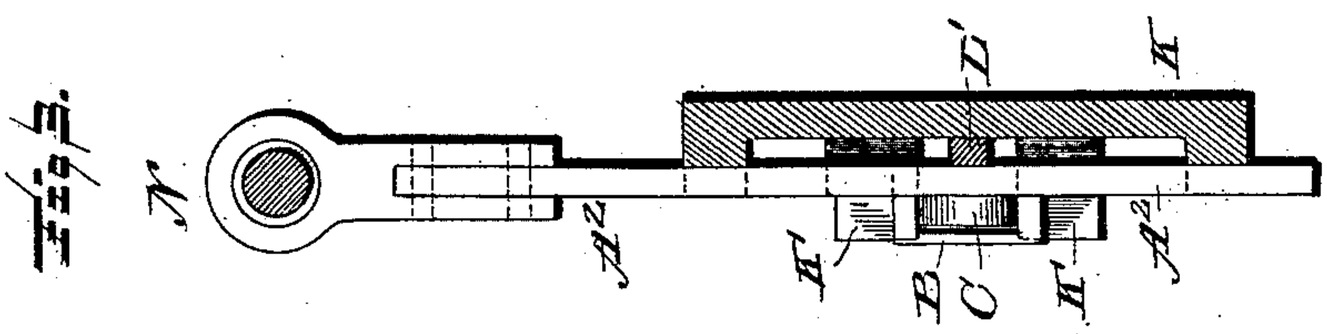
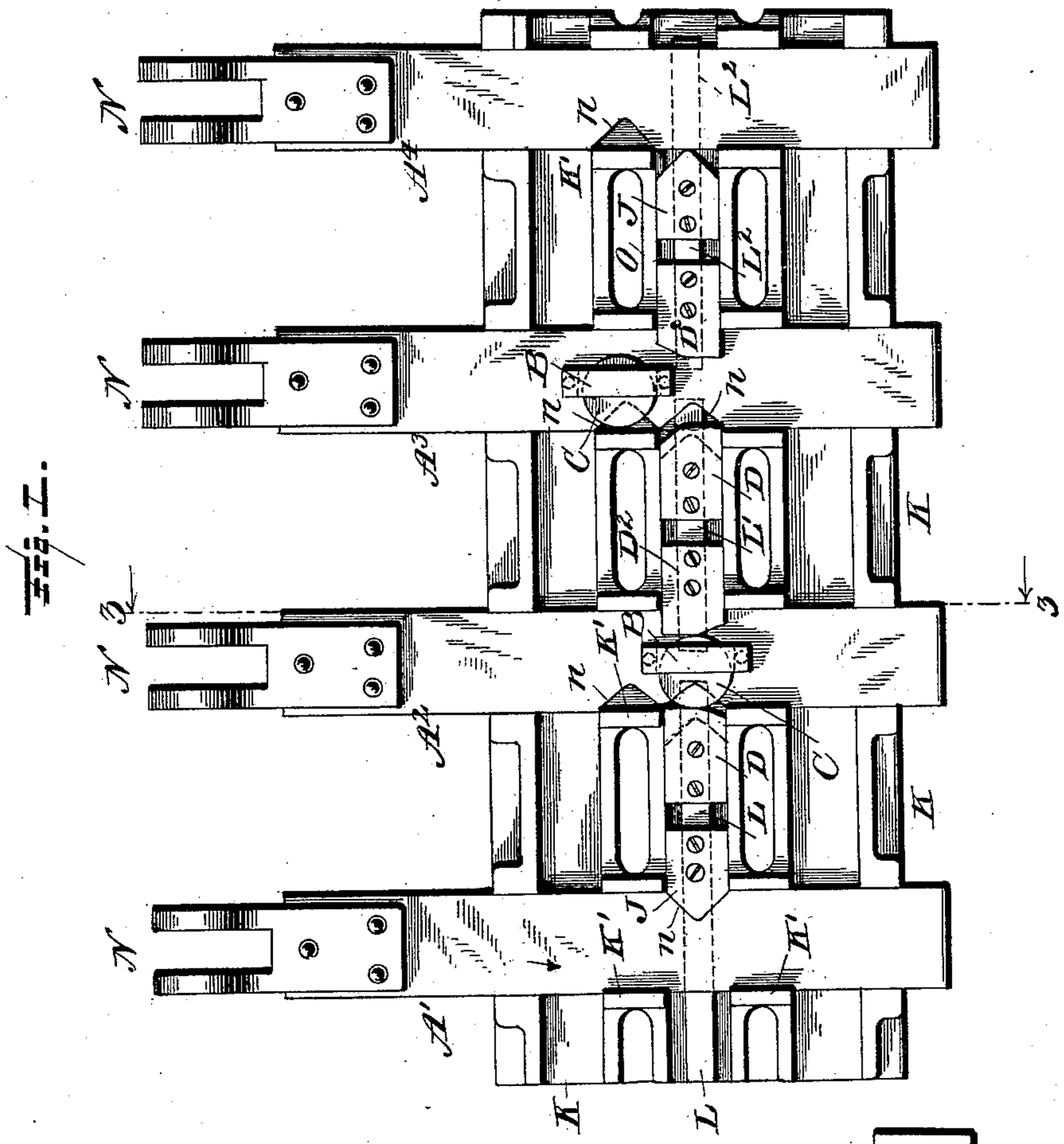
(No Model.) 2 Sheets—Sheet 1.

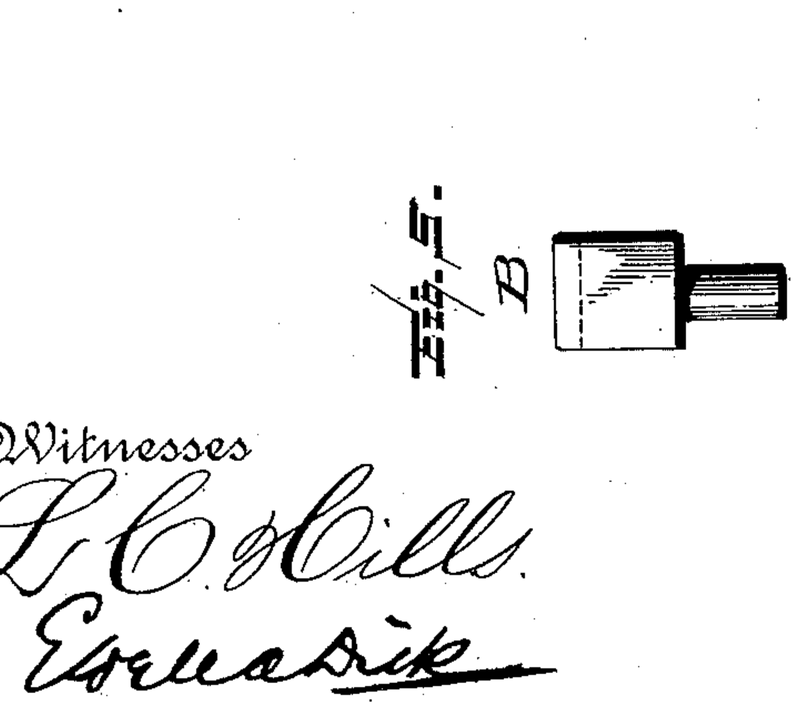
G. H. PFEIL.

INTERLOCKING SWITCH AND SIGNAL MECHANISM.

No. 472,393. Patented Apr. 5, 1892.







Witnesses
L. C. Hills.
Edward Dike

Inventor
George Henry Pfeil
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(No Model.) 2 Sheets—Sheet 2.

G. H. PFEIL.

INTERLOCKING SWITCH AND SIGNAL MECHANISM.

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Fig. 1.

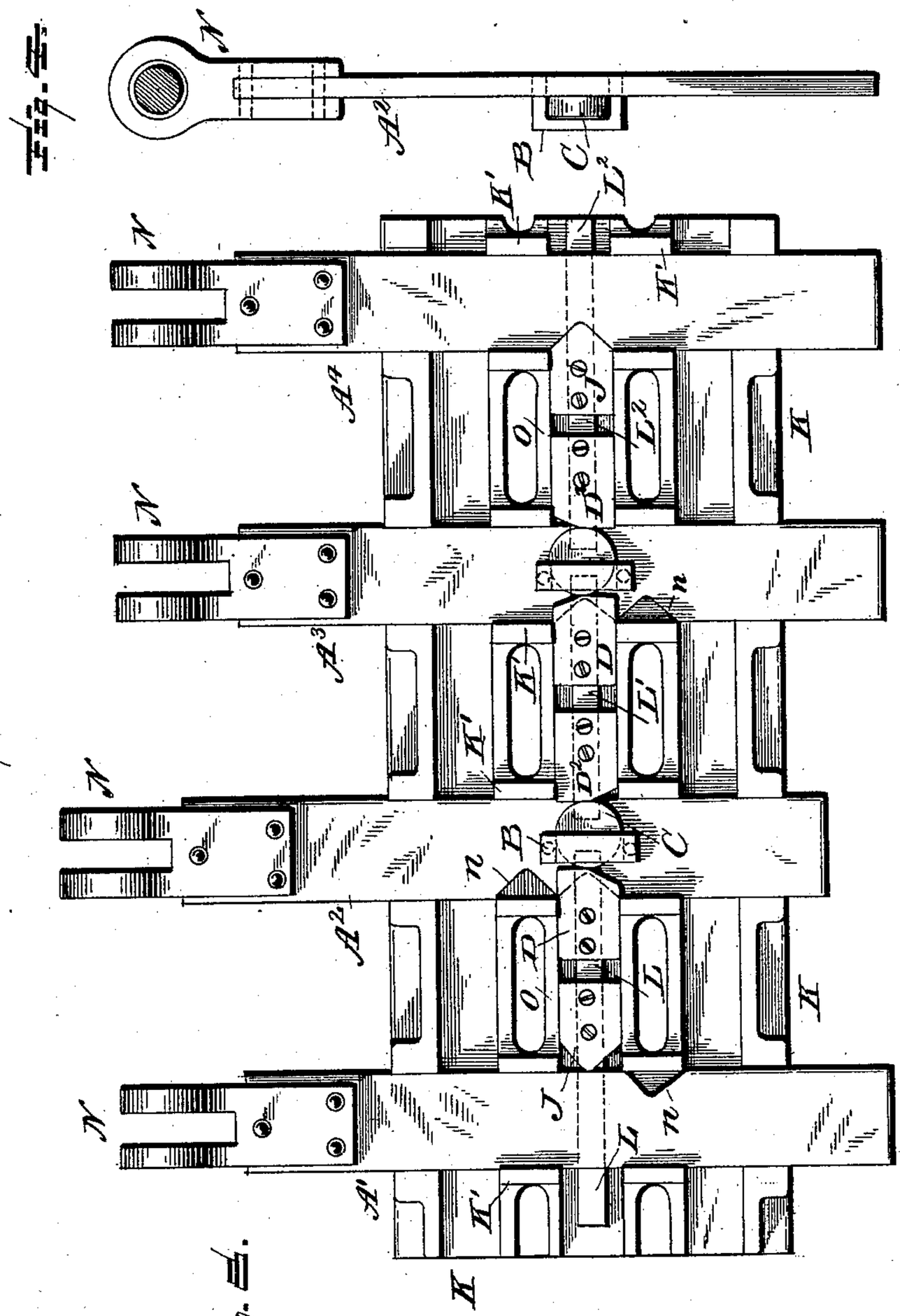


Fig. 2.

Fig. 3.

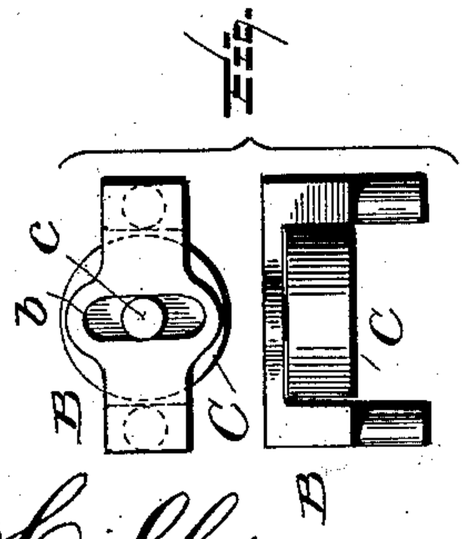
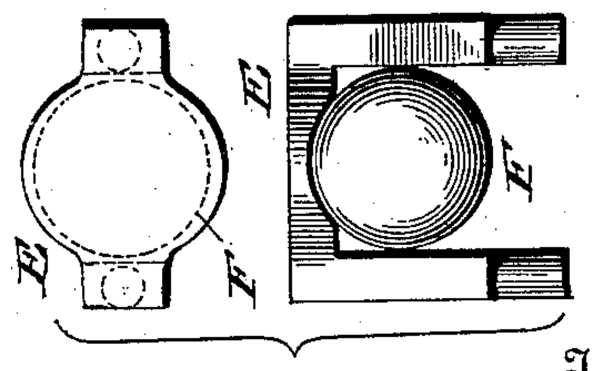


Fig. 4.



Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE HESS PFEIL, OF EASTON, PENNSYLVANIA, ASSIGNOR TO THE NATIONAL SWITCH AND SIGNAL COMPANY, OF SAME PLACE.

INTERLOCKING SWITCH AND SIGNAL MECHANISM.

SPECIFICATION forming part of Letters Patent No. 472,393, dated April 5, 1892.

Application filed December 10, 1891. Serial No. 414,604. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HESS PFEIL, at present residing at Easton, in the county of Northampton and State of Pennsylvania, have invented a new and useful Improvement in Interlocking Switch and Signal Mechanism, of which the following is a specification.

My invention relates to mechanism for interlocking the tappets of the operating-levers of a switch and signal interlocking machine; and it is directed to that kind of such mechanism in which the said tappets and the dogs for locking the same are combined with slides mounted on the tappets and adapted to operate the dogs. Mechanism of this general kind is not new with me.

My invention is directed to improving the slides carried by the tappets, or rather to furnishing an efficient and convenient substitute for such slides.

In all instances of which I have knowledge the slide hitherto has been a rectangular section fitted between transverse straight guides on the tappet and capable of rectilinear movement only. The consequence is that in practice the slides are very apt to cock and jam in their guides, thus rendering the action of the machine uncertain, moving as they do with friction and requiring considerable force to operate them and at times jamming tight, so as to completely block the machine. I substitute for the slide a roller, (either a short section of a cylinder or a ball or the like,) which is held loosely on the tappet, so that it is capable both of rotary movement on its axis and of bodily movement crosswise of the tappet. This roller renders the operation practically frictionless so far as concerns the dogs and itself. It moves with the utmost freedom and is not liable to jam or stick. Moreover, in the prior arrangements of which I have knowledge the slides themselves have been notched to directly interlock with the dogs, and have thus constituted the means by which the locked tappets are restrained from movement. Under my invention, however, the notches are in the tappets, while the rollers are simply the anti-friction intermediaries, whereby at the needed times the dogs are actuated to engage or quit the notches in the tappets.

The nature of my improvement and the manner in which the same is or may be carried into effect will be understood by reference to the accompanying drawings, in which—

Figure 1 is a plan of a number of interlocking tappets, rollers, and dogs embodying my invention. Fig. 2 is a smilar view of the same with the tappets, dogs, &c., adjusted to a position different from that in which they are represented in Fig. 1. Fig. 3 is a section on line 3 3, Fig. 1, looking toward the tappet A^2, the dog D^2 being removed, so as not to obstruct the parts. Fig. 4 is an edge elevation of one of the tappets. Fig. 5 is an end view of one of the roller guides or yokes. Fig. 6 is a side view of dog D. Fig. 7 is a side view of dog D^2. Fig. 8 is a plan and side elevation of a modified arrangement of the cylindrical roller and its guide-yoke. Fig. 9 is a plan and side elevation of a ball-roller and its yoke which can be used as a substitute for the cylindrical roller.

A' A^2 A^3 A^4 are tappets, which are mounted to slide in the direction of their length in the frame K and at the points N are to be attached in the usual way to the levers for operating them. Mounted in the frame and adapted to slide transversely of the tappets are the lock-bars L L' L^2. Upon the lock-bar L are fixed the dogs J D, which are located between tappets A' and A^2, and like all the other dogs, move in guides O in the frame. Upon the second lock-bar L' are fixed the dogs D^2 D, which are located between the tappets A^2 and A^3, and upon the third lock-bar L^2 are fixed the dogs D^2 J, which are located between the tappets A^3 and A^4. The dogs J are of the ordinary kind, having V or miter-shaped noses to engage similarly-shaped notches *n* in the edges of the tappets. There is one miter-shaped notch *n* in tappet A', two in tappet A^2, two in tappet A^3, and one in tappet A^4. In Fig. 1 the notch in tappet A' is represented as engaged and filled by the miter-nose of tappet J on lock-bar L. The other dogs are out of engagement with the notches.

Thus far there is nothing essentially new in the machine, except, perhaps, the special construction of the dogs D and D^2, (to be presently described,) which permits them to conveniently engage and operate the rollers.

Upon each one of the tappets A^2 A^3 is a roller C, consisting of a short section of a solid cylinder, which is loosely placed in a guide-yoke B of the form shown in Figs. 1 to 5, inclusive, said yoke being fastened by its legs to the tappet in a position to permit the roller to move bodily transversely of the tappet. The roller, in addition to this bodily movement, can also rotate on its axis; or, in other words, it can roll from side to side of the tappet. If desired, the roller can have a center pin *c* and the yoke can have a guide-slot *b* to receive the pin, as shown in Fig. 8, the slot serving to limit the range of transverse movement of the roller; or, in lieu of a cylindrical roller, a spherical or ball roller F can be used, with a yoke E, correspondingly modified in shape, to hold the ball and yet allow it the necessary transverse movement.

K′ are projections or ears on the frame K, which are intended to receive between them the rollers C when by the movement of their tappets they (the rollers) are carried out of range of or out from between the dogs—as illustrated, for example, in Fig. 1, where the roller C of the tappet A^3 is above the dogs D D^2. In this position the roller is between the ears K′, which serve to hold it in place in and to prevent it from falling to one side or the other out from its yoke.

The dog D has an extension *m* to operate on the roller, and is provided below this extension with a miter-nose *m′* to engage the miter-notches on the adjoining edge of the tappet, with which it co-operates. The dog D^2 has a like extension *m* for a like purpose; but it has no miter-nose, for the reason that in the particular arrangement shown in illustration of my invention the edge of the tappet adjoining it is plain and unnotched.

The method of operation is as follows: In Fig. 1 all of the tappets are in normal position, a position in which the roller C of tappet A^2 is in the path of the dogs, and the roller on tappet A^3 is above the path and out of the range of the dogs, and the miter-nose of the dog J of lock-bar L is in engagement with the notch *n* of tappet A′. All of the tappets in this position are unlocked. If now tappet A′ be reversed (its movement for this purpose being in the direction of the arrow placed on it in Fig. 1) it will push dog J and lock-bar L to the right, and as dog D is attached, also, to the same lock-bar L as dog J it will lock tappet A^2 by its nose *m′* and at the same time by its extension *m* will push the roller C of tappet A^2 over against dog D^2 on lock-bar L′, and consequently will move the dog D of that lock-bar also. In this way the tappet A^3 is locked; but inasmuch as its roller C is out of range of the dogs no movement is communicated to the lock-bar L^3, and consequently the tappet A^4 is left unlocked and free to move. Again, suppose the parts to have been returned to normal position, as in Fig. 1, and it is desired to lock all the tappets A^2 A^3 A^4. Tappet A^3 is reversed so as to bring its upper notch *n* and its roller C into the path of the dogs, and A^4 is reversed so as to bring its notch *n* into the like path, and then by reversing tappet A′ all of the dogs and rollers will be forced over to the right, and the parts will assume the position shown in Fig. 2, tappets A′ A^3 A^4 being reversed and tappet A^2 being normal, and all of the tappets excepting A′ being locked. In all of these movements, as well as others of which the apparatus may be rendered capable, the rollers transmit movement to the dogs with entire certainty. They are not liable to cramp or jam in their guideways. Any tendency to this is neutralized and prevented by their capacity to revolve as well as to move bodily in a transverse direction, so that all danger of the blocking of the machine is obviated, while there is great freedom from friction and consequent ease of manipulation.

Having described my invention and the best way now known to me of carrying the same into effect, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the tappets and locking-dogs, of dog-operating rollers mounted on said tappets and capable both of rotation and of bodily to-and-fro movement in the line of the dogs, substantially as and for the purposes hereinbefore set forth.

2. The combination of the supporting-frame, the tappets, the locking-dogs, dog-operating rollers mounted on said tappets and capable of both rotation and bodily to-and-fro movement in the line of the dogs, and ears K′ on the frame, between which the rollers are received when out of line with the dogs, substantially as and for the purposes hereinbefore set forth.

3. In an interlocking switch and signal mechanism, the combination of a notched tappet, a roller mounted on said tappet and capable both of rotation and bodily to-and-fro transverse movement thereon, and a dog D, having a nose *m* to engage the notched tappet and an extension *m′* to operate the roller, substantially as and for the purpose hereinbefore set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE HESS PFEIL.

Witnesses:
J. BRUNNER,
J. W. LATTIG.