming die, a relatively long arm on said screw for effecting slow movement of said screw to apply pressure at said head forming die, and a relatively short crank arm for effecting rapid movement of said screw.

2. In a riveting machine, a yoke frame, a die at one end of said frame adapted to hold a preformed end of a rivet against rotation, a screw at the other end of said frame having thereon a head forming die, a relatively long arm on said screw for effecting slow movement of said screw to apply pressure at said head forming die, and a relatively short crank arm for effecting rapid movement of said screw.

3. In a riveting machine, a yoke frame, a non-rotating die at one end of said frame, a screw at the other end of said frame having thereon a head forming die, a crank arm on said screw for effecting rapid turning of the screw, and a ratchet wrench for effecting slow turning of the screw with application of pressure at said head forming die.

4. In a riveting machine, a yoke frame, a non-rotating die at one end of said frame, a spindle having a threaded portion engaging within the other end of said frame and a portion projecting outwardly beyond said frame, a head forming die on the inner end of said spindle, a crank arm on said outwardly projecting portion of the spindle, and a ratchet wrench interposed between said crank arm and said yoke frame.

5. In a portable riveting machine, a yoke frame having a handle thereon whereby the frame may be conveniently held in a horizontal position, a non-rotating die at one end of said frame, a spindle at the other end of said frame having thereon a head forming die, a relatively long vertically disposed ratchet wrench on said spindle, and a relatively short crank arm on said spindle adjacent to said ratchet handle.

6. In a portable riveting machine, a yoke frame having a U-shaped handle joining the two ends of the frame whereby the frame may be conveniently held in a horizontal position, a non-rotating die at one end of said frame, a spindle at the other end of said frame having thereon a head forming die opposite said non-rotating die and having a portion projecting outwardly beyond said frame, a relatively short crank arm on said outwardly projecting portion of the spindle, and a vertically disposed ratchet wrench between said crank handle and said yoke frame.

MAXWELL B. HARVEY.