May 8, 1945. W. S. WILKINS 2,375,398

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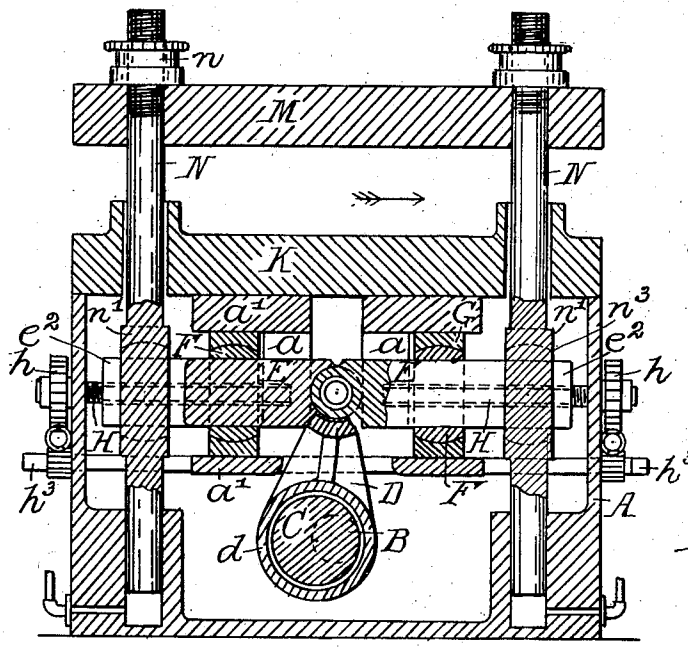


Fig. 1.

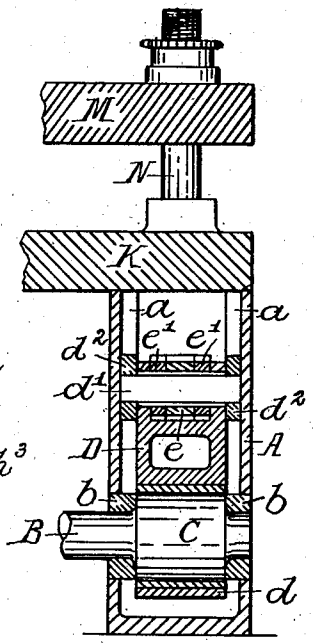
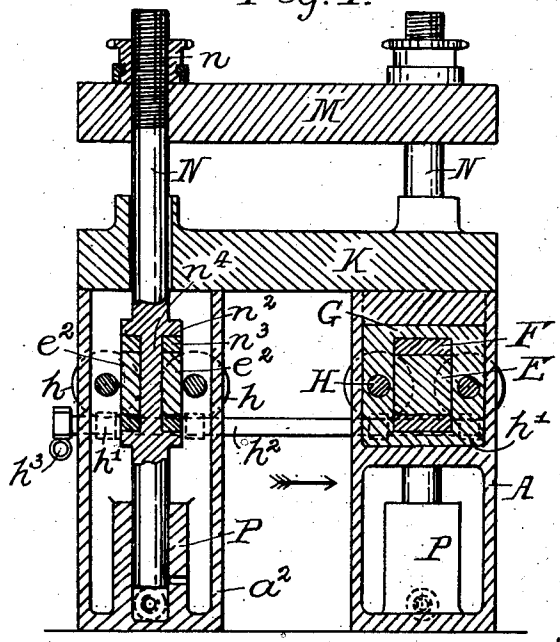


Fig. 3.



1a

Fig. 2.

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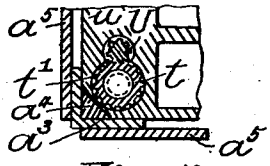


Fig. 5.

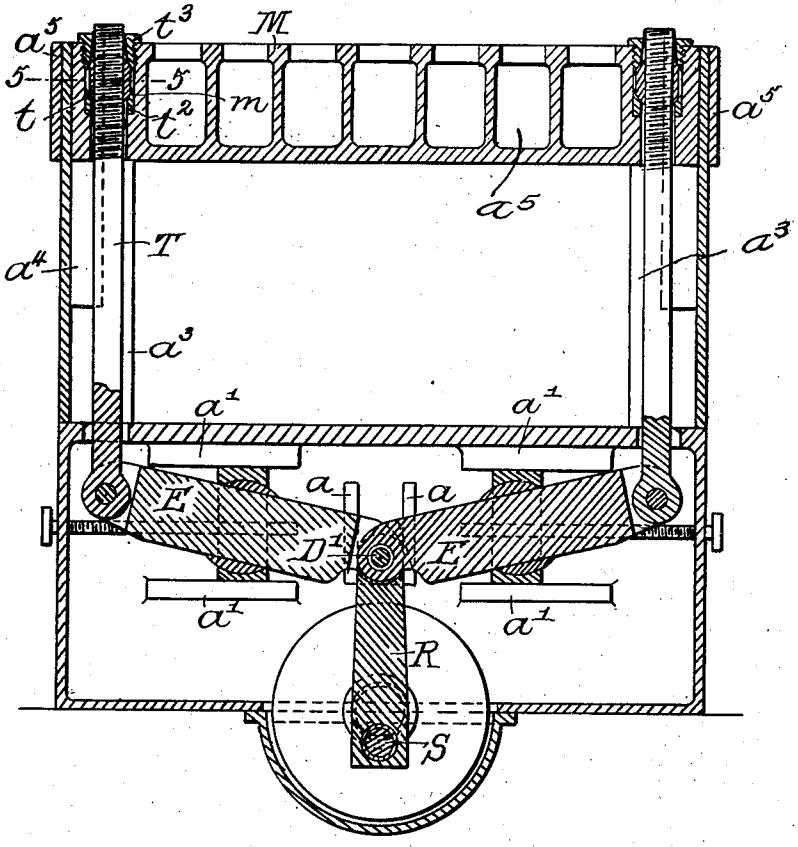


Fig. 4

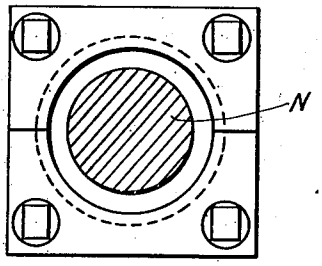


Fig. 8

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Fig. 5.a

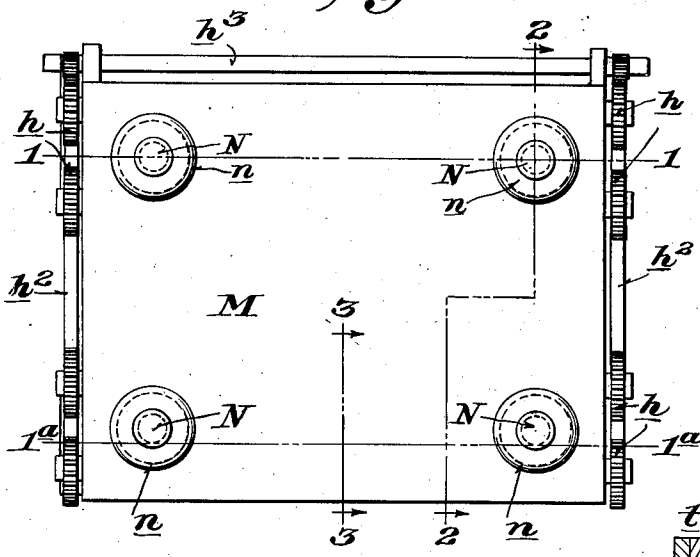


Fig. 7.

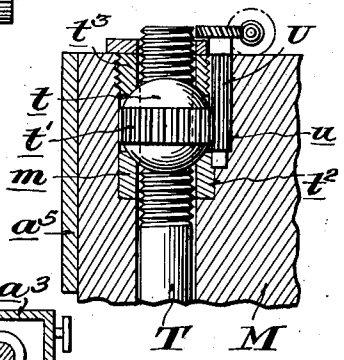
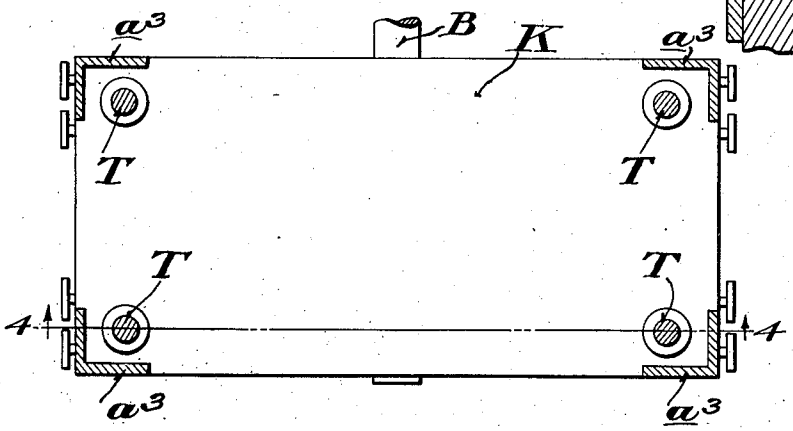


Fig. 6.



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Patented May 8, 1945 2,375,398

UNITED STATES PATENT OFFICE

2,375,398

POWER PRESS

Walter Samuel Wilkins, Wednesbury, England

Application February 23, 1943, Serial No. 476,864
In Great Britain May 15, 1942

6 Claims. (Cl. 100—70)

The invention relates to power presses, and more especially to power presses of the type in which an upper moving head is impelled downwardly by power means situated beneath a fixed lower bed or bolster, and has for its object to provide novel or improved means for adjusting the length of the stroke of the head.

It has been proposed to alter the stroke of an eccentric-driven power press by altering the eccentricity of the eccentric or eccentrics, but such method is difficult of adjustment and limited in its range.

According to this invention the moving head of the press is actuated by an eccentric or crank through the medium of a lever or levers, the pivot of each lever being at an intermediate point thereof and formed as a sliding part which is adjustable along the lever to alter the leverage thereof.

The eccentric or crank is carried and driven by a suitable driving shaft and actuates the moving head through an eccentric rod or connecting rod which is pivoted to one end of the lever or one end of each of two levers, the other end of each of which is drivingly connected to the moving head.

The connection to the moving head may comprise a rod or rods fixed in relation to the head and each carrying a pivoted guide to receive the outer end of the lever; or the connecting means may comprise a link for each lever pivoted to the end of the lever and to the head.

The eccentric or crank is preferably situated under the bed or table and the eccentric rod or connecting rod extending upwardly and being pivotally connected to the inner ends of two longitudinally disposed levers.

Two convenient embodiments of the invention are described by way of example, and with reference to the accompanying drawings; of which—

Figure 1 is a vertical section taken on line 1—1 of Fig. 5*a*;

Fig. 2 is a section on line 2—2 of Fig. 5*a*;

Fig. 3 is a transverse section on line 3—3 of Fig. 5*a*, the eccentric and shaft being shown in elevation;

Fig. 4 is a section on line 4—4 of Fig. 6 illustrating a modified form of the invention;

Fig. 5 is a fragmentary sectional plan view, on line 5—5 of Fig. 4;

Fig. 5*a* is a plan view of the press shown in Figs. 1–3;

Fig. 6 is a sectional plan view of the press, the section being taken just under the head a^5 in Fig. 4;

Fig. 7 is a section on a plane through the center of shaft T and shaft U, with the members T, *t*, *t'*, and U shown in elevation; and

Fig. 8 is a plan view of the split washer, showing rod N in section.

Referring first to Figures 1 to 3; A is the frame of the machine supporting bearings *b*, *b* (see Figure 3), for a driving shaft B integral with an eccentric C, around which passes the strap *d* of an eccentric rod D, which at its upper end "engages with a transversely disposed pin *d'*, on the ends of which are two slides d^2 d^2 (see Figure 3), guided between vertical guides *a*, *a*. E, E, are two longitudinally disposed levers, the one having, at its inner end, a single lug *e* and the other a pair of lugs *e'*, *e'*, all three lugs engaging with the pin *d'*. Each lever E is of rectangular section but is forked at its outer end to provide two prongs e^2, e^2 (see especially Figure 2). Each lever E passes through a guide slot of a part-cylindrical block F adapted for partial turning movement about a horizontal pivot axis in a housing G. This latter is adapted for longitudinal sliding movement between guides *a'*, *a'*, integral with the frame A. Each housing G with its block F can be moved along the respective lever E by longitudinal screws H threading through each block G. The screws have rigidly mounted, on their outer ends, worm wheels *h*, *h*, engaged by worms *h'*, *h'*, on transverse shafts h^2 which are coupled to a common operating worm shaft h^3 by worm and wheel gear. By rotating the operating shaft h^3 the two shafts h^2 are rotated and these in turn rotate the shafts H which move the blocks F. In this manner the fulcrums of the levers can be moved simultaneously to increase or decrease the leverage by the same amount.

K is the bed or table of the press adapted to carry the bottom tool or tools (not shown) and M is the movable head adapted to carry the upper tool or tools (also not shown). Passing up through both the table K and head M are four guide rods N threaded at their upper ends to receive nuts *n* adapted to bear down on the top surface of the head M. These rods, while acting to guide the head in its movement, act also as the means for moving the head up and down by threaded engagement therewith either directly or indirectly. The rods N pass clear through the head M and have nuts *n* screwed on their upper ends (see Fig. 2). The head M is lifted through the medium of the nuts *n* and these latter have each an annular groove into which is fitted an inturned ledge of a washer divided into two parts. Each part of the washer is secured to the top surface of the head M by two screws. This is well known practice in power presses. (See American publication Machinery Encyclopedia, vol. 5, page 162, year 1917, publishers, Industrial Press, New York.) Each of the rods N has intermediate its height an enlarged portion *n'* cut away at each side to form part-cylindrical cavities n^2 in which are located part-cylindrical blocks n^3. The inner faces of these blocks are formed flat and are adapted to engage against the top and bot-

tom surfaces of the bifurcated ends e^2 of the levers E. Between the cavities n^2 of each rod N there is left a central portion or web n^4 at either side of which the bifurcations e^2 pass. The bifurcated ends therefore act to impel the rods downwardly and they can slide longitudinally across the rods to allow for the fact that the outer ends of the levers move in a curved path. The part-cylindrical shape of blocks n^2 allows for the pivoting of the levers E in relation to the rods N.

When the housings G are moved inwardly towards each other, the up and down movement of the outer ends of the levers E is increased and the stroke of the press lengthened. Outward movement of the fulcrum blocks has the opposite effect, namely that of shortening the stroke of the press.

At its lower end each rod N passes down into a bore in a socket P integral with the frame A, such bore acting as a guide and dash pot for the lower end of the rod. The socket may, however, be utilised also as the chamber of a pump the lower end of the rod N forming the plunger.

The lower ends of frame portions a^2 may be utilised as oil sumps from which oil may be pumped to the various parts of the press. The eccentric strap d may dip into the oil.

Referring to Figures 4 and 5, the arrangement of the sliding fulcrum and the guiding of the pivot joint between the inner ends of the levers is similar to that which is described with reference to the previous figures; but, in Figure 4, there is shown a connecting rod R engaging at its lower end with a crank pin S, and with the levers E, E, by a pin D'. This latter is guided as before between vertical guides a, a.

Each lever E is pivoted at its outer end to a vertical rod T threaded at its upper end to receive a spherical nut t provided with a set of peripheral teeth t' with which engage teeth u of a short vertical shaft U, which is turned in the usual way to adjust the height of the moving head. t^2 is a bottom bearing piece fitted into the bottom of a vertical bore m formed in from the top of the head M. t^3 is a gland screwed into the top of the bore m. The gland t^3 and bearing piece t^2 have their inner ends formed part spherical to fit against the spherical nut t. The bearing piece t^2, gland t^3 and the metal in the head M below the bore m are bored to allow of a certain amount of lateral movement of the rod T as the respective lever E rocks.

The head M is guided by the internal surfaces of pillars a^3 which are of angle section and are strengthened by triangular-section corner-pieces a^4 which act as additional guides. The corners of the head M are cut away to engage against the inner faces of the corner pieces a^4. The upper ends of the pillars a^3 are connected together by plates a^5.

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

1. A power press comprising a movable head, a fixed table towards which said movable head is impelled, a driving shaft, crank type means driven by said shaft, a pair of levers extending in opposite directions and pivotally connected together, each at one end, and to said crank type means, guide means for said pivotal connection, a pair of rods adapted to be moved by the other ends of said levers and connected to said movable head to impel it towards said table, a pair of fittings forming fulcrums for said levers, and means for moving said fittings simultaneously along said levers to alter the stroke of the movable head.

2. A power press comprising a movable head, a fixed table towards which said movable head is impelled, a driving shaft, crank type means driven by said shaft situated on the side of said table remote from said movable head, a pair of levers extending in opposite directions and pivotally connected together, each at one end, and to said crank type means, guide means for said pivotal connection, a pair of rods adapted to be moved by the other ends of said levers and connected to said movable head to impel it towards said table, a pair of fittings forming fulcrums for said levers, and means for moving said fittings simultaneously along said levers to alter the stroke of the movable head.

3. A power press comprising a movable head, a fixed table towards which said movable head is impelled, a driving shaft, crank type means driven by said shaft, a pair of levers extending in opposite directions and pivotally connected together, each at one end, and to said crank type means, guide means for said pivotal connection, a pair of rods pivoted to the outer ends of said levers and connected to said movable head to impel it towards said table, a pair of fittings forming fulcrums for said levers, and means for moving said fittings along said levers to alter the stroke of the movable head.

4. A power press comprising a movable head, a fixed table towards which said movable head is impelled, a driving shaft, crank type means driven by said shaft, a pair of levers extending in opposite directions and pivotally connected together, each at one end, and to said crank type means, guide means for said pivotal connection, a pair of rods, rotatable guideways carried by said rods and through which the outer ends of said levers are adapted to slide and said rods connected to said movable head to impel it towards said table, a pair of fittings forming fulcrums for said levers, and means for moving said fittings along said levers to alter the stroke of the movable head.

5. A power press comprising a movable head, a fixed table towards which said movable head is impelled, a driving shaft, crank type means driven by said shaft, a pair of levers extending in opposite directions and pivotally connected together, each at one end, and to said crank type means, guide means for said pivotal connection, a pair of rods connected at their upper ends to said movable head, circular recesses in the sides of each said rod, circular guide blocks rotatable in said recesses, parallel guides in said blocks, bifurcations at the outer end of each lever adapted to pass through said guides in said blocks, a pair of fittings forming fulcrums for said levers, and means for moving said fittings along said levers to alter the stroke of the movable head.

6. A power press comprising a movable head, a fixed table towards which said movable head is impelled, a driving shaft, crank type means driven by said shaft, a pair of levers extending in opposite directions and pivotally connected together, each at one end, and to said crank type means, guide means for said pivotal connection, a pair of rods adapted to be moved by the other ends of said levers and connected to said movable head to impel it towards said table, a pair of fittings forming fulcrums for said levers, and means for moving said fittings along said levers to alter the stroke of the movable head.

WALTER SAMUEL WILKINS.