(No Model.)

2 Sheets—Sheet 1.

A. M. DOLPH.

BELT SHIFTING DEVICE.

No. 372,523. Patented Nov. 1, 1887.

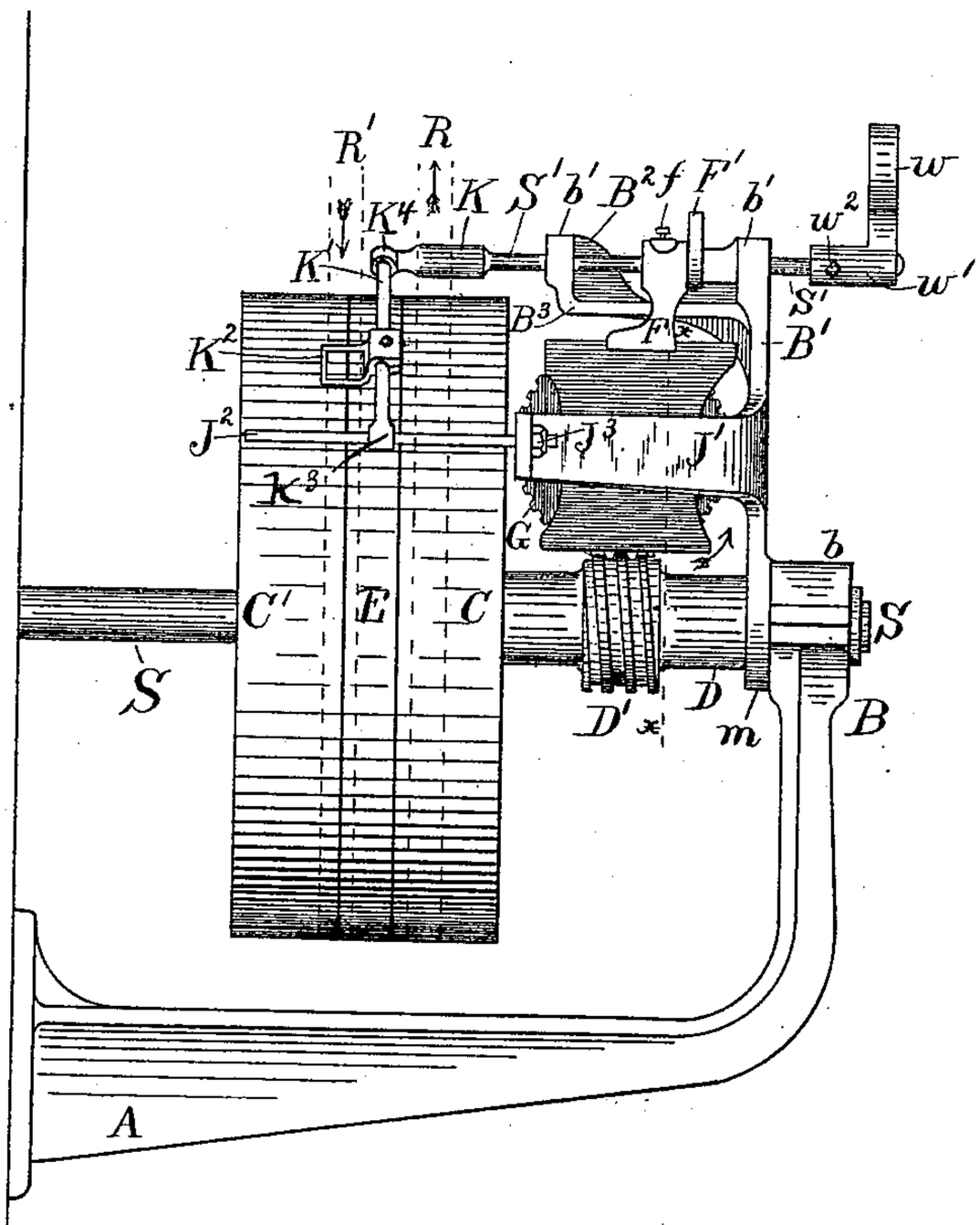

Fig. 1.

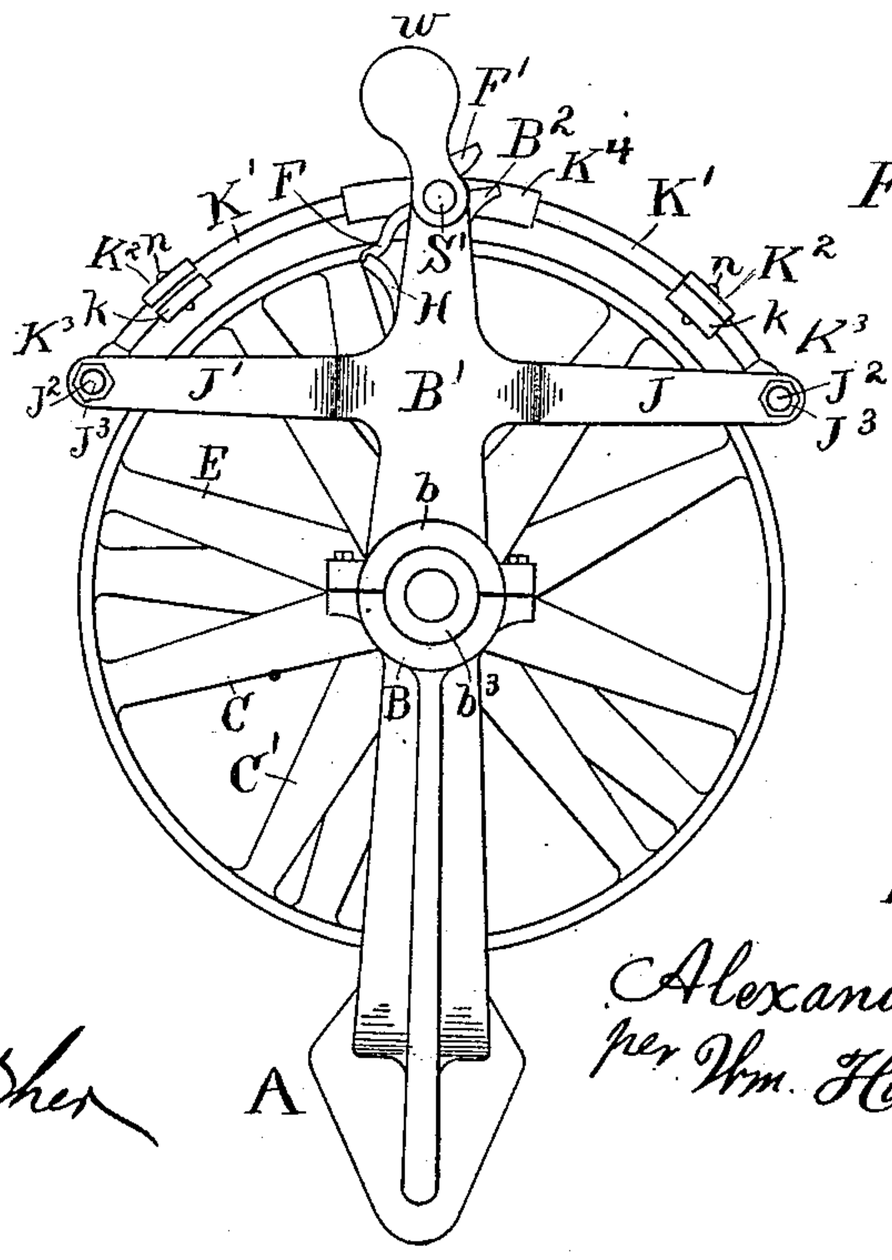

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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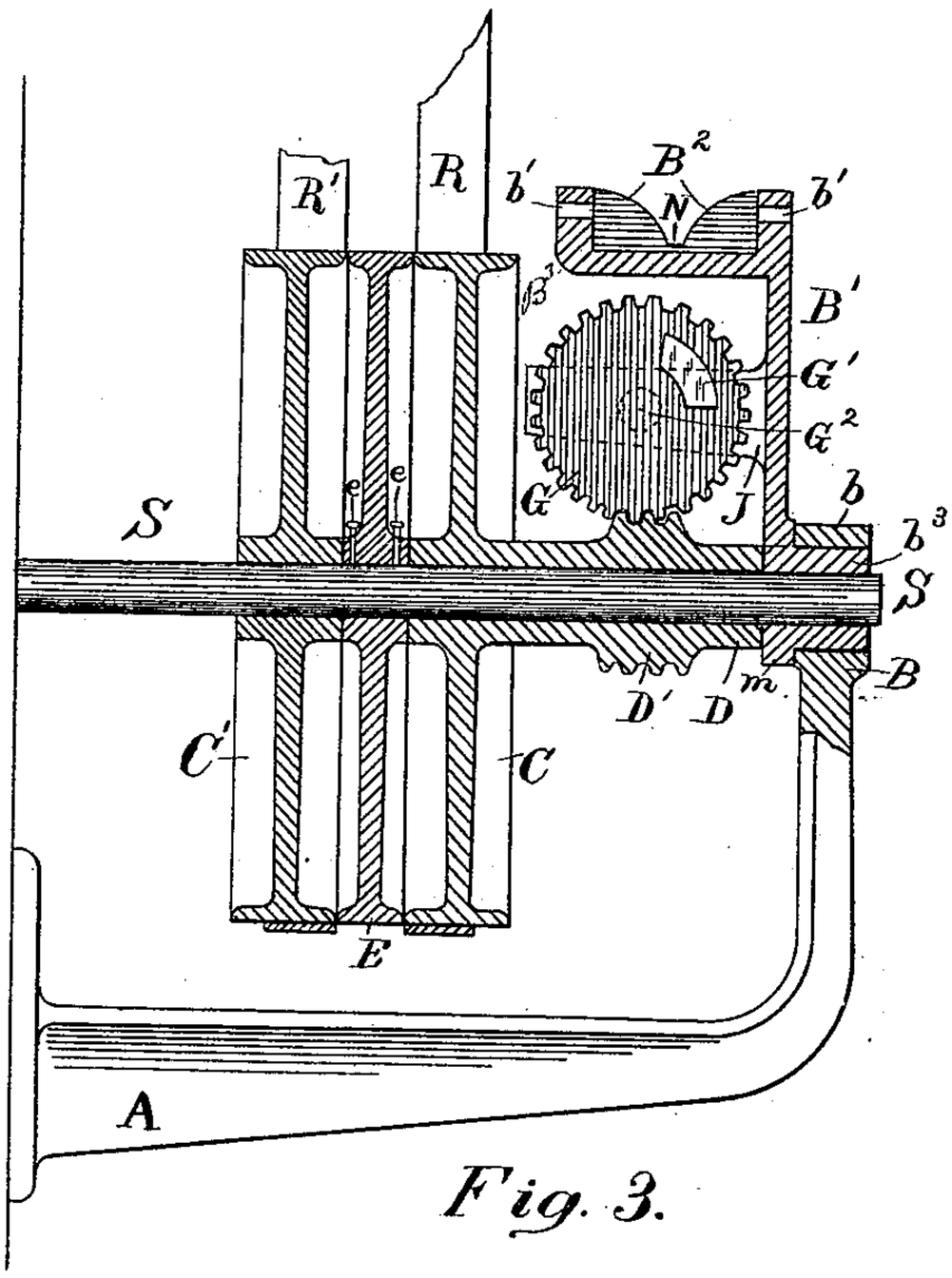

Fig. 3.

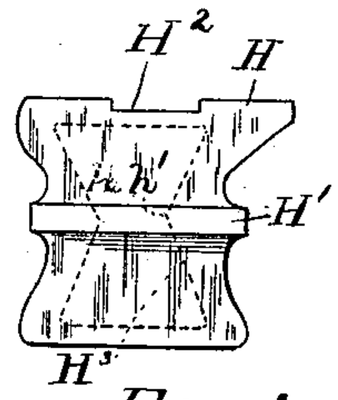

Fig. 4.

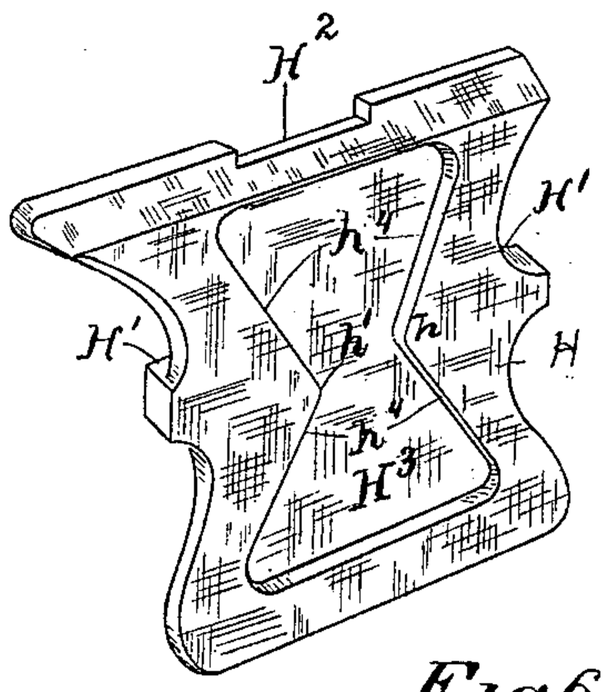

Fig. 6.

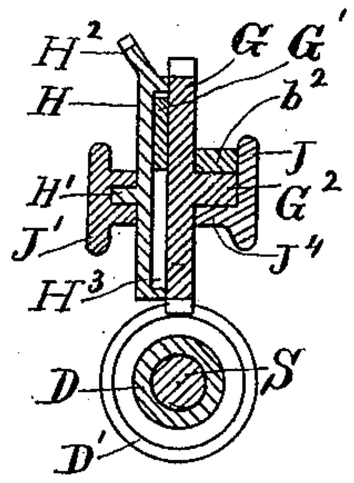

Fig. 5.

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UNITED STATES PATENT OFFICE.

ALEXANDER M. DOLPH, OF CINCINNATI, OHIO.

BELT-SHIFTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 372,523, dated November 1, 1887.

Application filed November 27, 1886. Serial No. 220,080. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER M. DOLPH, a resident of Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Belt-Shifting Devices, of which the following is a specification.

My device is for the purpose of automatically shifting belts and in this way reversing the direction in which an operating-shaft turns. It is especially adapted for use with some forms of washing-machines, but may be used with other machines requiring a similar automatic reversal—such, for instance, as planers, &c.

In the accompanying drawings, Figure 1, Sheet 1, is a side elevation of my device. Fig. 2, Sheet 1, is an elevation of that end of my device which is at the right hand in Fig. 1. Fig. 3, Sheet 2, is a central longitudinal section of the device. Fig. 4, Sheet 2, is an elevation of the front or outer side of the cam-plate. Fig. 5, Sheet 2, is a cross-section through the reversing apparatus, taken at the dotted line *x x*, Fig. 1. Fig. 6, Sheet 2, shows in perspective that side of the cam-plate opposite to that shown in Fig. 1.

S represents the shaft to which the device is attached and by which motion (power) is imparted to the washing-machine or other machine. The shaft S is provided with three belt wheels or pulleys, C', E, and C. The first of these, C', is a loose pulley. The middle pulley, E, is tight, being secured in position by the set-screws *e e*. The third pulley, C, is also a loose pulley. The hub of this pulley C projects outwardly, forming the sleeve D, which latter turns on the shaft S. The worm D' is cast with the sleeve D or otherwise rigidly attached to it. The end of the shaft S is supported by a bracket or support, A, in the following manner: The bracket or support A terminates in the journal-bearing B, in which the head b^3 of the bracket B' rests. This head b^3 is cylindrical and is held in place by the cap *b*, the latter being secured by appropriate set-screws. The head b^3 is preferably provided with a collar, *m*, as shown, which assists in preventing it slipping through the bearing B. The bar S' is journaled in the head b^3, so that it may be shifted lengthwise and rocked in its bearings. The bracket B' projects upwardly from the head b^3 and is provided with the arms J J'. The arms J J' embrace between them the cam-plate H and gear-wheel G, and this cam-plate H and gear G are attached to the arms J J' in the following manner: The gear-wheel G is provided with an axle, G^2, rigidly attached to it and projecting from one side of it. This axle is journaled on the lip J^4, projecting from the arm J, and is secured in position by the cap b^2. Attached rigidly to the opposite side of the gear-wheel G is a projecting lug, G', shaped as shown in Fig. 3. The reciprocating piece, which may be called a "cam-plate," H, is preferably a flat plate, one of whose surfaces is provided with the irregularly-shaped depression H^3, (shown in Figs. 4 and 5,) and the sides or walls h^4 of this depression constitute the walls of this cam H. In the shape of this depression attention must be called to the shoulders or corners *h* and *h'*. When preferred, the plate portion of the cam which is at the back of the depression may be omitted, the walls of the cam remaining. A flange, H', extends across the face of the cam H on the side opposite to the depression H^3 and fits into a groove or slot in the arm J', as shown in Fig. 5. The upper edge of the cam H is preferably flared outwardly; but, whether flared or not, it is provided with the notch H^2. When the cam H and wheel G are in position between the two arms J J', the lug G' projects into the depression H^3, as shown in Fig. 5. Instead of the particular cam mechanism herein described, any of the well-known forms of cam or similar devices may be employed to impart a reciprocating motion to the bar S'.

An arm, B^3, extends from the bracket B', and is provided at its end with a bearing, *b'*, a corresponding bearing *b'* being located at the top of the bracket B'. The bearings *b'* support the bar S', which latter operates directly the belt-shifting device. The wings B^2 extend from the arm B^3. They are provided with curved edges, which lead down to and from the notch N.

The attachments of the bar S' are preferably as follows; but the order of the arrangement of the various elements is not essential, as slight changes in the mechanism might necessitate slight changes in their position on the bar S'.

Commencing with the right-hand end of bar

S′ is a weight, *w*, provided with the sleeve *w′*, which latter is slipped onto the bar S′, and then secured in place by the set-screw w^2. The finger F′ projects from the side of the bar S′ toward the wings B^2. The clutch F extends out on the opposite side of the shaft and is held in position by the set-screw *f*. When the bar S′ is rotated to the left, as shown in Fig. 2, the clutch F fits in the notch H^2 in the upper edge of plate H. The end of the bar S′ is swiveled in the thimble K. After embracing the wheel G and cam H, the arms J J′ are again bent at right angles and extend somewhat beyond the peripheral edge of the pulleys, as shown in Fig. 2. From the end of each arm J J′ a rod, J^2, projects over the peripheral face or edge of the pulleys C E C′. The curved rod K′ has its end furnished with the sleeves K^3. The sleeves fit onto the rods J^2 and slip back and forth thereon. The rod K′ curves up over the pulleys and passes through the sleeve K^4, rigidly attached to the thimble K. The guide-loops K^2 are clamped to the rod K′ by set-screws *n*, which enable them to be adjusted in any desired position. The loops K^2 extend from the rod K′ in opposite directions, so that one has one belt passing through it and the other has the other belt passing through it. The belts R R′ run in opposite directions, as indicated by the arrows in Fig. 1. Instead of one rod K′ two separate rods, attached to the bar S′, may be employed.

The mode of operation is as follows: As shown in Fig. 1, the belt R′ (shown in dotted lines) is on the loose pulley C′, and also on the tight pulley E, while the belt R (also shown in dotted lines) is on pulley C. In consequence the pulleys E and C′ and shaft S turn in one direction with belt R′, and pulley C, with sleeve D and worm D′, turn in the opposite direction with belt R. The worm turns the gear-wheel G in the direction of the arrow. This movement throws the lug G′ over until it strikes the shoulder *h* of the depression H^3 of cam-plate H. This throws the cam-plate to the left, as shown in Fig. 1, and with it the clutch F, bar S′, rod K′, and the two belts R R′. In this way the belt R′ is thrown off the pulley E, and the belt R is thrown onto it, reversing the direction of the pulley E and shaft S. The belt R still continues to turn the pulley C, however, and in time the lug G′ strikes the shoulder or corner *h′* and reverses the mechanism, bringing the belts into the positions shown in Fig. 1. The weight *w* is so balanced as to keep the clutch F in position. If the weight *w* be turned to the other side, the clutch is released and the finger F′ is, by the mechanism described, forced into the notch N and brings the belts into the position shown in Fig. 3, where neither belt is on the tight pulley. In this position the bar S′ remains stationary; but the reversing mechanism continues to operate. If intervening mechanism should make it impossible to place the bracket A immediately under the shaft S, it may be otherwise conveniently located, and the bracket B′ still retain its upright position and be clamped by cap *b*. When the belts R and R′ approach the pulleys obliquely or from any other direction, the bracket B′ can be adjusted with reference to them. The weight *w* can also be adjusted to properly throw the clutch F. The loops K^2 are also adjustable, to accommodate the various distances apart of the belts.

While the various features of my invention are preferably employed together, one or more of said features may be employed without the remainder, and one or more of said features may, so far as applicable, be employed in conjunction with mechanism other than particularly herein specified.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the shaft S, pulleys C′, E, and C, the hub of the last being continuous with the sleeve D, provided with worm D′, gear G, provided with lug G′, reciprocating piece H, provided with walls h^4, notch H^2, and bar S′, provided with clutch F, substantially as set forth.

2. The combination of the shaft S, pulleys C′, E, and C, the hub of the last being continuous with the sleeve D, provided with worm D′, gear G, provided with lug G′, reciprocating piece H, provided with walls h^4 and notch H^2, bar S′, provided with clutch F, and rod K′, carrying guide-loops K^2 and rigidly attached to bar S′, substantially as and for the purposes set forth.

3. The combination of worm D′ and gear G, mounted on axle G^2 and provided with lug G′, engaging reciprocating piece H, the latter provided with flange H′, sliding in an appropriate supporting-groove, substantially as set forth.

4. In a belt-shifting device, the combination of bracket A, provided with journal-head B, cap *b*, and bracket B′, provided with head b^3, this latter being bored to receive a shaft, substantially as set forth.

5. The bracket B′, provided with head b^3 and carrying devices for moving the belts sidewise, in combination with shaft S, carrying the pulleys and worm, said shaft being journaled in head b^3 and the bearing support B, and cap *b*, inclosing and holding said head b^3 and enabling the bracket B′, with its devices and the support A, to be set at any desired angle with reference to one another, substantially as set forth.

6. In a belt-shifting device, the wings B^2, supported on a bracket and having a notch between them, the bar S′, having fingers, clutch F, adapted to engage the reciprocating piece, and finger F′, which rocks into the notch between the wings B^2, rod K, and loops supported by bar S′, and the fast and loose pulleys, substantially as described.

7. A driving-shaft having a fixed pulley thereon and a loose pulley at each side of the fixed pulley, a reciprocating piece actuated from the driving-shaft, a bar, S′, mounted

so as to be shifted and rocked in its bearings, a clutch, substantially as described, between the reciprocating piece and the bar, a finger on the bar, and wings on the bracket, supported by the frame, with which wings said finger may engage, all in combination, substantially as described.

8. The driving-shaft and its fixed and loose pulleys, the reciprocating piece actuated from said shaft, the bar S′, having belt-controlling loops, a clutch intermediate the reciprocating piece and the bar S′, a finger on said bar, wings projecting from the bracket and having an inclined notch between them into which said finger may be swung, and a weight secured to bar S′, so as to cause it to turn in its bearings, all in combination, substantially as set forth.

ALEXANDER M. DOLPH.

Witnesses:
O. M. HILL,
W. A. BARTLETT.