

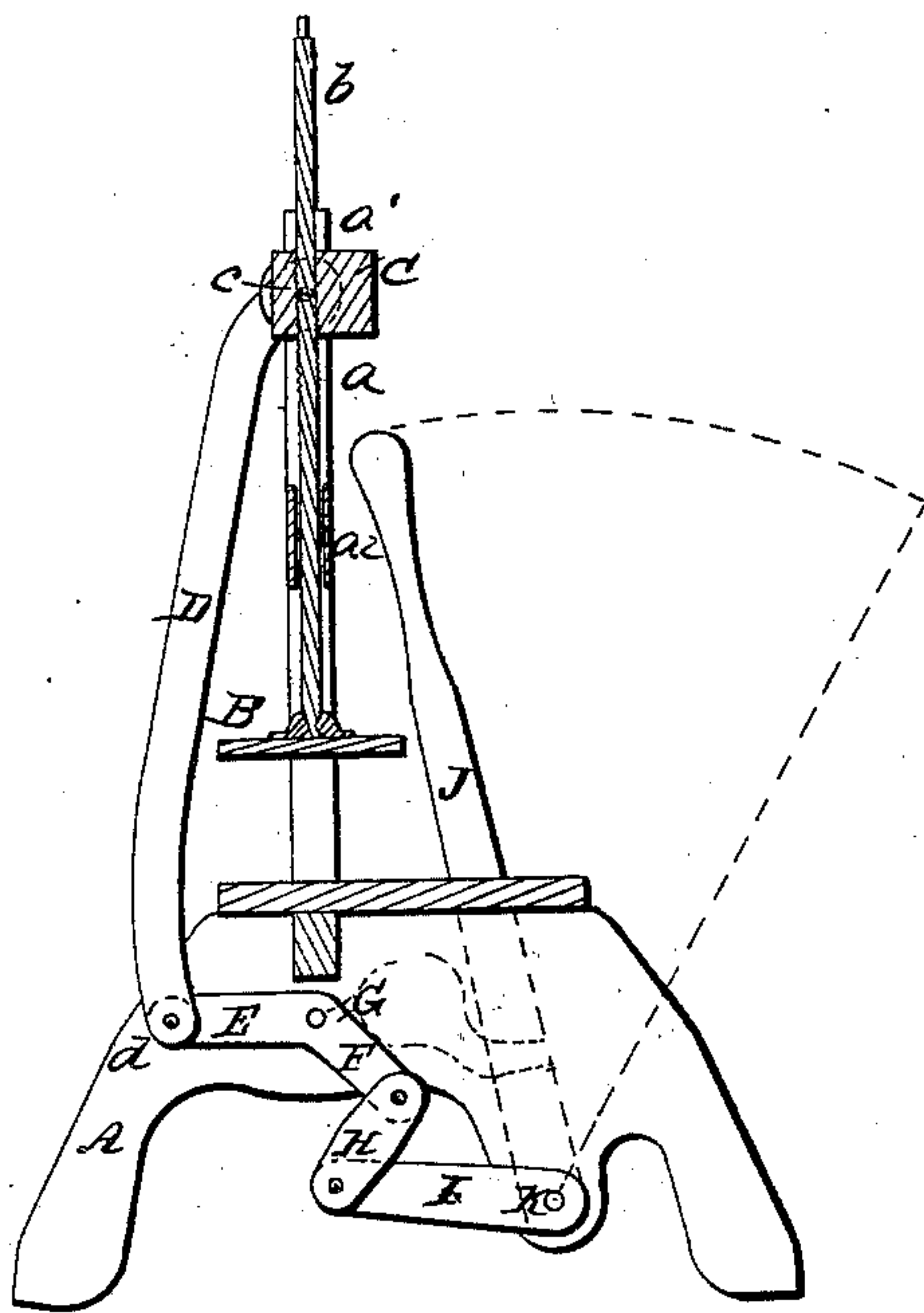
*G. Matthewman,*

*Hay Press.*

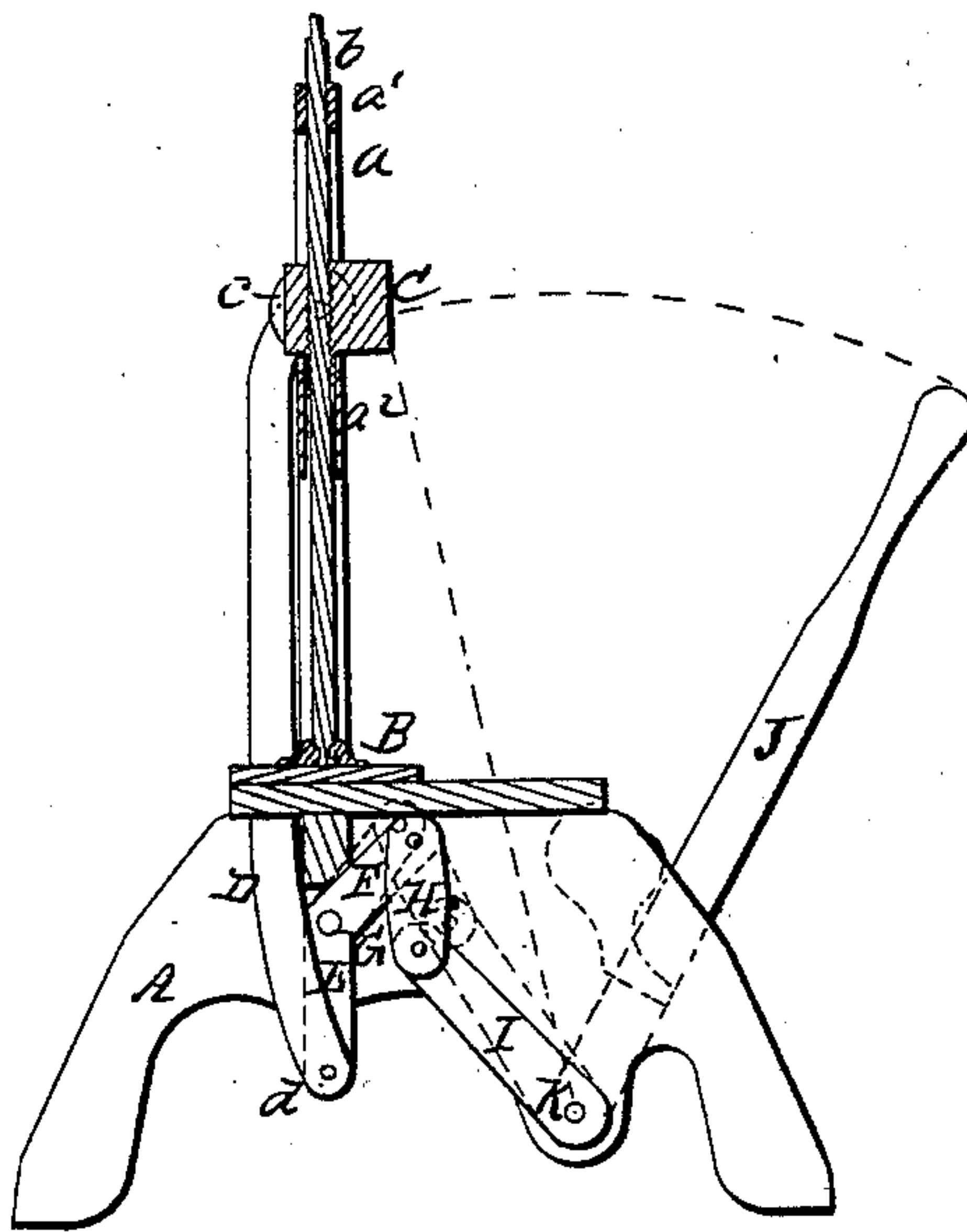
*N<sup>o</sup> 82,139.*

*Patented, Sep. 15, 1868.*

*Fig. 1.*



*Fig. 2.*



*Witnesses*

*C. C. Livings  
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By his attorney W. B. Nelson*

# United States Patent Office.

GEORGE MATTHEWMAN, OF BROOKLYN, NEW YORK.

*Letters Patent No. 82,139, dated September 15, 1868.*

## IMPROVEMENT IN PRESSES.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, GEORGE MATTHEWMAN, of Brooklyn, in the county of Kings, and State of New York, have invented certain new and useful Improvements in Presses; and I do hereby declare the following is a full and exact description thereof.

My invention relates to provisions for communicating a peculiar motion from the operating part or hand-lever to the pressing part or platen, and consists in the employment of two toggles, arranged to operate, the one upon the other, so as to effect the motion in the manner set forth below.

I will describe what I consider the best means of carrying out my invention.

The accompanying drawings form a part of this specification.

Figure 1 is a vertical section through my press, with the platen raised.

Figure 2 is a corresponding section, with the platen depressed.

Similar letters of reference indicate like parts in all the figures.

Tints are employed merely to aid in distinguishing the parts, and do not imply differences of material. The material of the whole may be iron and steel.

A is the bed and framework of the press, adapted to stand upon the ground or floor, and firmly supporting the several parts.

The upright frames  $a$  support cross-pieces,  $a^1$   $a^2$ , which serve as guides for the rod  $b$ , which may carry a platen, B, at its lower end, and is threaded through the cross-head C, so that, as the rod  $b$  is turned by a wrench applied at the top, the platen may be operated at different levels. This mode of adjusting the level at which the press, rod, and platen work, is well known.

D is a bent link, connected at its upper end to the cross-head C by the pin  $c$ .

E F is a bent lever, fixed on the stout rocking-shaft G, mounted in bearings in the framework A, in the position represented.

The lower end of the stout link D, running down behind the press-frame, is pivoted to the arm E by the pin  $d$ , as represented. Turning the arm E downward, into a perpendicular position, draws the cross-head C and its connections down to their lowest position, and the movement increases in leverage or purchase as the movement proceeds.

The means whereby the turning-motion is communicated to the lever E are shown very plainly in figs. 1 and 2. These figures being sections through the machine, near its centre, show the parts on one side only of the press, it being understood that the parts E D should be duplicated.

H is a link, connecting the end of the arm F with the arm I, which latter is turned by the hand-lever J, the position being such as to allow a convenient application of the muscular force to the end of the lever J, and to bring the arm I and the link H nearly in a straight line at the time when the press is exerting its greatest force, as indicated in red outline in fig. 2.

By examining fig. 1, it will be seen that when the platen is in its highest position, the link H is not at right angles to the arm I, but that it is considerably inclined in the opposite direction, and it will be seen that when the hand-lever J is operated to depress the platen, the platen moves rapidly and almost uniformly during all the earlier portions of the movement, and that it moves slowly and with a greatly-increasing slowness, and consequently increased purchase, during the latter portion of the movement.

The term "toggle" is one frequently employed by mechanics to designate a device for increasing mechanical effect by oblique action, whether the motion be compressive or tensile. With this general definition of the term "toggle," we may say that my press contains two toggles, peculiarly arranged, and acting the one upon the other.

The rapidity of the motion of the platen during the earlier movement of the hand-lever J is due to the fact that neither of the toggles is then at or near its straightened position. The approximately uniform movement of the press-rod  $b$ , for a long period, is due to the fact that the link H is not at right angles to the arm I at the commencement, that it comes into right angles thereto after a portion of the movement, and that there



is a period, not at the commencement of the movement, but after the hand-lever J has performed about half of its traverse, when the arms are in their best position for transmitting motion rapidly from the arm I through the link H. This peculiar relation, due to the obliquity of the link H, when the platen is fully raised, may be modified at will by changing the position of the centre K, where the arm I and hand-lever J turn. By moving this centre K nearer to the rocking-shaft G, the press-rod *b* will be made to move relatively slower at the commencement of its stroke, and faster at the middle of its stroke. By moving the centre K further away from the rocking-shaft G, the press-rod *b* will be made to move relatively faster at the commencement of the motion of the hand-lever J. The very great slowness of the movement of the press-rod *b*, during all the last part of the movement of the hand-lever J, is due to the fact that there are in the press two toggles, both nearly straight, working one upon the other. This condition is indicated in fig. 2.

The arm E, being nearly perpendicular, acts in the manner of a toggle to draw down the cross-head with great purchase, while the arm I and the link H, being in nearly straight line, each with the other, act on the arm F, being nearly at right angles with it, to turn it and its connections, with a very great purchase.

My machine is capable of being modified in many of its details, without sacrificing all the advantages of the invention. It is important, simply, that the parts be so related that while there is a double-toggle power, or that of one toggle acting upon another, so as to multiply the effect of one into that of the other, at the point or period when the press is exerting its greatest force, there shall be such a relation of the levers and connections, during the early portion of the movement, that the motion shall not be extremely quick at the commencement, and rapidly dying away, but shall be nearly uniform during the main portion of the movement.

With the proportions which I have tried, and have endeavored to represent in the figures, the first four inches of the travel of the hand-lever J give a motion to the press-rod *b* of one inch. The several succeeding increments, (of four inches each of motion of the hand-lever,) give motions to the press-rod *b*, as follows: One inch, one inch, one and one-half inch, one and three-eighths inch, one inch, one-half inch, one-eighth inch; the total travel of the press-rod being seven and one-half inches, and the whole distance the handle travels being thirty-two inches.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

Operating the press through the instrumentality of two toggles arranged as represented, that is to say, the arm I operating the arm F through the link H, presenting the several angular relations at the different periods, as specified, and the motion thus transmitted being conveyed to the press-rod *b*, and its connections, through the medium of the arms E and links D, forming a second toggle, all substantially as and for the purposes herein set forth.

GEORGE MATTHEWMAN.

Witnesses:

THOMAS D. STETSON,  
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