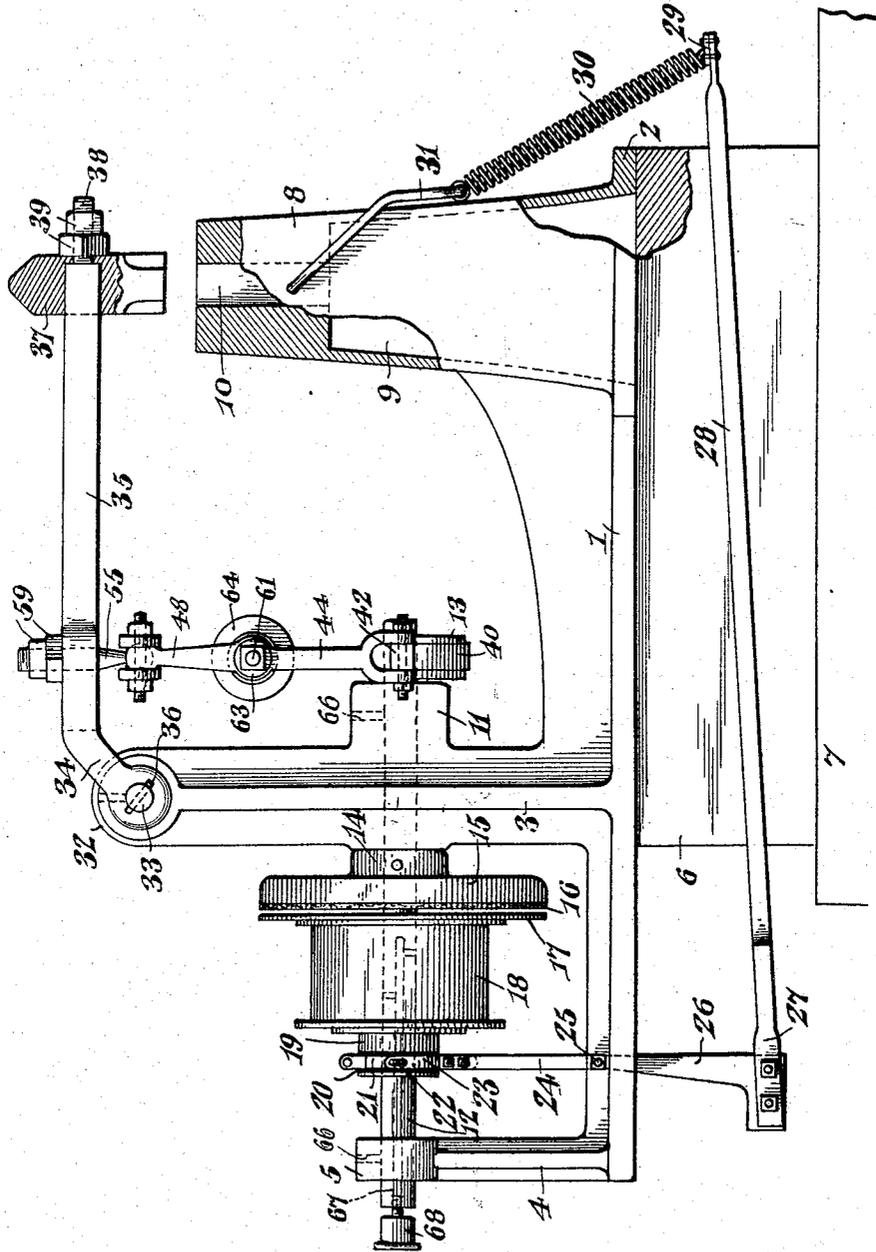


1,202,277.

H. D. FARNER.
POWER HAMMER.
APPLICATION FILED JUNE 17, 1915.

Patented Oct. 24, 1916.
2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

Jas. K. McLaughlin

F. J. Chapman.

H. D. Farner, INVENTOR

BY

E. G. Siggers

Attorney

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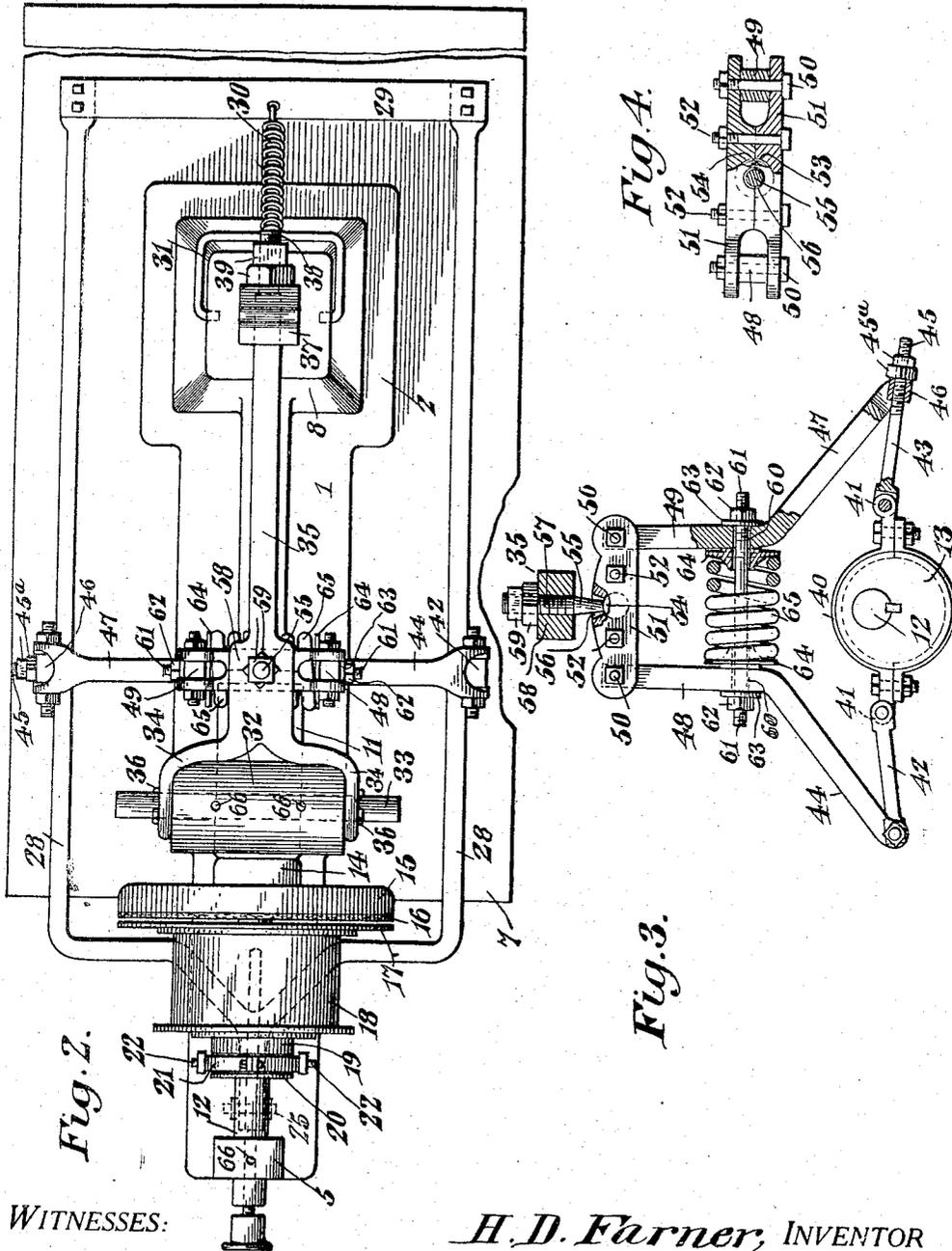


Fig. 2.

Fig. 4.

Fig. 3.

WITNESSES:

Jas. K. McEachran
F. J. Chapman

H. D. Farner, INVENTOR

BY

E. G. Siggers

Attorney

UNITED STATES PATENT OFFICE.

HARRY D. FARNER, OF MOUNT JEWETT, PENNSYLVANIA.

POWER-HAMMER.

1,202,277.

Specification of Letters Patent.

Patented Oct. 24, 1916.

Application filed June 17, 1915. Serial No. 34,691.

To all whom it may concern:

Be it known that I, HARRY D. FARNER, a citizen of the United States, residing at Mount Jewett, in the county of McKean and State of Pennsylvania, have invented a new and useful Power-Hammer, of which the following is a specification.

This invention has reference to power hammers, and its object is to provide a power hammer of small size capable of operating successfully in bench sizes and also capable of successful operation in larger sizes, and especially in sizes useful to blacksmiths and other artisans.

In accordance with the present invention there is provided a framework carrying an anvil with a post in spaced relation thereto on which is mounted a hammer having a head in operative relation to the anvil. The post also carries a shaft provided with a friction member toward and from which another friction member is movable, being loosely mounted on the shaft and shiftable by devices under the control of the operator. Power is applied to the shiftable clutch member by a belt or otherwise. The shaft carries an eccentric connected to the hammer by rockable and flexible connections in a manner permitting the reciprocation of the hammer and the delivery of a powerful blow by the hammer without undue strain upon the actuating parts.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification, with the further understanding that while the drawings show a practical form of the invention, the latter is not confined to any strict conformity with the showing of the drawings, but may be changed and modified so long as such changes and modifications come within the scope of the appended claims.

In the drawings:—Figure 1 is a side elevation with some parts in section of a power hammer constructed in accordance with the present invention. Fig. 2 is plan view of the structure of Fig. 1. Fig. 3 is an elevation with some parts in section of the elastic actuating means for the hammer. Fig. 4 is a plan view with some parts in section of a portion of the structure of Fig. 3.

Referring to the drawings there is shown an elongated base plate 1 with one end 2 laterally expanded and at an intermediate

point provided with an upstanding post 3, while the other end of the base plate terminates in an upright 4 on top of which there is provided a journal bearing 5. The base plate 1 in the larger sizes is customarily mounted on a block 6 in turn supported upon a foundation 7 which may be of concrete on a level with the floor of the building in which the hammer is installed. The block 6 and foundation 7 are to be taken merely as indicative of any suitable means of supporting the base plate 1 and parts carried thereby. In the smaller sizes the base plate 1 may be made fast directly upon a bench.

The structure is designed particularly for relatively light work, being readily driven in the smaller sizes of a $\frac{1}{2}$ H. P. electric motor, while the larger sizes can be driven by a 1 H. P. electric motor.

Rising from the laterally expanded end 2 of the base 1 is an upright anvil 8 which for purposes of lightness may have its lower end cored out, as shown at 9, and extending through the upper end of the anvil is a passage 10 for the reception of the shanks of dies and the like.

On the side of the post 3 toward the anvil 8 is a boss 11 at a height corresponding to the bearing 5, and the boss and post are bored through in line with the bearing 5 for the reception of a shaft 12 carrying at the end extending through the boss 11 and toward the anvil 10 an eccentric 13 keyed or otherwise fastened to the shaft.

Fast to the shaft 12 on that side of the post 3 remote from the anvil is a hub 14 having a laterally expanded head 15 with a flat face on which is secured friction material 16. Facing the friction material 16 is a friction disk 17 fast on a pulley 18 mounted on the shaft 12 to rotate independently thereof, and also movable lengthwise of the shaft toward and from the head 15 with its friction face 16. The pulley 18 is designed to receive a belt by which the pulley is rotated from a countershaft or from an electric motor, as may be found to be desirable. The pulley 18 is formed on the end remote from the disk 17 with a hub 19 having a circumferential groove 20 therein. Seated in the groove 20 is a strap 21 having diametrically oppositely directed pins 22 thereon extended through the ends of a yoke 23 carried by the corresponding end of a lever 24 pivoted by a bolt 25 or

otherwise to the base 1. The lever 24 has an arm 26 dropped below the base and there made fast to one end 27 of a treadle 28 which at the other end is provided with a foot board 29, by means of which the treadle is manipulated, so as to move the friction disk 17 into holding relation to or out of engagement with the friction surface 16. In order to hold the clutch members normally separated the foot board end of the treadle is held up by a spring 30, one end of which is made fast to the foot board and the other to a bail 31 carried by the anvil 8.

The top of the post 3 is formed into a head 32 traversed by a rod 33 and straddled by one end 34 of an arm 35, said end 34 being in the form of a yoke to straddle the head 32 and the ends of the yoke are traversed by the rod 33, which latter is held to the yoke 34 by pins 36 or otherwise. The other end of the arm 35 is seated in a hammer head 37 and is provided with a threaded stem continuation 38 projecting through the hammer head and there receiving nuts 39, by means of which the hammer head is made fast to the arm 35 in position to override the anvil 8, the parts being properly proportioned for the purpose.

The eccentric 13 is encircled by an eccentric strap 40 having ears 41 at diametrically opposite ends to respective ones of which are connected links 42, 43. The link 42 has the end remote from that connected to the eccentric strap pivotally connected to the corresponding end of an angle arm 44, while the link 43 has the end remote from the eccentric strap threaded, as shown at 45, and extended through a block 46 pivotally mounted in one end of an angle arm 47 similar to the arm 44. The threaded end 45 has nuts 45^a applied thereto. Those ends of the arms 44 and 47 which are connected to the links 42 and 43 diverge, while the other ends of these arms, indicated at 48, 49, respectively, are connected by pivot bolts 50 to opposite ends of a crosshead 51 longitudinally split with the parts connected together by bolts 52. Midway of the length of the cross head 51 it is formed with a socket 53 in which is seated a ball 54 having a stem or neck 55 extending through an opening 56 communicating with the socket 53. That end of the stem 55 remote from the ball 54 is screw threaded, as shown at 57, and this threaded end is tapped through the arm 35 which may be there widened, as shown at 58. The threaded end 57 of the stem 55 is secured to the arm 35 by nuts 59.

The ends 48 and 49 of the arms 44 and 47 are in the normal position of the parts quite or approximately parallel and adjacent to the bend of the arms each is traversed by a passage 60 in alinement with that of the other. Through the alined pas-

sages 60 there is extended a bolt 61 threaded at both ends and there carrying nuts 62 and washers 63. Between the arm extensions 48 and 49 the bolt or rod 61 has loosely thereon spring receiving heads 64 receiving corresponding ends of a compression spring 65 surrounding the rod 61.

Where the shaft 12 traverses bearings such bearings may be babbitted. Where lubrication is needed lubricating passages 66 are provided and in order to properly lubricate the clutch member 18, which is in the form of a pulley loosely mounted on the shaft 12 the latter has an axial bore 67 for lubricant fed by a lubricant cup 68. Of course, any other suitable means of supplying lubricating material may be provided.

In the position of the parts shown in the drawings the hammer head 37 is at about its nearest approach to the anvil 8 with the parts at rest. When it is desired to start the hammer into motion the operator presses upon the foot board 29, thus extending the spring 30 and causing the lever 24 to rock on the pivot 25 in a manner to move the clutch member 18 with its engaging plate 17 into contact with the friction surface 16, whereupon the head 15 is set into rotation, it being assumed that the pulley 18 is being driven and this rotative movement is imparted to the shaft 12 and eccentric 13. The connecting members consisting of the links 42, 43, arms 44 and 47, and head 51 have up and down and lateral reciprocating movements imparted to them. The up and down movement is imparted by the stem 55 to the arm 35 which is thereby rocked with the rod 33 in the bearings in the head 32 and the hammer 37 is correspondingly reciprocated toward and from the anvil 8. When the hammer head 37 is moved toward the anvil 8 it may continue its movement beyond that to which it is carried by the eccentric 13, since the lowering movement of the hammer head is elastically resisted by the spring 65 and the compression of the spring will permit the arms 44 and 47 to move downwardly, the links 42 and 43 providing a yielding connection between the arms 44 and 47 and the eccentric strap. The result is that the down stroke of the hammer, which is the power stroke, is an inertia stroke; that is, the momentum of the hammer permits it to override the distance to which it is carried by the power impulse and to deliver upon the work a powerful blow if the work be just out of reach of the position to which the hammer is positively carried.

By suitable adjustments of the nuts 45^a and 62 the relation of the links 42 and 43 to the ends of the arms 44 and 47 and to the eccentric 13 is readily adjusted. In this way the hammer may be so connected to the eccentric as to cause the hammer to strike the

work before the downward limit of movement of the hammer under the positive action of the connections between the hammer arm and eccentric 13 is reached, or as occurs in the adjustment shown in the drawings, the limit of travel of the hammer under the direct action of the eccentric 13 may be reached before the hammer actually strikes the work. In the latter case the momentum of the hammer determines the blow.

The connections between the eccentric which may be taken to represent the driving power and the arm 35 which may be taken to represent the hammer, permit a great variety of adjustments as to the character and force of the blows delivered, which blows may occur in very rapid succession or more slowly, in accordance with the speed of the driving pulley 18.

As already stated the invention is susceptible of embodiment in such small size as to permit its use upon a work bench with the employment of a driving force such as would be supplied by a $\frac{1}{8}$ H. P. electric motor. Again, the invention is susceptible of embodiment in such large size as to need a 1 H. P. electric motor for the driving means, and such a hammer structure is well adapted for use by blacksmiths, since it can readily handle metal up to two inches in thickness.

It will be observed that the hammer head 37 is readily removable and may be replaced by any special tool or die to cooperate with another die lodged on the anvil 8, wherefore the hammer head 37 may be taken as indicative of any suitable tool other than a hammer.

Moreover, if the structure be mounted on a bench rather than on a special base the treadle has its foot receiving portion suitably extended or dropped for the purpose.

What is claimed is:—

1. In a power hammer, a reciprocable hammer, a rotatable driving member for reciprocating the hammer, and connections between the driving member and hammer comprising oppositely movable associated arms connected at one end to the hammer, links connecting the other ends of the arms to the driving member, positive means for determining the spread of the arms, and elastic means interposed between the arms and resisting their approach.

2. In a power hammer, a reciprocable hammer, a rotatable driving member for reciprocating the hammer, and connections between the driving member and hammer comprising oppositely movable associated arms connected at one end to the hammer, links connecting the other ends of the arms to the driving member, positive means for determining the spread of the arms, and elastic means interposed between the arms and resisting their approach, the means for de-

termining the separation of the arms having adjusting means for regulating its effective length.

3. In a power hammer, a reciprocable hammer, a rotatable driving member for reciprocating the hammer, and connections between the driving member and hammer comprising oppositely movable associated arms connected at one end to the hammer, links connecting the other ends of the arms to the driving member, positive means for determining the spread of the arms, and elastic means interposed between the arms and resisting their approach, the means for determining the separation of the arms having adjusting means for regulating its effective length, and the connections between the driving member and the arms also having adjusting means for determining the effective length of said connections.

4. In a power hammer, a reciprocable hammer, an eccentric driving means for the hammer, and connections between the eccentric driving means and the hammer comprising a cross head connected to the hammer, divergent arms each pivoted at one end to the cross head and there separated with the other ends of the arms separated to a greater extent than the pivot ends, links connecting the divergent ends of the arms to the eccentric, a rod connecting the arms between the eccentric and cross head and determining the extent of separation of the arms, and a spring interposed between the arms and in surrounding relation to the rod and yielding to the approach of the arms.

5. In a power hammer, a reciprocable hammer, an eccentric driving means for the hammer, and connections between the eccentric driving means and the hammer comprising a cross head connected to the hammer, divergent arms each pivoted at one end to the cross head and there separated with the other ends of the arms separated to a greater extent than the pivot ends, links connecting the divergent ends of the arms to the eccentric, a rod connecting the arms between the eccentric and cross head and determining the extent of separation of the arms, and a spring interposed between the arms and in surrounding relation to the rod and yielding to approach of the arms, the cross head having a universal connection with the hammer.

6. A power hammer comprising a base member, an anvil upstanding from the base member, a post also upstanding from the base member in spaced relation to the anvil, a rock arm mounted on the post, a hammer head carried by the rock arm at the end remote from the post and in operative relation to the anvil, an eccentric carried by the post, yieldable connections between the eccentric and rock arm, a driving member mounted to rotate in the same axis as the eccentric,

and a clutch between the eccentric and the driving member for coupling them together.

7. A power hammer comprising a base member, an anvil upstanding from the base member, a post also upstanding from the base member in spaced relation to the anvil, a rock arm mounted on the post, a hammer head carried by the rock arm at the end remote from the post and in operative relation to the anvil, an eccentric carried by the post, yieldable connections between the eccentric and rock arm, and a clutch for connecting the eccentric to a source of power, said eccentric and rock arm having connections between them in the form of a jointed member with opposed parts yieldable in a direction one toward the other and provided with a spring for resisting such yielding movement, and positively acting means for preventing separation of the yielding members beyond a predetermined limit.

8. In a power hammer, a hammer head and carrier therefor in the form of a pivoted arm, a driving means in the form of an eccentric, and connections between the eccentric and the hammer carrying arm having opposed members with devices positively determining the separation of said opposed members and elastically yieldable to the approach of said members.

9. A power hammer comprising a basic member with an anvil uprising therefrom

near one end, and a post near the other end, a power hammer pivotally mounted on the post and having a head in operative relation to the anvil, a shaft carried by the post with an eccentric at one end and provided with a clutch having one member fast to the shaft and the other member rotatable thereon and movable toward and from the first member, the second-named member being adapted to be power driven, connections between the eccentric and hammer for imparting movements to the hammer toward and from the anvil, and means for operating the clutch comprising a lever pivoted to the base with one end connected to the movable member of the clutch for moving it into and out of engagement with the other member of the clutch, a treadle fast to the end of the lever remote from the clutch and extending to an accessible point adjacent to the anvil, and a spring at the accessible end of the treadle for holding it in an elevated position and thereby separating the clutch members.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HARRY D. FARNER.

Witnesses:

W. L. HAZEN,
J. C. MOORHEAD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."