June 24, 1930. J. W. SHALLENBERGER 1,767,485

POWER HAMMER

Filed Oct. 22, 1925

Fig. 1.

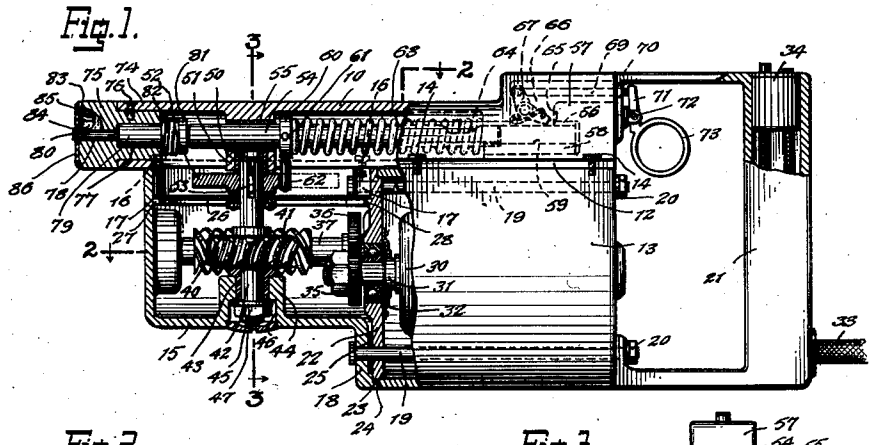


Fig. 2.

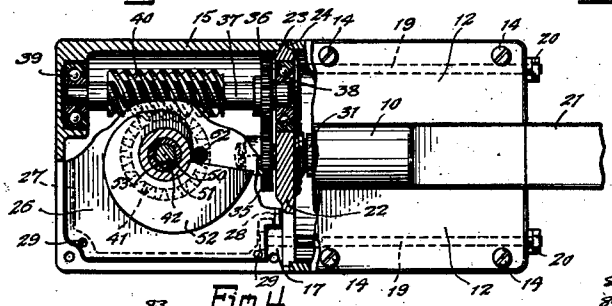


Fig. 3.

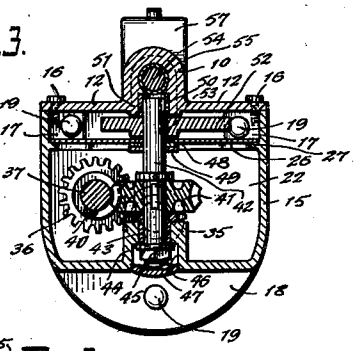


Fig. 4.

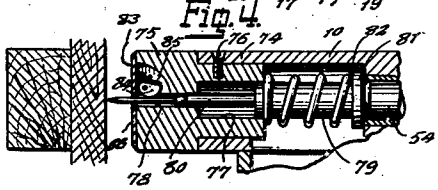


Fig. 5.

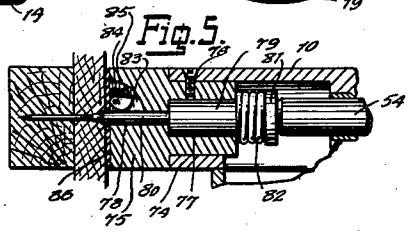


Fig. 6.

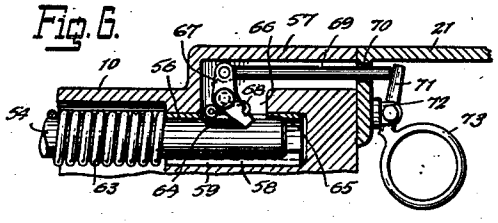


Fig. 8.

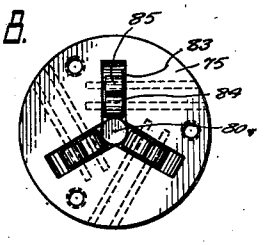
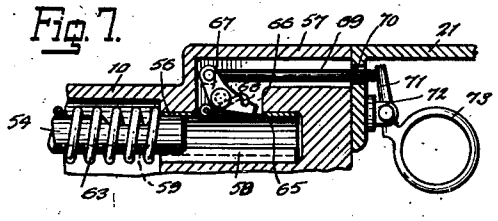


Fig. 7.



INVENTOR.
JOHN W. SHALLENBERGER.
BY
ATTORNEYS.

Patented June 24, 1930 1,767,485

UNITED STATES PATENT OFFICE

JOHN W. SHALLENBERGER, OF BRIDGEPORT, CONNECTICUT

POWER HAMMER

Application filed October 22, 1925. Serial No. 64,094.

This invention relates to a portable power hammer, and particularly an electric motor driven hammer for driving nails, and is especially designed for use by carpenters in work involving the use of a large number of equal sized and similarly driven nails, as for instance in the laying of floors, putting up plaster board, lath, wood trim, and the like, and has for an object to provide a hammer of this character which will permit the driving of such nails in a rapid, uniform and reliable manner, thereby effecting a great saving in time, with less fatigue to the operator.

A further object is to provide a hammer of semi-automatic type, which will be under the positive manual control of the operator, enabling him to have accurate control of the placing and driving of the nails, without the necessity of continually switching the electric current off and on.

Another object is to provide an electric motor driven hammer capable of utilizing such sources of current as are ordinarily available, such as lighting circuits, thereby adding greatly to the convenience and scope of its use.

A still further object is to provide a device of this character in which the driving mechanism is not fixedly connected to the hammer mechanism, so that the shock of impact of the hammer is not transmitted to the driving mechanism, thus reducing vibration and wear.

Still another object is to provide nail holding and positioning means, adapted to support the nail during a portion of the time it is being driven, and then to automatically release it, so that any possibility of inaccurate driving or bending of the nail is prevented.

With the above and other objects in view, embodiments of the invention are shown in the accompanying drawings, and these embodiments will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claims.

In the drawings:

Fig. 1 is a view, partly in side elevation and partly in vertical section, of the hammer, according to the present embodiment of the invention;

Fig. 2 is a plan view, partly in section, of the hammer, the section being taken along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 1;

Fig. 4 is a sectional view of the forward end of the hammer, showing a nail in position for driving;

Fig. 5 is a similar view showing the position of the parts after the nail has been driven and countersunk;

Fig. 6 is a sectional view of the ear and trigger mechanism, showing the position of the parts with the hammer action stopped;

Fig. 7 is a similar sectional view, showing the parts in position for operating the hammer;

Fig. 8 is an end view of the nose piece, with the cover removed, showing the positioning of the clutch members.

Similar reference characters indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings, the hammer according to the present embodiment of the invention, comprises a main body consisting of a hammer casing 10 of elongated hollow form provided with a flange 12 extending at each side, a motor casing 13 secured to the flange 12 by screws 14, and a gear and cam casing 15 secured to the flange 12 by screws 16, engaging corner boss portions 17 of said casing 15, said casing 15 being provided with an outwardly extending flange 18 engaging the lower end portion of the motor casing 13 and being secured to the said motor casing by means of tie rods 19 engaged through the flange 18 and the two corner bosses 17, which are extended inwardly for this purpose, and extending longitudinally through the motor casing where they are secured to the outer wall thereof by locknuts 20.

A handle 21 is secured at its ends to the upper ends of the hammer casing 10 and the motor casing 13, the end connected to motor casing being preferably secured by the outer

tie rod 19. A vertical wall plate 22 separates the interiors of the motor and gear casings, the flanged peripheral edge 23 being seated and clamped against the end of the motor casing and within a recess 24 in the gear casing, in a manner to form a lubricant tight seal, a compressed felt washer 25 being preferably provided about the outer tie rod 19 between the said wall plate and the flange 18.

The inner or cam housing portion of the casing 15 is separated from the outer or gear housing portion by means of a horizontal partition plate 26 secured upon ledges 27 and 28, formed upon the casing wall and the wall plate 22, by means of screws 29, in a manner to form a lubricant tight seal.

The electric driving motor 30 is mounted in the motor casing 13, its shaft 31 having a bearing at one end in the end of said casing and at its other end, which projects into the casing 15, in anti-friction ball bearings 32. Current is supplied to the motor from any suitable source by a lead 33 extending into the handle, and may be switched on and off by a push-button switch 34 secured in the handle.

Upon the end of the motor shaft within the casing 15 there is secured a spur gear 35 which meshes with a spur gear 36 secured upon a longitudinal worm shaft 37 mounted at its ends in ball bearings 38 and 39 supported respectively in the wall plate 22 and the end of the gear casing 15. This shaft is provided with a worm 40 meshing with a worm gear 41, mounted upon a transverse cam shaft 42 supported at its outer end in a flanged thrust bearing 43 secured in an inwardly extending apertured bearing support 44 formed at the lower side of the casing 15, the shaft being secured against longitudinal movement by a nut 45 secured upon its end within a pocket 46 of the support 44, and the said pocket being closed by a threaded cap 47.

The inner portion of the shaft 42 extends through an opening 48 in the partition plate 26, and about which a lubricant sealing gasket 49 is secured, and its inner end is supported in a bearing bushing 50 secured in a bearing support 51 formed upon the hammer casing 10. Within the space inside of the partition plate 26, the shaft 42 is provided with a uniform motion cam 52, secured thereon by means of a key 53, the outline of this cam having a gradual rise from its low point to its high point, which latter then connects with the low point by a sudden drop.

The main hammer plunger 54 is in the form of a cylindrical member slidably mounted near its lower end in a tubular bearing bushing 55, secured in the bearing support 51, and at its upper end in a tubular bearing bushing 56, secured in the upper portion 57 of the casing 10, the plunger being held against rotation by means of a key 58 secured in the bushing and engaging a slot 59 in the plunger. A collar 60 is secured to the plunger by a pin 61, and is provided with a roller 62 projecting inwardly into relation with the periphery of the cam 52, the plunger being normally pressed forward by means of a helical spring 63, bearing at its ends upon the collar 60 and the portion 57.

A notch 64 is provided in the upper side of the plunger 54 near its upper end in such a position that in the upper position of the plunger, to which it is moved by the high point of the cam, it will register with a slot 65 in the bushing 56, and which slot is connected with a pocket 66 in the upper portion of the casing 10. Within the pocket 66 there is pivotally mounted a locking sear 67 normally pressed downward in a clockwise direction at its lower end by means of a spring 68, and pivotally connected at its other end to the inner end of a push rod 69 having its outer end slidably projecting through a guide passage 70, where it is engaged by a trigger 71 pivotally mounted in a bracket 72 and provided with a ring shaped finger grip 73, the abutment of the lower portion of the trigger against the bracket limiting the rotation of the sear under the action of the spring, as shown in Fig. 6. It is obvious that when the trigger is released, as shown in Fig. 6, that as the plunger shaft is moved to its upper position the sear will enter the notch 64 so that its squared end abuts the rearward beveled end of the notch, and thereby retains the plunger in retracted position. By pulling the trigger, as shown in Fig. 7, the sear is raised and the plunger released under the action of its spring, being thereafter successively retracted and released by the cam, as long as the operator holds the trigger in such position.

Within the downwardly projecting tubular end portion 74 of the casing 10 there is removably inserted a shouldered head or nose piece 75, secured in position by screws 76 and provided with a shouldered passage including a relatively large diametered upper portion 77 and a relatively small diametered lower portion 78. A striker 79 is slidably engaged in the base of the head 75 and includes a reduced diametered lower portion 80 engaging the lower portion 78 of the bore, and a flanged inner end 81, between which and the inner end of the head there is provided a helical spring 82 which in the retracted position of the plunger shaft presses the striker inwardly into abutting relation with the bearing support 51, as indicated in Fig. 4.

In this retracted position, and with the

plunger held in retracted position by the sear 67, the nail is adapted to be inserted and held in the head, perparatory to being driven, and for the purpose of yieldably holding the nail there are provided in the lower face of the head a series of pockets 83, extending radially from the bore, and in which there are provided a series of semi-circular clutch shoes 84 pivoted near their forward ends and normally pressed inwardly by means of springs 85 bearing upon their outer flat sides. A centrally appertured cover plate 86 is secured to the end of the head by screws and serves to close the pockets 83.

The operation of the device is as follows:

The electric motor is switched on by the operator by means of switch 34. This starts the cam 52 revolving, by means of the gears 35 and 36, the worm 40, the worm gear 41, and the cam shaft 42. If the plunger 54 is in the locked position, as shown in Fig. 6, the cam will revolve without disturbing the plunger shaft. If, however, the plunger shaft has previously come to rest in any other position, the first revolution of the cam will force it back by means of the roller 62 and it will be locked by a sear 67.

A nail is then inserted by the operator in the orifice 78 of the head 75, as shown in Fig. 4, where it will be held by the clutch shoes 84. The point of the nail is then placed in the desired position for driving, which may be horizontal, vertical, or at any angle, and the trigger pulled by the finger of the operator. This releases the sear and allows the spring 63 to force the plunger 54 forward until the roller 62 strikes the face of cam 52. If the cam is at that instant in such a position that its lowest point is in line with the axis of the plunger, the latter will continue forward until it strikes the head of striker 79, which will deliver the blow to the nail. If the cam is in any other position, the first blow will not fall on the striker until the next revolution of the cam. The rotation of the cam forces back the plunger 54 by means of the roller 62 and collar 60, compressing spring 63 until the highest point of the cam is passed, at which point the spring is released and delivers the blow of the plunger to the striker, which drives the nail.

The hammer will continue to function in the manner just described as long as the trigger is held back by the operator. When it is desired to stop the hammer action, (for example, after a nail has been driven) the trigger is released. This allows the sear 67 to drop down under the pressure of the sear spring 68, and on the next backward stroke the sear will engage the notch 64 in the plunger and lock it. Spring 82 then forces the striker 79 back against the stop 51, and the hammer is then in readiness for the insertion of the next nail.

It is obvious that if a change is desired in the speed at which the hammer delivers its blows, this may be accomplished by substituting driving gears of different ratios without otherwise disturbing the mechanism. Further, interchangeable head pieces 75 may be used to provide for different maximum nail sizes, each head serving for several sizes of nails.

I have illustrated and described preferred and satisfactory embodiments of my invention, but it is obvious that changes may be made therein, within the spirit and scope thereof, as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a power hammer, an impact member adapted to have to and fro movement, a motor, spring means adapted to impart movement to said impact member in one direction, means between said motor and impact member adapted to impart movement to the latter in the other direction against the force of said spring means, a tabular guide to receive a fastening, and a striker movable in said guide adapted to be moved by said impact member during its spring actuated movement according to the inserting movement given the fastener in the guide.

2. In a power hammer, an impact member adapted to have to and fro movement, a motor, spring means adapted to impart movement to said impact member in one direction, means between said motor and impact member adapted to impart movement to the latter in the other direction against the force of said spring means, a tabular guide to receive a fastening, a striker movable in said guide adapted to be moved by said impact member during its spring actuated movement according to the inserting movement given the fastener in the guide, and spring means adapted to press said striker towards the impact member.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, the 30th day of September, 1925.

JOHN W. SHALLENBERGER.

4

CERTIFICATE OF CORRECTION.

Patent No. 1,767,485. Granted June 24, 1930, to

JOHN W. SHALLENBERGER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 3, for "perparatory" read "preparatory", and lines 92 and 106, claims 1 and 2, for "tabular" read "tubular"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22nd day of July, A. D. 1930.

(Seal)

Wm. A. Kinnan,
Acting Commissioner of Patents.