(No Model.) 2 Sheets—Sheet 1.

N. C. STILES.

DROP HAMMER.

No. 421,327. Patented Feb. 11, 1890.

FIG. 1.

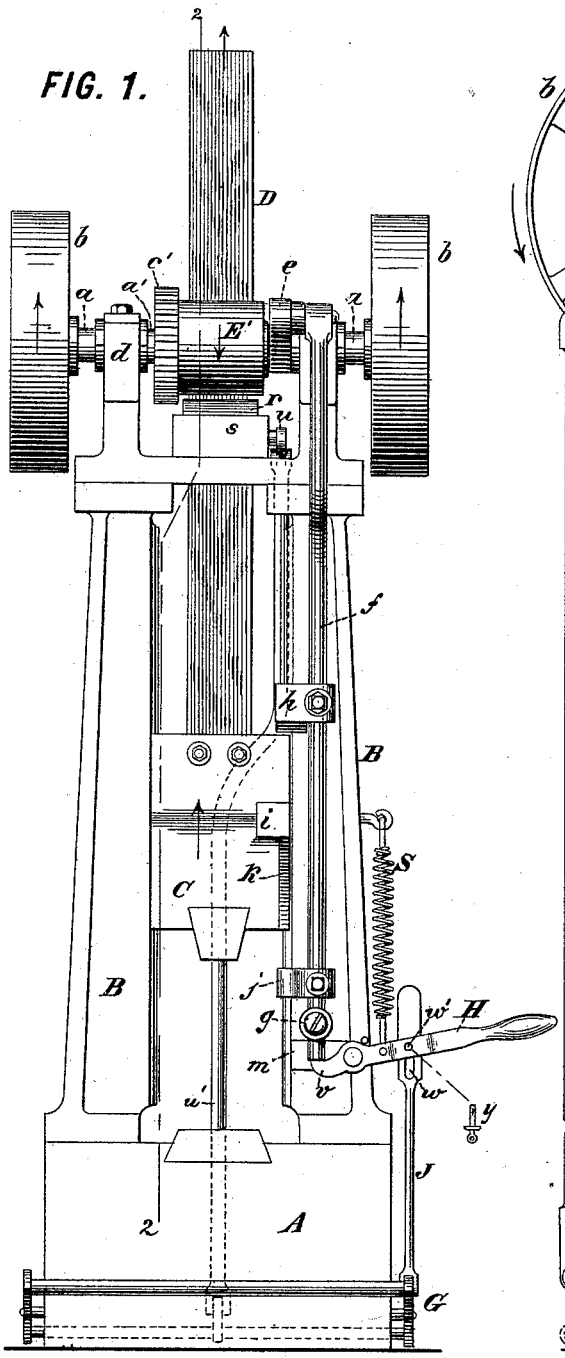
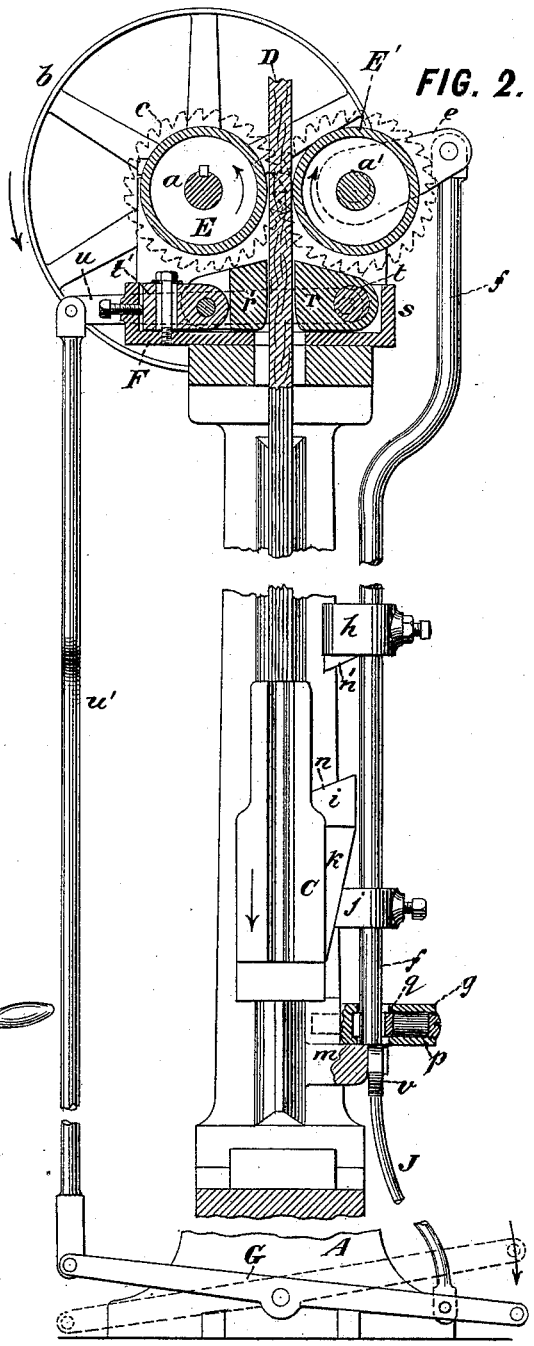


FIG. 2.



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John Becker

INVENTOR:

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(No Model.) 2 Sheets—Sheet 2.

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FIG. 3.

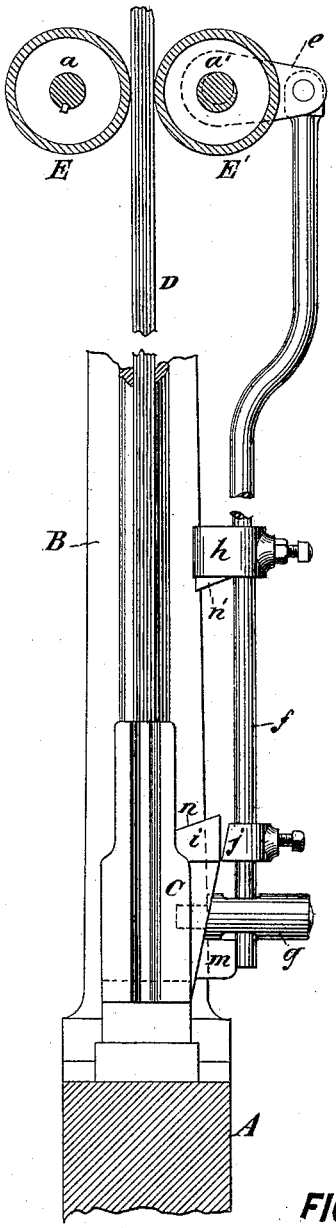


FIG. 4.

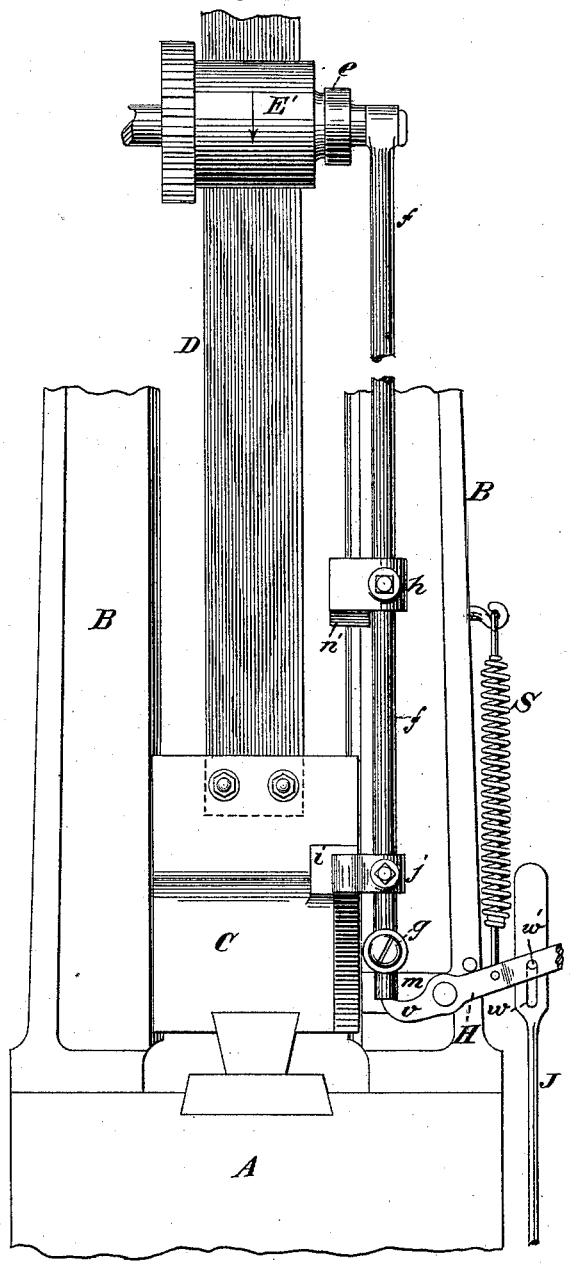
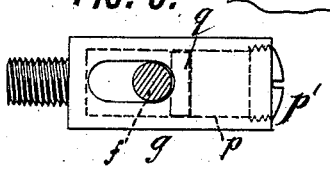


FIG. 5.



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UNITED STATES PATENT OFFICE.

NORMAN C. STILES, OF MIDDLETOWN, CONNECTICUT.

DROP-HAMMER.

SPECIFICATION forming part of Letters Patent No. 421,327, dated February 11, 1890.

Application filed April 11, 1889. Serial No. 306,865. (No model.)

To all whom it may concern:

Be it known that I, NORMAN C. STILES, a citizen of the United States, residing in Middletown, in the county of Middlesex and State of Connecticut, have invented certain new and useful Improvements in Drop-Hammers, of which the following is a specification:

This invention relates to upright power-hammers or drop-hammers of that class wherein the hammer-head or drop is lifted by two revolving friction-rolls, which close together and grasp between them a board or upright plate or strap fixed to the hammer-head. In such hammers it is customary to provide a sustaining device—such as a pair of clutch-jaws—for upholding the hammer and means for automatically separating and disengaging the lifting-rolls upon the ascent of the hammer to some predetermined height. The hammer is dropped by disengaging the sustaining device by moving a treadle or hand-lever.

My present invention introduces some novel improvements in hammers of this character, relating chiefly to the means for automatically separating the lifting-rolls and for manually separating them in order that the hammer may be caused to rise to varying heights.

A power-hammer of the same general construction as the one provided by my present invention is claimed in my reissued patent, No. 10,324, dated May 8, 1883, upon which my present invention constitutes in some respects an improvement.

Figure 1 of the accompanying drawings is a front elevation of my improved drop-hammer. Fig. 2 is a vertical transverse section thereof cut in the planes denoted by the lines 2 2 in Fig. 1. Fig. 3 is a similar transverse section showing the parts in a different position. Fig. 4 is a fragmentary front elevation showing the parts in the same position as in Fig. 3. Fig. 5 is a detail plan view.

Let A designate the usual anvil or base; B B, the side frames or uprights; C, the hammer-head; D, the board or plate fixed to the hammer-head and projecting upward; E E′, the lifting-rolls, between which the board or plate D is gripped and which revolve in opposite directions; and F, the clutching device for upholding the hammer.

The roll E is fixed on a driving-shaft *a*, on the opposite ends of which are fixed belt-pulleys *b b*, by which it is driven. Fixed on this shaft or on the roll E is a gear *c*, Fig. 2, which meshes with and drives a similar gear *c′*, fixed to the driven roll E′. This roll E′ turns loosely on the eccentric part of a shaft *a′*, the concentric portion of which oscillates in bearings in a frame *d*, mounted on top of the uprights B B. The shaft *a′* is oscillated by an arm *e*, fixed to it and projecting to the front, its end being engaged by a rod *f*, which extends down in front of one of the uprights B, its lower end being guided by sliding in a housing *g*. (Shown in plan in Fig. 5.) As the rod *f* is lifted the eccentric shaft *a′* is oscillated and the driven roll E′ is moved away from the roll E, while when the rod *f* is lowered the oscillation of the shaft moves the driven roll toward the roll E, so that the two rolls grip the board D between them. The rod *f* is provided with two set-collars *h* and *j*, fixed to it by set-screws, so that they can be adjusted to different heights. The hammer-head C is provided with a projection *i*, which, when the hammer is ascending, encounters the projection *h*, and by the momentum of the hammer lifts the latter and the rod *f*, and thereby separates the driving-rolls E E′, so that they cease to pull up the hammer. The hammer-head C is also formed with an incline *k* on its front side, which, as the hammer is descending and when it reaches nearly the bottom of its stroke, encounters the rear side of the set-collar *j* and presses the latter outwardly or forward, so that its lower end is pushed off from the ledge *m*, on which it has been resting, as shown in Fig. 2, thereby causing the rod *f* to drop by its own weight to the position shown in Fig. 3. This dropping of the rod *f* brings the rolls E E′ together again and the hammer is immediately lifted. Upon the reascent of the hammer its projection *i* again strikes the collar *h* and lifts the rod *f*, so that its lower end is lifted onto the ledge *m* again, whereby the rod *f* is upheld during the descent of the hammer, and the rolls E E′ are prevented from coming together and arresting or interrupting the descent of the hammer. Heretofore springs have been provided for pulling back the lower end of the rod *f* in order to insure

that it shall move laterally onto the ledge *m* when thus lifted. I avoid this complication by beveling the upper surface of the projection *i* and the lower surface of the collar *h*, as shown at *n* and *n'* in Figs. 2 and 3, the direction of the bevel being such as to impart to the rod *f* a tendency to move rearwardly, whereby as soon as it is lifted above the projection *m* its lower end at once swings onto this projection.

The action of the wedge *k* against the collar or stop *j* is to throw the bottom end of the rod *f* forcibly outward, so that some means is required for guiding the lower end of the rod and preventing its too great displacement. It is also desirable to provide for cushioning the end of the rod, so that its outward movement shall be arrested gently and without undue noise or vibration. To this end the housing *g* is provided with a buffer, which receives the shock when the rod moves outward too violently. The construction is best shown in Fig. 2, from which it is seen that the housing *g* is bored out tubularly, and in its bore is inserted a rubber block *p*, held in by a screw-cap *p'* and faced on the side which comes against the rod with a metal disk *q*. The rod has free outward movement in the slot of the housing; but in this movement it encounters the disk *q*, which it forces forward against the rubber cushion, which it compresses.

The sustaining device F consists of any known or suitable means for upholding the hammer. The construction shown is one which is well known as applied to the Stiles & Parker hammer, consisting of two clamping-jaws or friction-pawls *r* and *r'*, pivoted in an equalizing frame or slide *s*, and so constructed that they yield to the upward movement of the board D, but close together and grip it in case it moves downwardly. The jaw *r'* is pivoted to an adjustable sliding block *t'*, by means of which it may be adjusted to take up wear. The jaw *r* is pivoted on the eccentric portion of an oscillating shaft *t*, the ends of which have bearings in the frame *s*, and on one end of which is fixed a lever-arm *u*, projecting backward and connected by a rod *u'* to the tail of a treadle G, which is pivoted to the base A. This treadle stands normally in the position shown in dotted lines in Fig. 2, and on being depressed by the foot of the operator to the position shown in full lines the rod *u'* is forced up and the shaft *t* is oscillated, thereby moving the center of the jaw *r* sufficiently away from the jaw *r'* to release the board D, whereupon the hammer falls. Upon the striking of the hammer it is immediately engaged by the coming together of the rolls E E', as already described, and lifted until these rolls are separated by the action of the projections *i* and *h*, as already explained, whereupon the hammer commences to fall, and if the operator has released the treadle G it will be immediately raised and held by the jaws *r r'*; but if the operator continues to press down upon the treadle, thereby holding the sustaining device out of action, the hammer will immediately fall again, and as long as the treadle continues to be held depressed the hammer will continue to rise and fall, giving repeated blows, the violence of which will be determined by the height to which the collar *h* is adjusted.

Pivoted to the front of the frame is a hand-lever H, the end of the short arm *v* of which comes directly beneath the rod *f*. A spring S is arranged to act upon the lever H in such direction as to hold its arm *v* normally drawn down, so that it shall not interfere with the descending movement of the rod *f* when its lower end is pushed off from the ledge *m* by the action of the incline *k* on the hammer-head. The outer or long arm of the lever H is vertically slotted, and through this slot freely passes the upper end of a link or rod J, the lower end of which is jointed to the treadle G. This rod J has a slot *w* formed in it, and which coincides with a hole *w'*, formed transversely in the lever H, so that a pin *y* may be put through the hole *w'* and will pass through the slot *w*. In the normal position the upper end of the slot terminates in and coincides with this hole, so that when the pin *y* is in place the pressing down of the treadle G will pull down the rod J and the upper end of the slot will immediately engage the pin, and through the latter will transmit the downward motion to the lever H, thereby moving its short arm *v* upwardly and lifting the rod *f*, if the latter be in its lower position. This construction enables the operator to cause the hammer to strike a lighter blow than that to which it is set by pressing down the treadle before the hammer has been fully lifted. This pressing down of the treadle opens the lifting-rolls, and also opens the jaws *r r'*, so that the hammer immediately redescends. If it is desired to have the hammer stop on striking the anvil without being relifted, the operator will hold the treadle down.

The object of the slotted connection between the lever H and rod J is to enable the lever to be operated without necessarily operating the treadle, so that the ascent of the hammer may be arrested at any point while leaving the hammer suspended. Thus, for example, when the hammer has ascended to, say, half its usual height, the operator may with his hand press down the lever H, thereby lifting the rod *f* and opening the rolls E E', whereupon the hammer will stop, and, the treadle G not being depressed, it will be arrested and upheld by the sustaining device. If it were not for the slot *w*, this motion of the lever H would be communicated downwardly through the rod J to the treadle, and thence up to the sustaining device, the jaws of which would be opened the same as though the treadle had been depressed, and the hammer would immediately fall.

When repeated blows of full force are de-

sired, the pin y must be pulled out of the hole w', so that by keeping the treadle depressed the hammer will rise and fall automatically by the successive action of the provisions k j and i h. The separable connection between the lever H and the treadle which admits of this constitutes a novel feature of my invention.

It sometimes occurs that the shafting from which a power-hammer is driven will slow down, so that the hammer is not driven at the requisite speed to operate it perfectly. In such case the hammer-head does not ascend with sufficient velocity to enable its momentum to lift the projection h and rod f high enough so that the lower end of the rod shall be upheld by the rod m. It results, then, that the rolls E E′ are not fully separated, and by the falling back of the rod they come together again against the board D and strive to lift the hammer, thereby holding its projection i against the collar h. This is disadvantageous, because the pulleys are liable to wear hollows in the board. By my improved construction, when the operator finds that the speed has thus slowed down so that the lifting of the hammer has not fully separated the rolls, he has only to press down the lever H, and thereby lift the rod f sufficiently far to leave its lower end sustained upon the ledge m.

My improved power-hammer is of very simple construction, and is adapted for all the various uses for which it is desirable that a power-hammer should be employed.

It will be observed that I make the one treadle serve all the different purposes for which it is desirable to use a treadle, instead of employing two distinct treadles, as heretofore; also, that when the pin y is inserted the one treadle serves a double function, acting to release not only the sustaining mechanism, but also the lifting-rolls. Furthermore, the operator is enabled to effect the release of the hammer at varying heights by the use of either the foot or hand, as may be most convenient.

I claim as my invention the following-defined novel features and combinations, substantially as hereinbefore specified, namely:

1. In a drop-hammer, the combination, with the lifting-rolls and the engaging and releasing rod f, connected thereto, and with the hammer-sustaining device and the operating-treadle connected to and adapted, when depressed, to release said sustaining device and drop the hammer, of a lever H, adapted, when vibrated, to engage and lift said rod, and an intervening separable connection between said lever and treadle, whereby normally the depression of the treadle both opens the lifting-rolls and releases the sustaining device, but by separating said connection the treadle may be depressed without vibrating the lever, in order thereby to strike a succession of blows.

2. In a drop-hammer, the combination, with the lifting-rolls and the engaging and releasing rod f, connected thereto, of a hand-lever H, adapted, when vibrated, to lift said rod, a treadle G, a connecting-rod J between the lever and treadle, and a separable connection between the lever and said rod, consisting of a pin y, adapted to enter coinciding holes in the lever and rod at their intersection.

3. The combination, with the lifting-rolls and the engaging and releasing rod f, with its collar j and ledge m, of the hammer-head formed with a wedging-incline k, adapted to encounter said collar on the descent of the hammer and to force the rod outward off from said ledge.

4. The combination, with the lifting-rolls and the engaging and releasing rod f, with its stop-collar h and ledge m, of the hammer-head formed with a projection i for engaging said stop, having its upper face backwardly inclined to impart an inward tendency to the rod while lifting it, whereby its lower end, when lifted above the ledge m, is swung inward thereonto.

5. The combination, with the hammer-head with its incline k, the lifting-rolls, the rod f, with its collar j, the ledge m, and the housing g for guiding the lower end of the rod, of an elastic buffer for resisting the forward motion of the rod when it is pushed off said ledge by the incline.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

NORMAN C. STILES.

Witnesses:
GEORGE H. FRASER,
CHARLES K. FRASER.