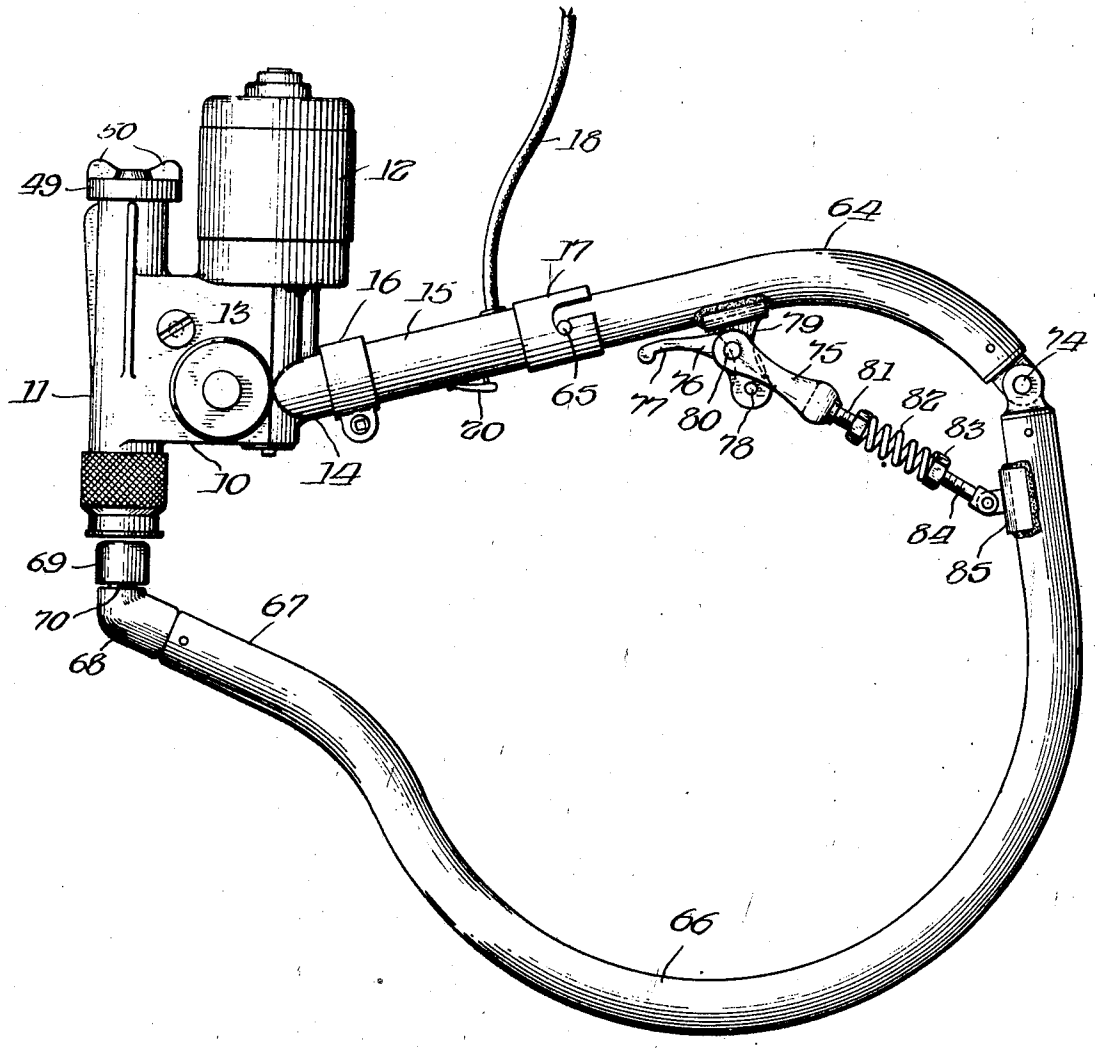
Oct. 30, 1945. F. V. ROSENBROOK 2,387,771

ELECTRIC HAMMER

Filed Jan. 22, 1943 2 Sheets-Sheet 1

Fig. 1.



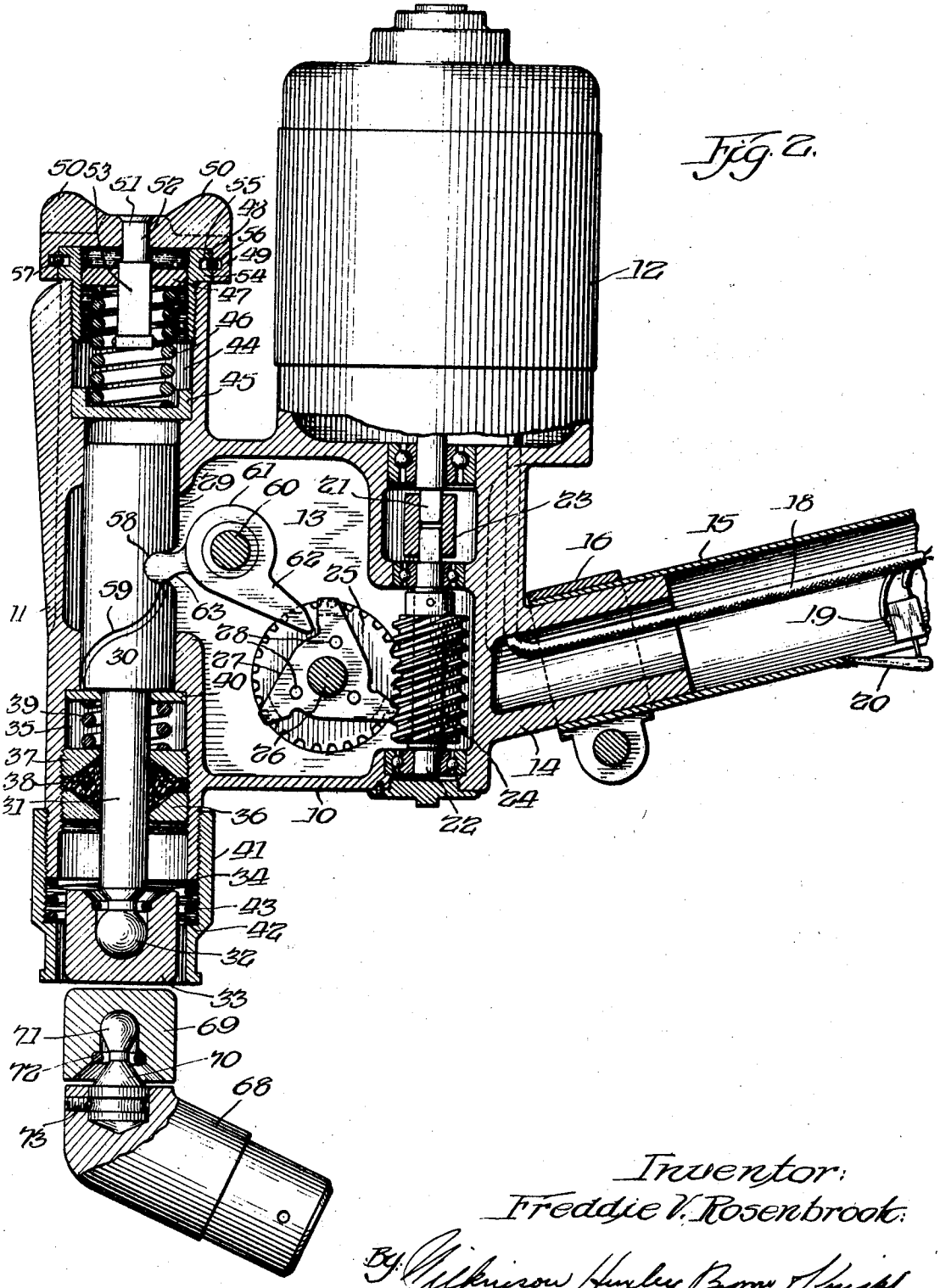
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Fig. 2.



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ELECTRIC HAMMER

Freddie V. Rosenbrook, Chicago, Ill.

Application January 22, 1943, Serial No. 473,164

7 Claims. (Cl. 153—32)

My invention relates to an electric hammer and has particular reference to a hammer to which a cooperating yoke is attached by means of which light, thin metal, such as light sheet metal used in fenders, sheet metal used in airplane wings and other parts, and other extremely light, thin metal can be straightened and worked, so that bumps, bends and the like can be straightened out and the metal restored to its original form.

Another and further object of my invention is the provision of a hammer in which the force of the blows imparted to the metal can be regulated and in which a wide range of force can be applied running from more forceful blows for heavier metal to very light blows which are something more than vibration and in which the blows are delivered quite rapidly, so that sufficient heat is developed through the impact of the blows, coupled with the blows themselves to change the molecular structure of the metal, similar to the condition present when metal is spun into various designs over a form. This result is accomplished without danger of cracking or otherwise injuring or destroying the sheet form of the metal.

A further object of the invention is the provision of a combined holder and anvil which is large enough to enable the tool to be operated over a fairly large surface of metal and so designed that the anvil is not rigid but has considerable elasticity or springiness in it and which in that respect closely approximates the situation when an anvil or a dolly is held by hand against a workpiece and a hammer used by hand in the operation of straightening and re-forming metal.

I am aware that hammers of this same general type have heretofore been manufactured, but generally they have not been successful because the shocks resulting from the operation of the parts is so great that they are soon broken in service, and also because the force of the blow delivered is less resilient, more in the nature of a shock blow rather than the resilient light blow akin to that imparted by an operator with a hand hammer. The rapidity of the blows is sufficient to develop considerable heat and can be used successfully to re-shape and re-form the metal without fracturing or cracking it or heating it to an extent where a fracture line might be formed therein.

A still further object of the invention is the provision of an electric hammer of exceedingly light construction which is portable and can be used in the field or any place where a suitable source of power is obtainable, which has a very wide range of adjustments and can be made to perform satisfactorily on the lightest aluminum sheet material to sheet metal such as automobile fender work, and other of the heavier groups of sheet material.

These and other objects of my invention will be more fully and better understood by reference to the accompanying sheets of drawings, and in which:

Figure 1 is a view in elevation showing the complete hammer with the anvil and yoke on which the handle is mounted; and

Figure 2 is a view partially in section and partially in elevation of the hammer proper.

Referring now specifically to the drawings and in which like reference characters refer to like parts throughout, a frame 10 is shown which has a cylindrical portion 11 at one side thereof, with an electric motor 12 of the usual form being provided. The frame 10 has a compartment 13 alongside of the cylindrical portion 11 within which a part of the operating parts are mounted. The frame 10 has a projection 14 at one side thereof over which a handle 15 is fitted, which is held in place over the projection 14 by a clamp 16, with a socket member 17 being mounted on the outer end of the handle 15 for purposes hereinafter described. An electric current transmission cord 18 is provided connected to a switch box 19 located in the handle 15, with a switch operating handle 20 being provided by means of which the operator can open or close the electric circuit leading to the motor 12, as may be desired during the operation of the device.

The motor 12 has a motor shaft 21 extending therefrom and is connected to a shaft 22 by means of a coupling 23. Shaft 22 has a worm gear 24 mounted thereon which is in engagement with a gear wheel 25 mounted on a shaft 26 which, in turn, is mounted in the frame 10. A cam member 27 also is mounted upon the shaft 26 and secured to the gear wheel 25 by means of pins 28, so that the cam member rotates as the gear 25 is driven by the worm 24.

A reciprocating hammer 29 is mounted in the cylindrical portion 11 of the frame 10, and comprises a body portion 30 which reciprocates in the bore in the cylindrical portion 11 of the frame 10, and a stem portion 31 which is provided with a ball end 32 upon which a head 33 is mounted, the head 33 having a recess therein within which the ball 32 is seated, and which is held in position by a spring member 34 sur-

rounding the neck or connecting portion of the stem 31 and the ball end 32. The stem 31 extends through a cylindrical chamber 35 with the walls thereof being internally threaded for a portion of their distance. Guide members 36 and 37 provided with packing 38 form a guide for the stem 31 and also serve to keep the stem lubricated during the operation of the hammer, while the member 37 serves to support a spring 39 surrounding the stem 31 above which a washer 40 is positioned seated against the lower end of the portion 30 of the hammer, so that the force of the blow delivered by the hammer is partially received upon the spring 39, with the washer 40 moving inside of the chamber 35 with each stroke of the hammer.

An internally threaded foot 41 is fitted over the externally threaded end of the portion 11 of the frame 10. An internally formed shoulder 42 on the inner wall of the foot 41 is provided having a spring 43 seated thereon, which bears against the lower end of the portion 11. The foot 41 serves both as a support as well as a guide for the hammer as it is moved over the workpiece. This foot is adjustable so that it may be properly positioned with respect to the force of the blow desired, depending upon the character of the work to be performed by the hammer, the thickness of the metal, and other matters which come within the judgment of the operator. The normal position of the foot will be approximately that shown in the drawings, which is approximately even with the end of the head 33. If a lighter blow is desired, the foot can be extended beyond the end of the head 33, while if a heavier blow is desired the foot may be moved so that the head 33 normally projects a short distance out of the foot 41.

At the top of the cylindrical portion 11 a cylinder chamber 44 is provided, within which is mounted a cup-shaped washer 45 which supports a spring 46. An externally threaded disc 47 is threaded into a gland member 48 internally threaded for engagement with the disc 47 and externally threaded for engagement with the internal threads formed on the upper end of the portion 11 of the frame 10. A cap 49 is provided having finger pieces 50, 50 thereon, within which a stud 51 is positioned having a rectangular stem 52 which becomes the male member of a rectangular member 53 fixedly connected to the disc 47, so that as the member 49 is rotated the disc 47, through the operation of the male and female members 52 and 53, respectively, can be rotated, thus moving the disc member 47 inside of the gland 48 and permitting the operator to vary the tension of the spring 46, thus enabling the operator to adjust the hammer to impart a light or a heavy blow to the workpiece during the operation of the hammer. The gland member 48 has an extension 54 at the upper side thereof within which a circumferential channel 55 extends, with a channel 56 being formed in the cap member 49. A spring member 57 normally holds the cap member 49 in engagement with the gland 48 and allows the cap member to rotate freely thereover so as to provide adjustment for the spring as hereinbefore pointed out.

The body portion 30 of the hammer 29 has a transversely extending recess 58 formed therein with a depth of at least one-third of the diameter of the said body portion with a spiral groove 59 being provided which prevents the trapping of air below the body portion 30 and above the washer 40 during the operation of the hammer, and also serves as an oil groove for proper lubrication of the various operating parts. Mounted in the frame 10 is a pin 60 upon which a rocker member 61 is mounted, this rocker member 61 having an arm 62 extending radially therefrom for engagement with the projections on the cam 27 as it is rotated, while extending radially from the rocker member 61 is another arm 63 of rounded contour to fit into the recess 58 formed in the body portion 30 of the hammer 29 by means of which the hammer 29 is moved by the rotation of the cam 27. The rocker member 61 disposed opposite from arm 63 with respect to pin 60 acting as a fulcrum constitutes a lever of the first class and results in a compact construction of the assembly.

The yoke is secured at one of its ends to the socket 17 and comprises a section 64 having a pin 65 fitted in a bayonet joint in the socket 17, and a second section 66 of pipe generally semicircular in form, with a projecting end 67 to which a connecting member 68 is mounted. An anvil 69 is mounted thereon by means of a connecting member 70 having a head portion 71 fitted into a socket formed in the anvil 69, with a spring-retaining member 72 being provided. The head end of the connecting member 70 has a circumferential member fitted therein within which the head 71 is seated to hold the connecting member 70 in fixed relation with the member 68. The anvil 69 is so positioned on the head 71 that it will conform to and automatically position itself in axial alignment with the hammer 29 during the operation of the device. The members 64 and 66 are connected together by means of the hinge 74 and also by means of a toggle connection comprising a toggle link 75 connected to a link 76 having a finger portion 77, which in turn is pivotally mounted by means of a rivet 78 to a bracket 79 welded or otherwise secured to the member 64. The links 75 and 76 are hingedly connected by a pin 80, while the member 75 has a threaded stud 81 secured thereto to which a spring 82 is connected. The spring 82, in turn, is connected to a nut 83 operating upon a bolt 84 hingedly connected to a bracket 85 welded or otherwise secured to the member 66, so that when the toggle is in closed position the anvil 69 is brought into engagement with the hammer and is held in this position by the tension of the spring 82 when the hammer is in position over a workpiece. When it is desired to remove the hammer, the operator grasps the handle 77 and opens the toggle connection so that the member 66 drops away from the side of the workpiece and the hammer can be easily removed from the workpiece when and if desired.

In operation the device is exceedingly simple in that the operator by grasping the handle 15 can place the hammer into the desired position over a workpiece and swing the arm 66 on the under side thereof which places the workpiece in position between the anvil 69 and the head 33 of the hammer. The switch 20, being under the operator's fingers, can be closed, starting the motor and rotating the cam member which, in effect as shown in the drawing, lifts the hammer against the spring 46. This spring is compressed until the lever 62 passes over the ends of the projecting portions of the cam member, and the hammer is driven downward toward the work, part of the force being received by the spring 39 which is compressed, and part of the blow delivered against the workpiece and through the

workpiece shock is received upon the resiliently supported anvil 69. The force of the blow, of course, can be controlled by the operator through the adjustment of the end 50 as well as the foot 41, depending upon the character of the work being done and the character of the metal, whether flexible or otherwise, and many other factors which enter into this character of work.

For instance, upon highly polished surfaces the hammer head 33 may be provided with a fiber or rubber covering, or a fiber or rubber covering may be provided over the anvil member 69, such as is now common in hand hammers for use in straightening fenders and doing other body work in connection with repairs to automobiles. The hammer is designed to operate rapidly so that the metal is slightly heated by the impact of the blows delivered upon it as the hammer is moved by the workman around the bent portion or over and across it, depending upon the character of the material to be straightened out. This operation is continued until the metal is straightened or re-formed into the condition in which it was before being deformed by accident or otherwise.

While I have herein described and upon the drawings shown an illustrative embodiment of the invention, it is to be understood that the invention is not limited thereto but may comprehend other constructions, arrangements of parts, details and features without departing from the spirit of the invention.

I claim:

1. In combination with a frame, a hammer mounted for reciprocatory movement in the said frame, electrically operated means whereby the said hammer is actuated, a handle on said frame, a support member detachably connected to said handle, an anvil holding and supporting member hingedly secured to the said support member, an anvil on said anvil holding and supporting member, a toggle member secured to said support member and a spring connected to said toggle member and to the said anvil holding and support member, the toggle member and spring spanning the hinged ends of the said support member and said anvil holding and support member and adapted to resiliently lock the anvil member against a work piece.

2. A rapidly vibrating electric hammer comprising a frame having a bore therein, a reciprocating hammer mounted in said bore comprising a striking portion at one end thereof and an actuating portion at the opposite end thereof, said striking portion including a universally mounted head an anvil cooperating with the striking head of said hammer, means comprising a coil spring at the end of the hammer opposite the striking portion for impelling said hammer into striking position, means in said bore between said striking portion and actuating portion comprising a coil spring for cushioning the blow of the hammer and for effecting a recoil thereof in the reverse direction, an electric motor mounted on said frame, cam means driven by said motor, and rockable means in said frame connected to said actuating portion of said hammer and repeatedly operated by said cam means to drive the hammer in the direction of said recoil and against the force of said first coil spring preparatory to the impelling thereof by said spring upon the separation of the camming means from said rockable means.

3. A vibrating hammer assembly comprising a D-shaped frame composed of a substantially straight portion and a substantially semi-circular portion with a pivotal mounting at one meeting point between said portions, a bore at the end of said straight portion opposite said pivotal mounting, a reciprocating hammer mounted in said bore extending towards the semi-circular portion of the D-shaped frame, an anvil mounted at said last mentioned portion remote from said pivotal joint, and yielding connecting means extending between said straight and semi-circular portions of the frame subtending said pivotal joint and closely adjacent thereto for selectively maintaining said anvil closely adjacent said reciprocating hammer or to rock said anvil relative to hammer to permit the reception and removal of work between the hammer and anvil.

4. The combination set forth in claim 3 wherein said yielding connecting means comprises a coil spring and a toggle lever assembly.

5. The combination set forth in claim 2 wherein said anvil cooperating with said striking head is also universally mounted for cooperation with said head, and a tubular foot surrounding said striking head with the free extremity thereof being adjustable relative to the head for controlling the effective blows of the head against the anvil with the material being worked upon therebetween.

6. The combination set forth in claim 2 wherein said rockable means connected to the actuating portion of the hammer comprises a lever of the first class pivotally mounted in the frame.

7. The combination set forth in claim 3 wherein said substantially straight portion is formed in part by a handle for the reciprocating hammer which is readily detachable from the remainder of the straight portion adjacent to said pivotal mounting.

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