3 Sheets--Sheet 1.

N. C. STILES.

Drop-Hammer.

No. 160,483. Patented March 2, 1875.

Fig. 1

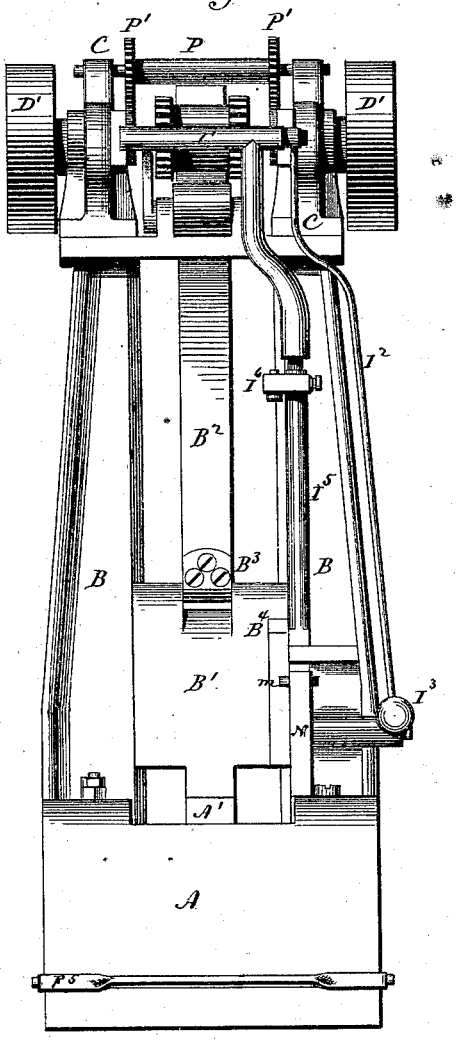
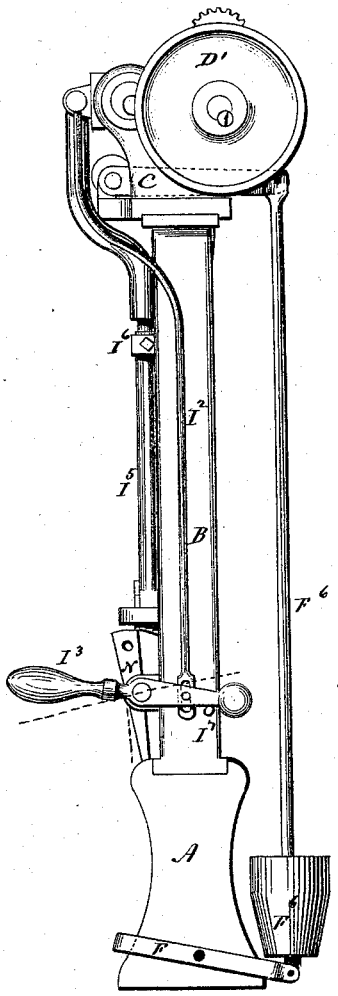


Fig. 2



Witnesses.
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3 Sheets--Sheet 2.

N. C. STILES.

Drop-Hammer.

No. 160,483. Patented March 2, 1875.

fig. 3

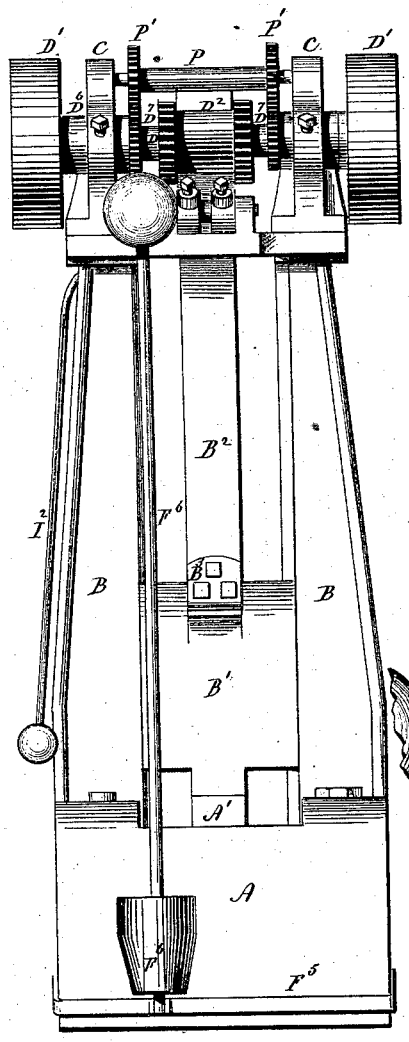


fig. 4

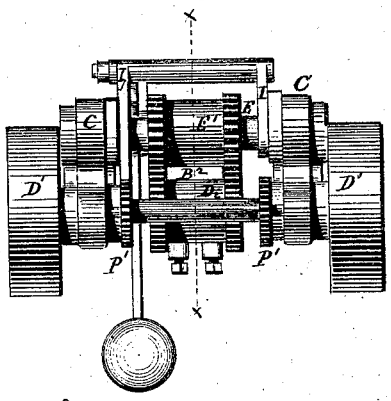


fig. 5

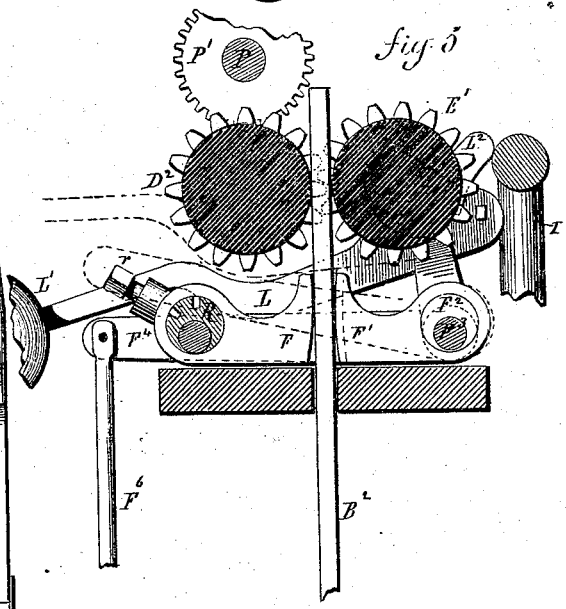
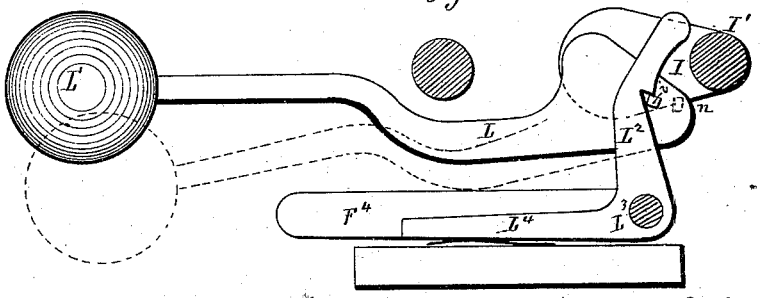


fig. 6



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3 Sheets--Sheet 3.

N. C. STILES.
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fig. 7

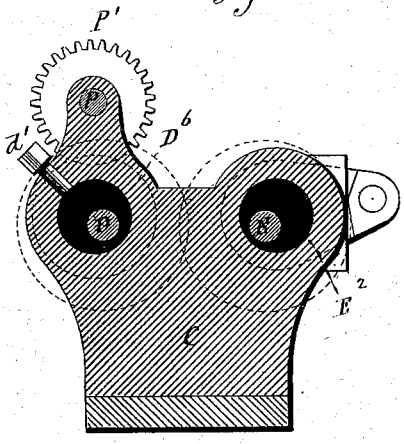


fig. 8

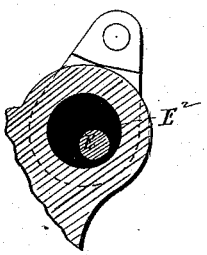


fig. 9

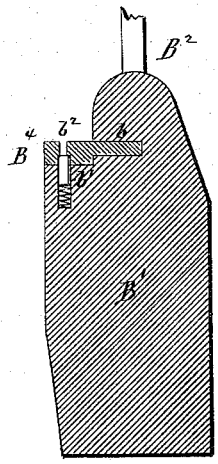


fig. 10

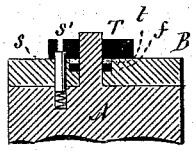
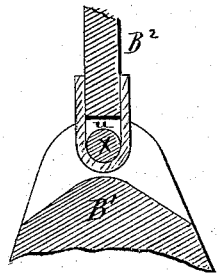


fig. 11



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UNITED STATES PATENT OFFICE.

NORMAN C. STILES, OF MIDDLETOWN, CONNECTICUT, ASSIGNOR TO THE STILES & PARKER PRESS COMPANY, OF SAME PLACE.

IMPROVEMENT IN DROP-HAMMERS.

Specification forming part of Letters Patent No. **160,483**, dated March 2, 1875; application filed May 11, 1874.

To all whom it may concern:

Be it known that I, NORMAN C. STILES, of Middletown, in the county of Middlesex and State of Connecticut, have invented a new Improvement in Drop-Press; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a front view; Fig. 2, a side view; Fig. 3, a rear view; Fig. 4, a top view of the operative mechanism; and in Figs. 5 to 10, inclusive, detached views, enlarged.

This invention relates to an improvement in the drop-press for which Letters Patent were granted Bennett Hotchkiss, February 17, 1863, and in which the hammer is raised by a pair of revolving rolls, one of which is hung upon an eccentric bearing, so that by turning the said bearing the roll is made to approach the other to grasp the strap, or separated to release the strap, the object being to perfect in details the construction and operation of the press; and the invention consists, primarily, in the arrangement of a pair of clamps, one adjustable, combined with the eccentric rolls, which will grasp the hammer strap or bar, and hold it suspended at any desired point, and provided with mechanism for opening said clamps when the descent of the hammer is desired.

A is the bed which supports the operative mechanism, and on which the anvil A′ is set. B B are the uprights or posts, between which the hammer B^1 is arranged in substantially the usual manner, so as to move freely up and down, guided by said uprights. B^2 is the strap or bar, which is attached to the hammer, and by which it is raised. This may be a flexible strap, as leather or similar material, or it may be a wood bar attached to the hammer by a flexible or elastic connection, B^3; the latter is preferred. Upon the upper end of the posts the frame C, in which the operative mechanism is placed, is secured in substantially the usual manner. The driving-shaft D carries upon its extremes pulleys D^1, by which power is communicated to the mechanism. On this shaft a roll or drum, D^2, is fixed, and forward of the driving-shaft a second shaft, E, is arranged parallel to the driving-shaft, and on which is a corresponding roll or drum, E^1. The two rolls are geared together, as seen in Figs. 4 and 5, so that they turn in opposite directions. Between the two rolls the bar B^2 passes, and when the rolls are revolving they press against the bar with sufficient force, and will cause the hammer to rise until the pressure of the rolls upon the bar is relaxed, substantially as in the said Hotchkiss patent.

In order to release or apply the pressure of the rolls, the second shaft, E, with its drum E^1, is made adjustable, so as to approach or recede from the other roll, and this is done by arranging the shaft E in eccentric bearings E^2, as seen in Fig. 7, so that by turning the bearing E^2 to the position in Fig. 8, the roll E^1 will be drawn away from the other roll. This is also substantially the same as in said Hotchkiss patent.

It frequently occurs that it is desirable to hold the hammer suspended at a certain point, and if this be done by the rolls alone they are liable to indent the bar or strap, so as to materially interfere with the operation of the rolls to raise the hammer. To avoid this difficulty I arrange beneath the rolls a pair of clamps, F F^1, as seen in Fig. 5, the one F^1 hung upon a shaft, F^2. The bearings F^3 of this said shaft are eccentric to the axis of the shaft, and to this shaft a lever, F^4, is attached, so that by raising the said lever, as denoted in broken lines, the shaft F^2 will be thrown back, and carry with it the clamp F^1; but when forward they lie against the bar, as seen in Fig. 5, and clamp the bar between the two and hold it in that position, but yet allow it to rise to any desired extent, so that when the hammer is drawn up it will be caught by the clamps F F^1 so soon as the power which raised the hammer is relaxed, and will be there held until the lever F^4 is raised, as before described. This is done by connecting to the said lever a treadle, F^5, through a rod, F^6, as seen in Figs. 2 and 3, but so that at any time when the hammer is so supported the operator may release it by

placing his foot upon the treadle and forcing up the lever F^4. The bearings which support the movable roll E^1 are turned, as before described, by means of levers I, one to each bearing, and these connected together by a bar, I^1, and a rod, I^2, extending down, as seen in Figs. 1 and 2, to a lever, I^3; and the operator at any time, by pressing down the lever I^3, will throw up the levers I, as from the position in Fig. 7 to that in Fig. 8, and thus move the roll back from the bar, so that it will not engage the bar, but left free the levers I drop to the position in Fig. 7, which is that of engagement with the bar.

In connection with the levers I, and represented as hung upon the same bearing, is a lever, L, one arm of which has a stud, *n*, extending beneath one of the levers I, and upon the end of the other arm a weight, L^1. This weight is a counterpoise for the levers I and their connections, so that when free the weight L^1 will drop to the position denoted in broken lines, Fig. 6, and throw up the levers I to draw back the roll E^1; but in order that the rolls may remain together against the bar B^2, a latch, L^2, is hung upon the bearing L^3, with an arm, L^4, running back, and a spring tending to throw the latch L^2 forward, and on the shorter arm of the lever L is a stud, *i*, which the latch will engage when the lever L is raised, so as to drop the shorter arm, and will thus permit the rolls to remain together; but when the operator depresses the lever I^3, so as to raise the levers I, they will strike the upper end of the latch L^2, as seen in Fig. 5, and disengage the latch, so that the weight will then fall and carry and hold the levers I upward, which is the position seen in Fig. 5. This will leave the hammer suspended by the clamps F F^1. The clamps F F^1 may be employed with other lifters.

In order that the hammer in its ascent may automatically open the rolls a rod, I^5, is arranged vertically in suitable guides on one of the uprights, and in suitable connection with the levers I, as seen in Fig. 1, and on this rod is an adjustable stop, I^6, which a projection, B^4, on the hammer in its ascent will strike, and cause the rod I^5 and its connections to rise with the hammer until the lever L is tripped, as before described, and throw back the roll, to relieve the bar from the action of the rolls, and leave the hammer suspended at that point. The elevation, therefore, to which the hammer will be raised is governed by the position of the stop I^6, which may be adjusted on the bar to give such desired elevation. The hammer being thus suspended and held by the clamps F F^1, the operator has only to place his foot on the treadle and open the clamps, as before described, when the hammer will fall.

In doing this the lever F^4 immediately beneath the lever L, as seen in Fig. 5, strikes the said lever L, and raises it until it is caught in its highest position by the latch L^2, as seen in Fig. 6, which leaves the levers I free to fall, and bring the rolls again into contact with the bar B^2. Thus the pressure upon the treadle not only frees the hammer and permits it to fall, but also brings the rolls into position to quickly take the hammer up after its fall. A weight, F^6, is applied to the treadle to insure its quick return when freed from the foot that the clamps may immediately engage the bar. The automatic letting back of the roll, if it allowed the roll to come into immediate contact with the bar B^2, would retard, if not prevent, the descent of the hammer. To avoid this, a trip, N, is hung to the upright, which, when the hammer is up, will fall back beneath the lower end of the rod I^5, as denoted in broken lines, Fig. 2, and will thus prevent the descent of the rod I^5 and its connections; but as the hammer approaches the anvil it strikes a stud, *m*, on the trip, and throws it out from beneath the rod I^5; then that rod and its connections will fall, and cause the roll to instantly engage the strap to raise the hammer. The hammer, striking the stop I^6, will cause a quick or sudden upward movement of the levers I, and that communicated directly to the rod I^2 would impart a corresponding sudden throw to the lever I^3 if the connection between the lever I^3 and rod I^2 were a close joint, and thus make it inconvenient and even dangerous for the operator.

To avoid this difficulty, I connect the lever I^3 and the bar I^2 by means of a slot, I^7, in the rod I^2, the extent of the slot being sufficient to allow the necessary vertical movement of the rod without contact with the lever; therefore, the lever I^3 will stand still while the rod I^2 plays freely in its vertical movement.

In order to raise the rod I^2 and its upper connections by means of the lever I^3, it is only necessary to turn the lever until it takes its bearing in the upper end of the slot I^7, as denoted in broken lines.

It is desirable at times to adjust the roll D^2 that it may run nearer to or farther from the roll E^1, in order to take the bar B^2 of greater or less thickness. To do this, a shaft, D, is hung in eccentric bearings D^6, (see Fig. 7,) and these bearings are each provided with a pinion, D^7, and parallel with their axis is another shaft, P, on which are corresponding pinions P^1, working in the pinions D^7, as seen in Fig. 3; and the bearings D^6 are held by set-screws *d'*. When it is desired to adjust the shaft D and its roll D^2, loose the screws *d'* and turn the shaft P, which correspondingly turns the two bearings, and will throw the roll D^2 nearer to or farther from the other roll, as may be required; then the screws *d'* should be again set to hold the bearings in that position. The shaft P and the pinions are not essential, as each bearing may be turned independently. It is also required to adjust the clamp F so as to be adapted to bars of different thickness; and this is done by arranging the clamp F upon an eccentric bearing, R, which may be turned to so adjust the bar, and when properly adjusted fixed by the set-screw *r*.

The piece B^4 on the hammer is necessarily made of steel, or like hard metal, and, if attached to the hammer by means of a screw or bolt, or otherwise rigidly fixed, is, by the jar of the hammer, liable to be broken or loosened. To avoid this, I construct the piece B^4 with a tang, *b*, extending into the hammer, as in Fig. 9, and beneath the piece I set in the hammer a spring-pin, b^1, which, when the piece is in position, will rise into a corresponding hole in the piece, as seen in Fig. 9, and thus lock the piece in position; and when from any cause it is desired to remove the piece B^4, I insert, through the perforation b^2, over the pin b^1, and which is smaller than the pin, a point, which shall press down the pin b^1 until it is below the piece B^4; then that piece may be drawn from the hammer and removed or replaced at pleasure.

A great difficulty in the use of drops is experienced by the breaking of the bolts which secure the uprights to the base, or loosening of the nuts thereon. To overcome this difficulty I form a recess in the base of the uprights around the bolt-hole, as seen in Fig. 10, and place therein an india-rubber collar, *f*, and over this a metal collar, *t*, and then turn the nut T hard down thereon. This gives a slightly-elastic bearing for the nut, which will yield sufficiently to prevent the concussion or blow of the hammer from jarring the bolt sufficiently to break it or the upright.

To prevent the nut from turning I arrange beneath it a spring-pin, S, and make on the under side of the nut a recess, or several of them, into one of which the spring-pin will catch when the nut is completely turned down; and to release the nut from the pin I make a perforation, S′, through the nut, corresponding to the recess for the pin, through which the pin may be reached and pressed down, so as to allow the turning of the nut when occasion may require.

In the falling of the hammer, the weight of the bar, hung as it must be to the hammer, causes, as it were, a blow upon the hammer at the point of connection, and is liable to break the loop or pin to which it is hung, or to break or injure the bar itself. To avoid this I place between the bar B^2 and the loop X, to which the bar is attached, (see Fig. 11,) an elastic block, *u*, which will receive the force of the descending bar and break its effect upon the hammer or the bar.

I do not broadly claim the several parts, except as in the combinations hereinafter specified, and, with reference to the seventh clause of claim, I am aware of Patent No. 125,386, and therefore claim nothing contained in that patent; and, further, I am aware that nuts have been fastened by a recess upon the under side, and a spring to engage in said recess.

I claim as my invention—

1. The combination of the rolls D^2 and E^1, the lever L, its counter-balance L^1, and the latch L^2, substantially as and for the purpose specified.

2. In combination with the two rolls D^2 and E^1, the eccentric bearings D^6 for the shaft of the driven roll D^2, pinions D^7, shaft P, and pinions P^2, for the purpose of adjusting said driven roll, substantially as set forth.

3. The clamps F F^1, the one F of which is provided with an adjustable eccentric bearing, R, substantially as and for the purpose set forth.

4. The combination of the two rolls D^2 and E^1, the lever L, and the latch L^2 with the clamps F F^1 and the lever F^4, all operating together substantially as described.

5. In combination with the rolls D^2 E^1, the lever I^3, and rod I^2, the slot I^7 in said rod, substantially as and for the purpose specified.

6. In combination with the rolls D^2 E^1, the hammer B, vertical bar I^5, and stop I^6, the trip N, substantially as and for the purpose specified.

7. The piece B^4, projecting from the hammer, combined with the spring-pin b^1 and corresponding recess in said piece, and the perforation b^2, substantially as and for the purpose specified.

8. In combination with the spring-pin S, and the nut by which the parts are secured together, and recesses upon the under side of said nut to receive said spring-pin, the perforation S′, opening into the said recess, but of less diameter than the said recess, substantially as described, for the purpose of disengaging said pin.

NORMAN C. STILES.

Witnesses:
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