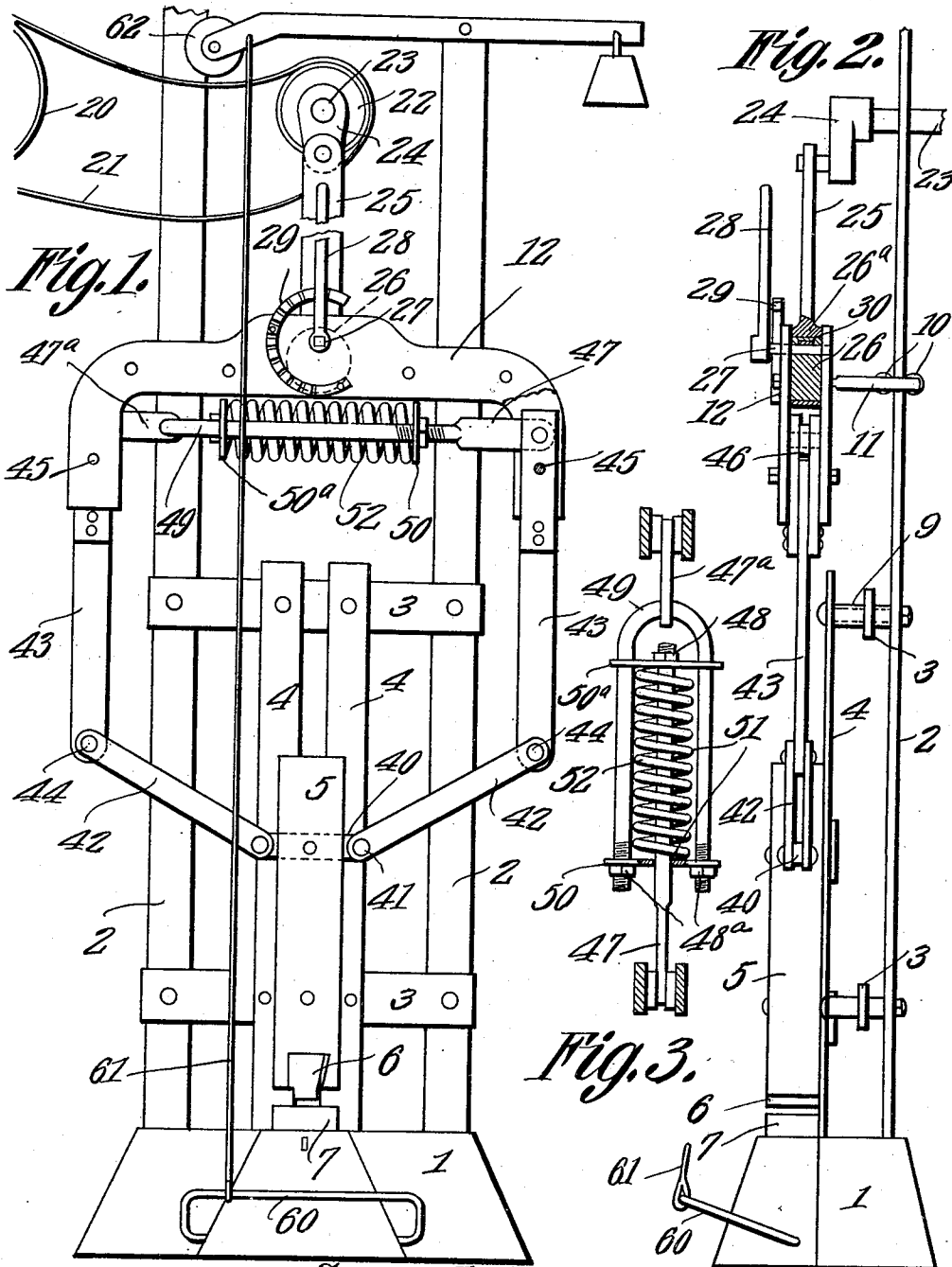


S. A. THORNBURG.
POWER HAMMER.
APPLICATION FILED MAR. 31, 1911.

1,007,159.

Patented Oct. 31, 1911.



Witnesses
J. P. Loring
L. A. Wilcox

Samuel A. Thornburg

Inventor,
by *C. A. Snow & Co.*
Attorneys

UNITED STATES PATENT OFFICE.

SAMUEL A. THORNBURG, OF FRONTENAC, KANSAS, ASSIGNOR OF ONE-HALF TO
ARTHUR J. FLETCHER, OF FRONTENAC, KANSAS.

POWER-HAMMER.

1,007,159.

Specification of Letters Patent.

Patented Oct. 31, 1911.

Application filed March 31, 1911. Serial No. 618,234.

To all whom it may concern:

Be it known that I, SAMUEL A. THORNBURG, a citizen of the United States, residing at Frontenac, in the county of Crawford and State of Kansas, have invented a new and useful Power-Hammer, of which the following is a specification.

This invention relates to power hammers, and more especially to those having a sliding head wherein the upper die is operated by means of a toggle lever; and the objects of the same are to simplify the construction of such a machine by reducing its number of parts and the size of the whole, and to provide readily accessible means for adjusting the rapidity, length of throw, and power of the stroke. These objects are accomplished by the construction described and claimed below, and as shown in the drawings wherein—

Figure 1 is a front elevation of this machine complete, partly broken away. Fig. 2 is an edge view thereof. Fig. 3 is a plan view of the shackle connecting the toggle levers, illustrating the means for adjusting the tension of the spring.

In the drawings the numeral 1 designates the base from which rise standards 2 connected by cross bars 3 which carry guides 4 in which the hammer head 5 moves vertically, and this head carries the hammer or upper die 6 which coacts with the anvil or bed die 7 in a manner well known in this art. The rollers 10 move astride the standard 2 and are journaled in a bracket 11 which projects to the rear from a vertically movable yoke 12. The power wheel is here indicated at 20 as a pulley, loosely belted as at 21 to another pulley 22 on a crank shaft 23 whose crank 24 is connected with a pitman 25 having an eccentric band 26^a at its lower end which is mounted on an eccentric 26 journaled in the yoke 12 in any suitable manner. Through the front and rear plates of this yoke is journaled a shaft 27 having a handle 28 fast on its forward end and movable over a toothed segment 29 so as to adjust the position of the handle and shaft. Between the plates of the yoke said shaft is secured as at 30 within the eccentric head 26 as by squaring the shaft and the hole through the eccentric, or by a key as shown, or in any suitable manner. It follows that adjustment of the handle turns the eccentric and alters the vertical path

of movement of the yoke with respect to the rise and fall of the crank 24. The connection between the hammer head and the arms of the yoke is duplicated at each side of the latter, and a description of that at one side will suffice for both. Ears 40 project from the sides of said head, and to each of them at 41 is pivoted one arm or link 42 of the toggle, the other arm or link 43 being pivoted to this arm at 44 and rising therefrom between the face plates of the yoke 12 in whose lower end this link 43 is pivoted as at 45; and said arm is forked at its upper end as at 46. Between the arms of the fork is pivoted the outer end of a rod 47 (see Fig. 3) whose inner end is threaded and has a nut 48. Between the arms of the opposite fork 46 is pivoted a shorter rod 47^a whose inner end connects with a shackle 49 at the bend thereof, while the arms of this shackle are connected at their remote ends by a plate 50 which is held upon said arms by nuts 48^a, the center of the plate having a hole 51 for the passage of the rod 47. Around the latter between this plate and a similar plate 50^a mounted on the rod inside its nut 48, is coiled an expansive spring 52, and it will be obvious that the normal tendency of this spring is to draw the forked extremities 46 of the upper links 43 of the toggle levers toward each other, and spread their lower ends apart at 44. By setting the nuts 48 and 48^a, the tension of the spring can be adjusted; and by removing the nuts the spring can be replaced by one of greater or less length or power.

A pedal 60 is pivoted to the base 1 and connected by a rod 61 with a belt tightener 62 which when depressed throws tension on the belt 61 and drives the pulley 22 from the power wheel 20.

It is obvious that any suitable type of belt fastener, speed changer, fast and loose pulleys, or other connecting and disconnecting mechanism might be substituted without departing from the spirit of my invention.

In operation, when the pedal is depressed the belt tightener causes the pulley 22 and its crank 24 to rotate, and the pitman 25 causes the yoke 12 to rise and fall as rapidly as the crank rotates. This rapidity may be regulated to some extent by the speed with which the power wheel 20 revolves and to some further extent by the tension imparted

to the belt tightener, for the latter might be permitted to be loose so as to allow a little slipping of the belt. Adjustment of the handle or lever 28 adjusts the path through which the yoke rises and falls, but not the degree or extent of its rise and fall; but as the yoke carries the other mechanism connecting it with the hammer head, if the yoke is caused to move through a higher path it will be obvious that the upper die 6 will be correspondingly adjusted and the machine can operate upon thicker work. Hence we have accounted for the speed of rotation and the path through which the hammer moves. As the crank makes an upward stroke all movable parts of the mechanism rise. As the crank makes its downward stroke, the yoke descends rapidly as the hammer head has not yet lost the inertia of its previous upward stroke. The result is that the descending pivots 45 move the upper toggle links 43 downward while the lower toggle links 42 stand practically idle for a moment until the pivots 44 have moved past a horizontal line through the pivots 41, the expansion of the spring 52 assisting. As the movable parts reach the lower limit of their stroke, the lower pivots 44 exert a downward tension on the then upper pivots 41, and the hammer head 5 is given a sudden downward impulse and caused to strike a forcible blow upon the anvil. In making its blow the hammer head causes the inner ends of the links 42 to pass again below their outer ends 44 as the latter start on the next upward movement with the yoke, and the rebound of the hammer head starts it then upward so that it follows the yoke and the ascending mechanism, and the operation is repeated.

It is obvious that by adjusting the tension of the spring, the force of the blow can to a considerable extent be adjusted.

It will be clear to those familiar with this art that the dies can be changed at will so that this machine can be used either as a

power hammer or for any other purpose of which it is susceptible.

I do not confine myself to the materials or shapes or proportions of parts, and considerable change in details may be made without departing from the principle of my invention.

What is claimed is:—

1. In a power hammer, the combination with a yoke, means for reciprocating it vertically, upright guides, and a hammer head movable therein; of links pivoted to said head and leading from its opposite sides, an upright link pivoted at its lower end to the outer end of each of said other links and forming therewith a toggle lever, each upright link being pivoted near its upper end to said yoke, and a yielding means for drawing the upper extremities of these upright links toward each other connecting the upper extremities of the said links.

2. In a power hammer, the combination with a yoke, means for reciprocating it vertically, upright guides, and a hammer head movable therein; of links pivoted to said head and leading from its opposite sides, an upright link pivoted at its lower end to the outer end of each of said other links and forming therewith a toggle lever, each upright link being pivoted near its upper end to said yoke, rods connecting the upper extremities of said upright links, a shackle attached to the inner end of one rod with its arms lapping the other rod, a plate across the extremity of the last-named rod, a plate across the ends of the shackle arms, means for adjusting both said plates, and an expansive spring between them.

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

SAMUEL A. THORNBURG.

Witnesses:

JOHN HADERLEIN,
KATIE HADERLEIN.