

(No Model.)

3 Sheets—Sheet 1.

A. W. BENNETT & J. M. MILLEN.

RAILWAY SIGNAL.

No. 380,165.

Patented Mar. 27, 1888.

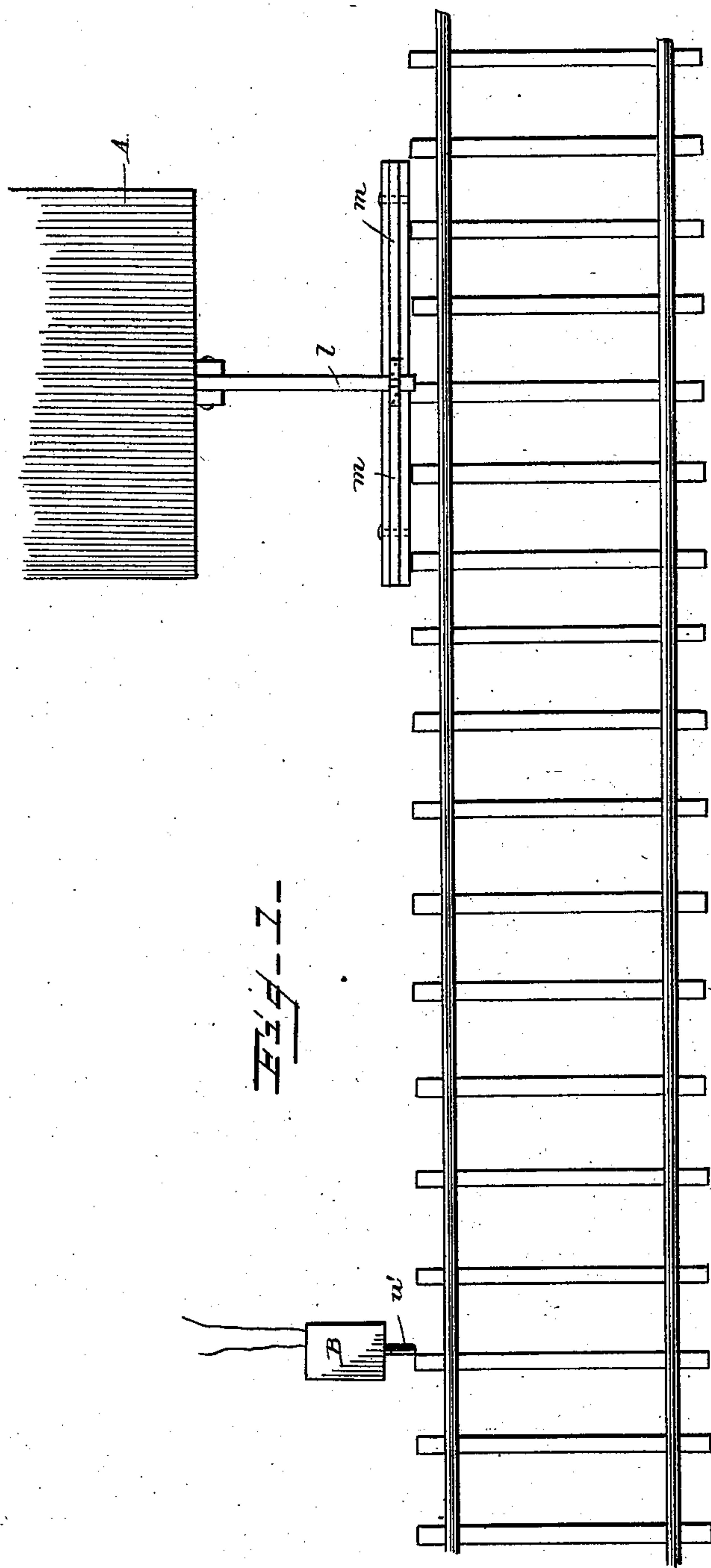


Fig. 1-

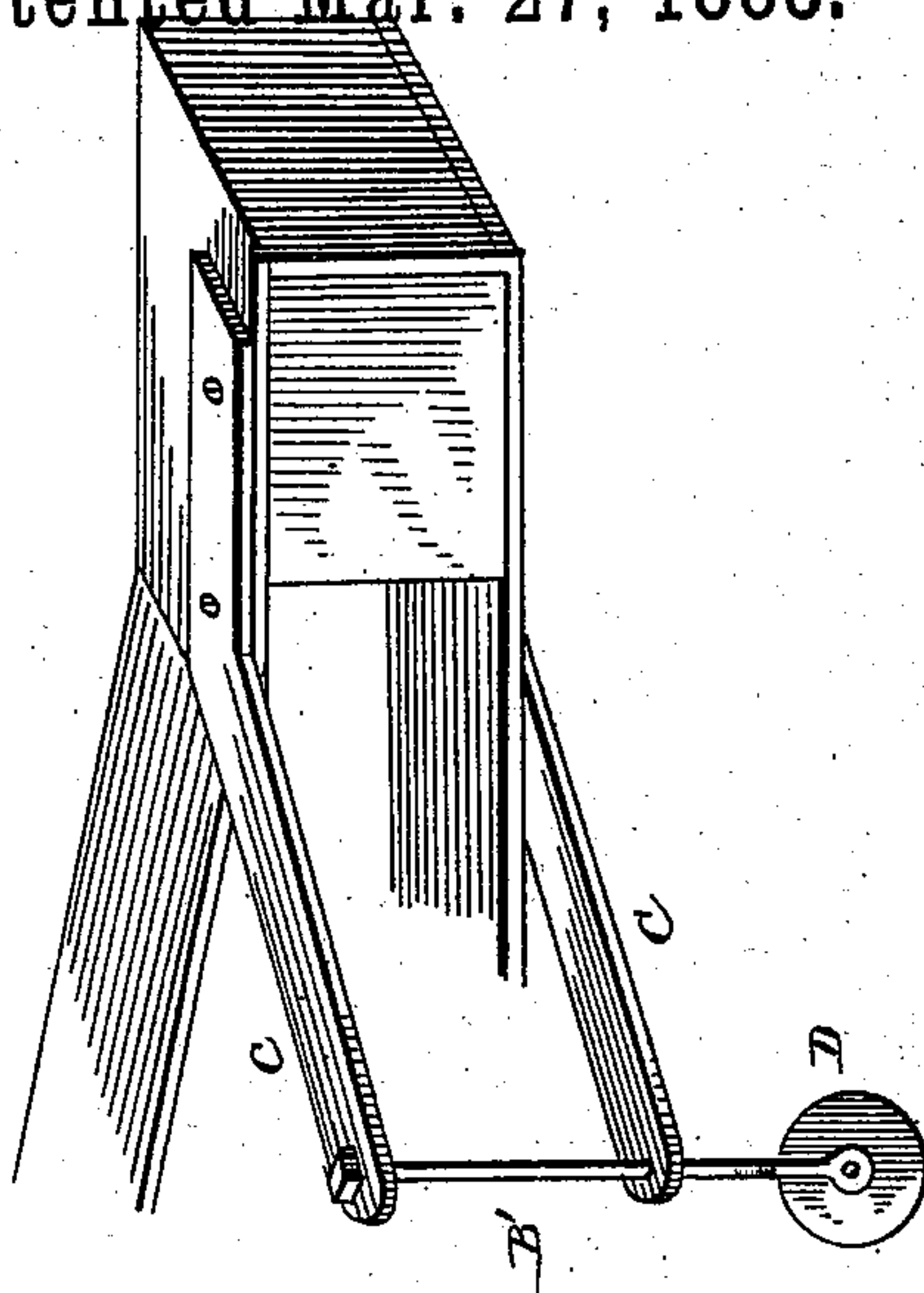


Fig. 2-

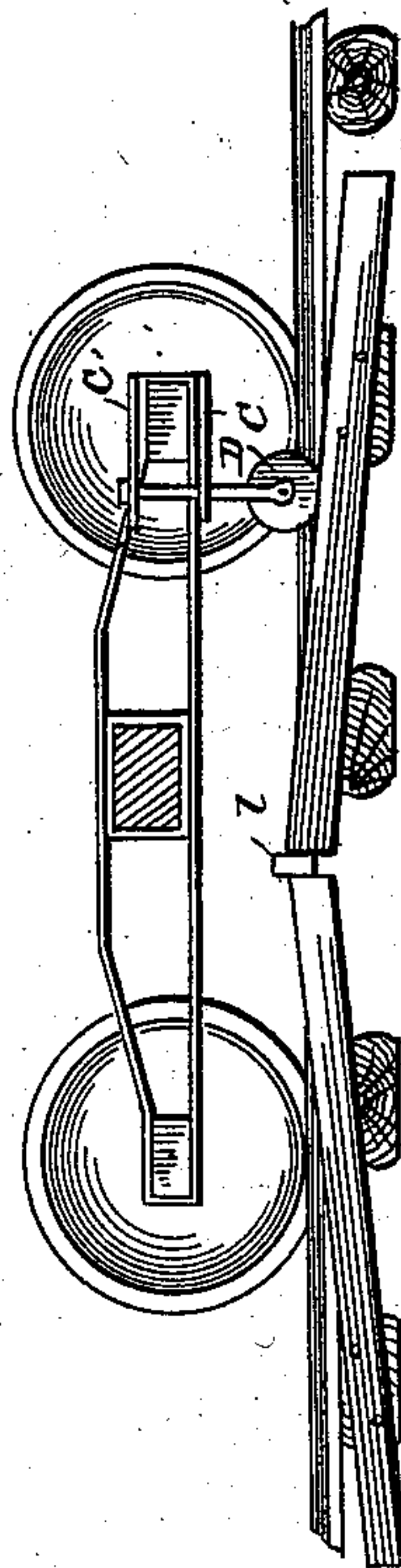


Fig. 3-

WITNESSES

Wm. J. Huntmann
Edwin L. Jewell.

INVENTORS.

Arthur W. Bennett.
John M. Millen.
By W. A. Redmond Attorney

(No Model.)

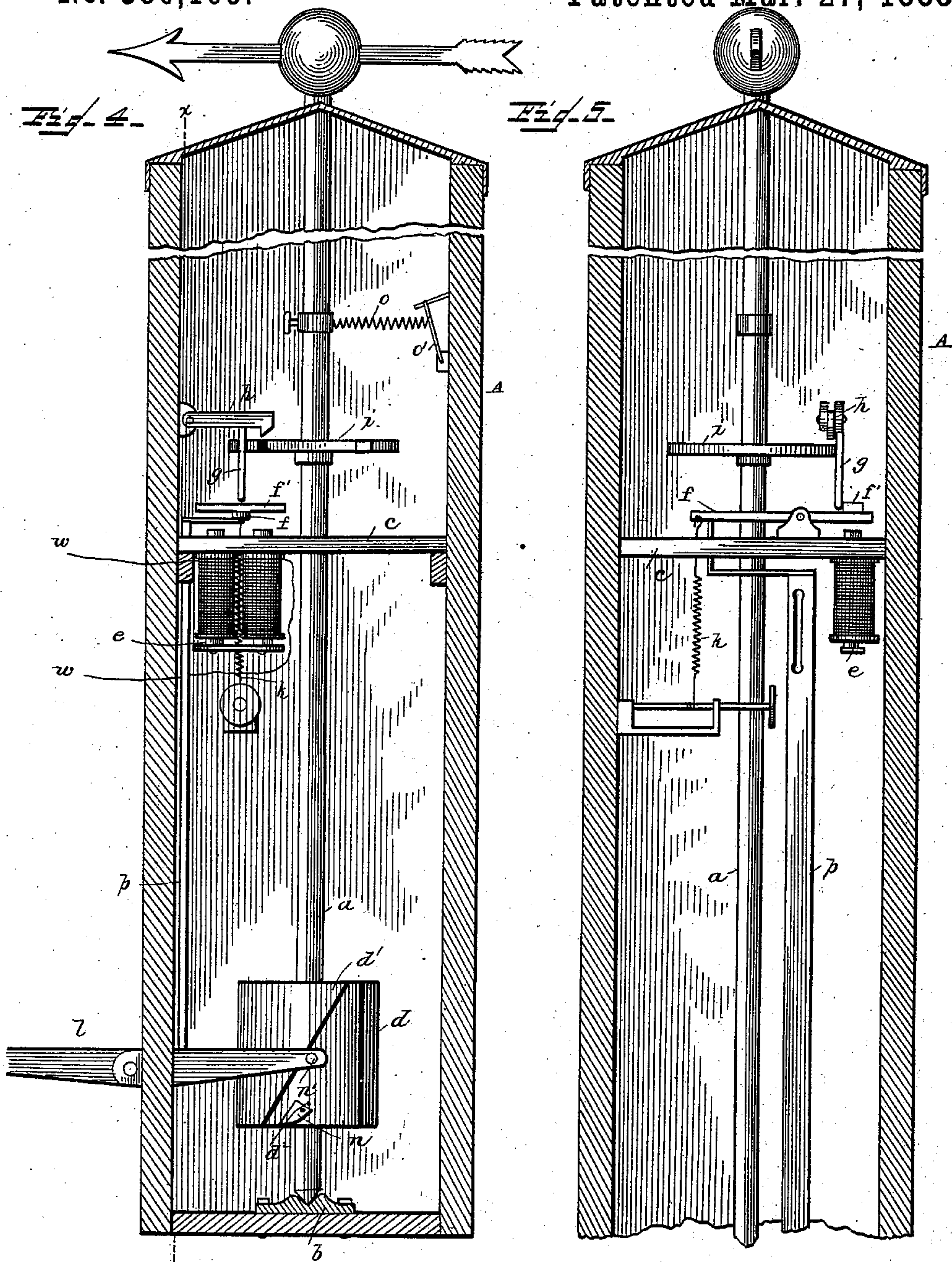
3 Sheets—Sheet 2.

A. W. BENNETT & J. M. MILLEN.

RAILWAY SIGNAL.

No. 380,165.

Patented Mar. 27, 1888.



WITNESSES,

Wm. F. Huntmann,
Edwin L. Jewell,

INVENTORS.

Arthur W. Bennett,
John M. Millen,
By *W. A. Redmond* Attorney.

(No Model.)

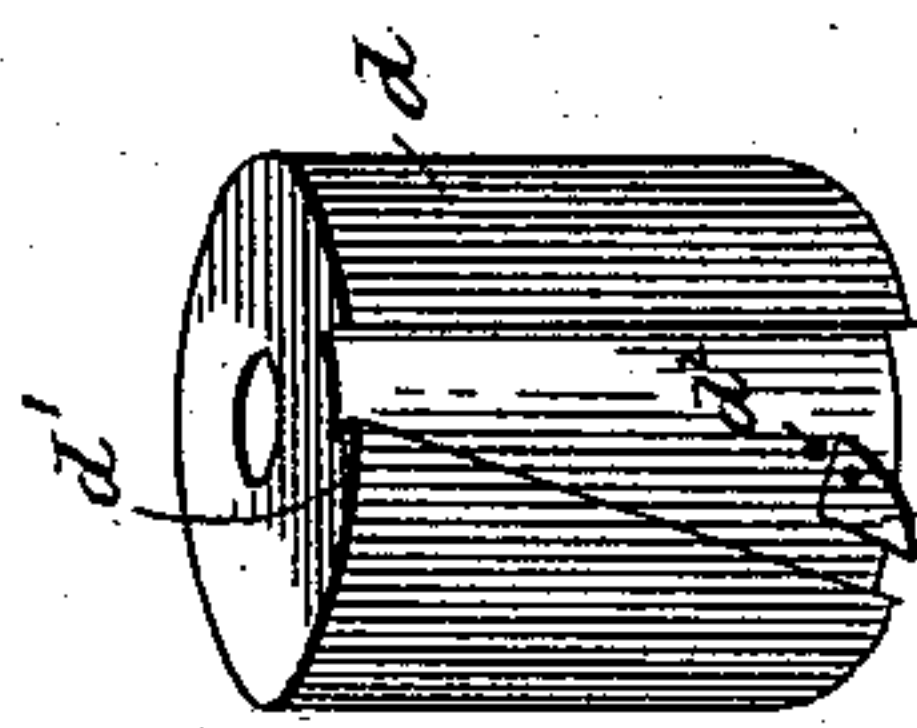
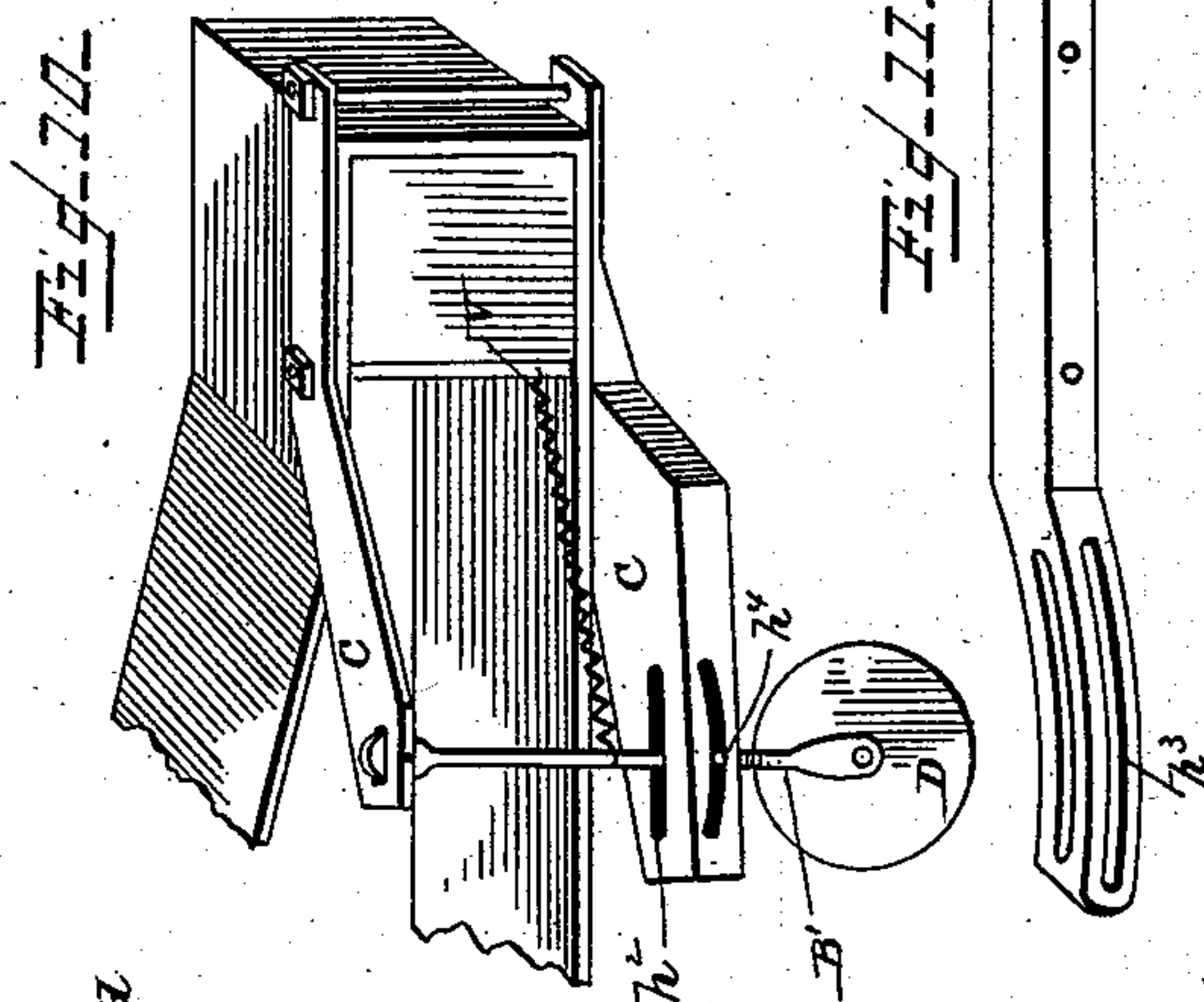
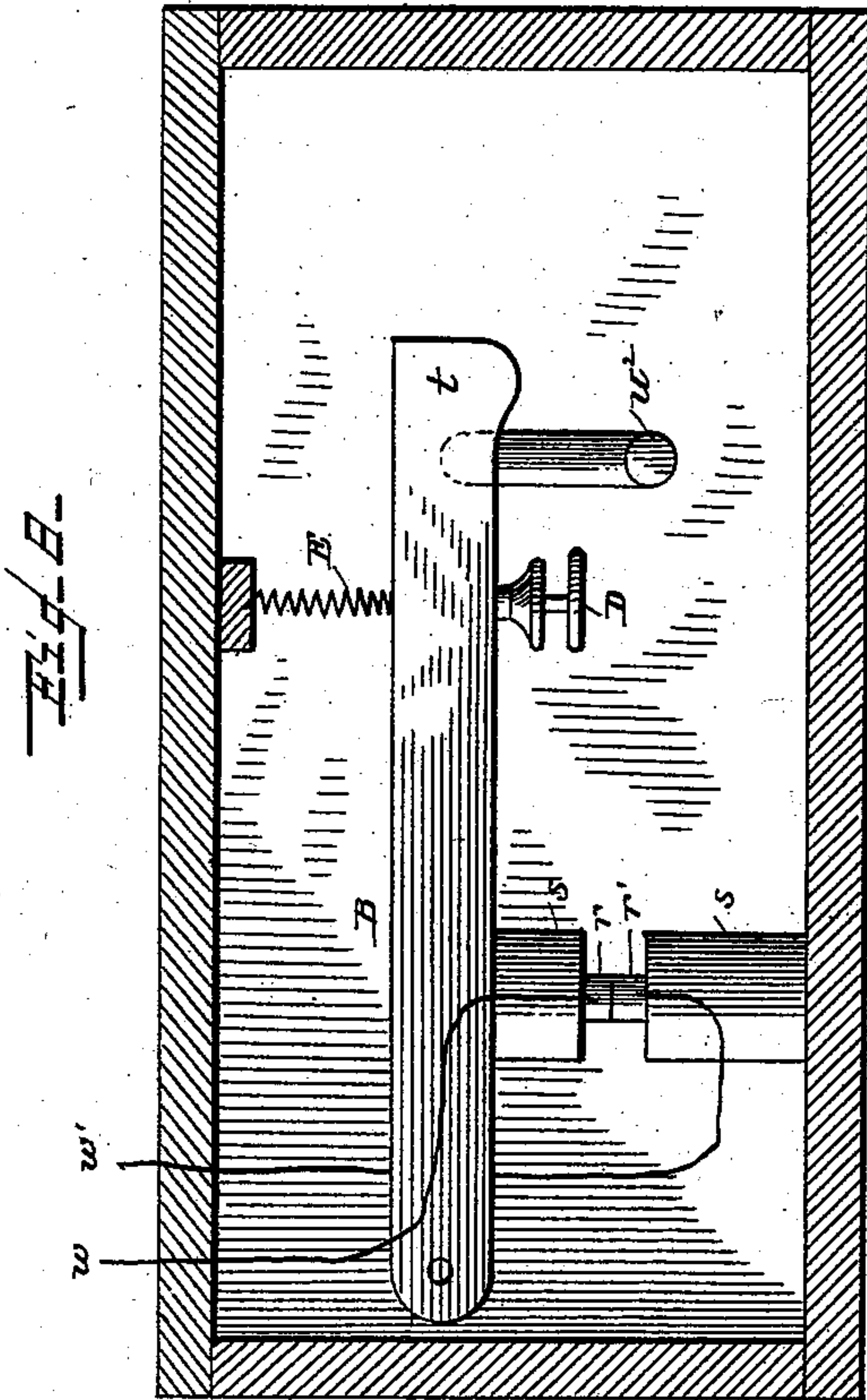
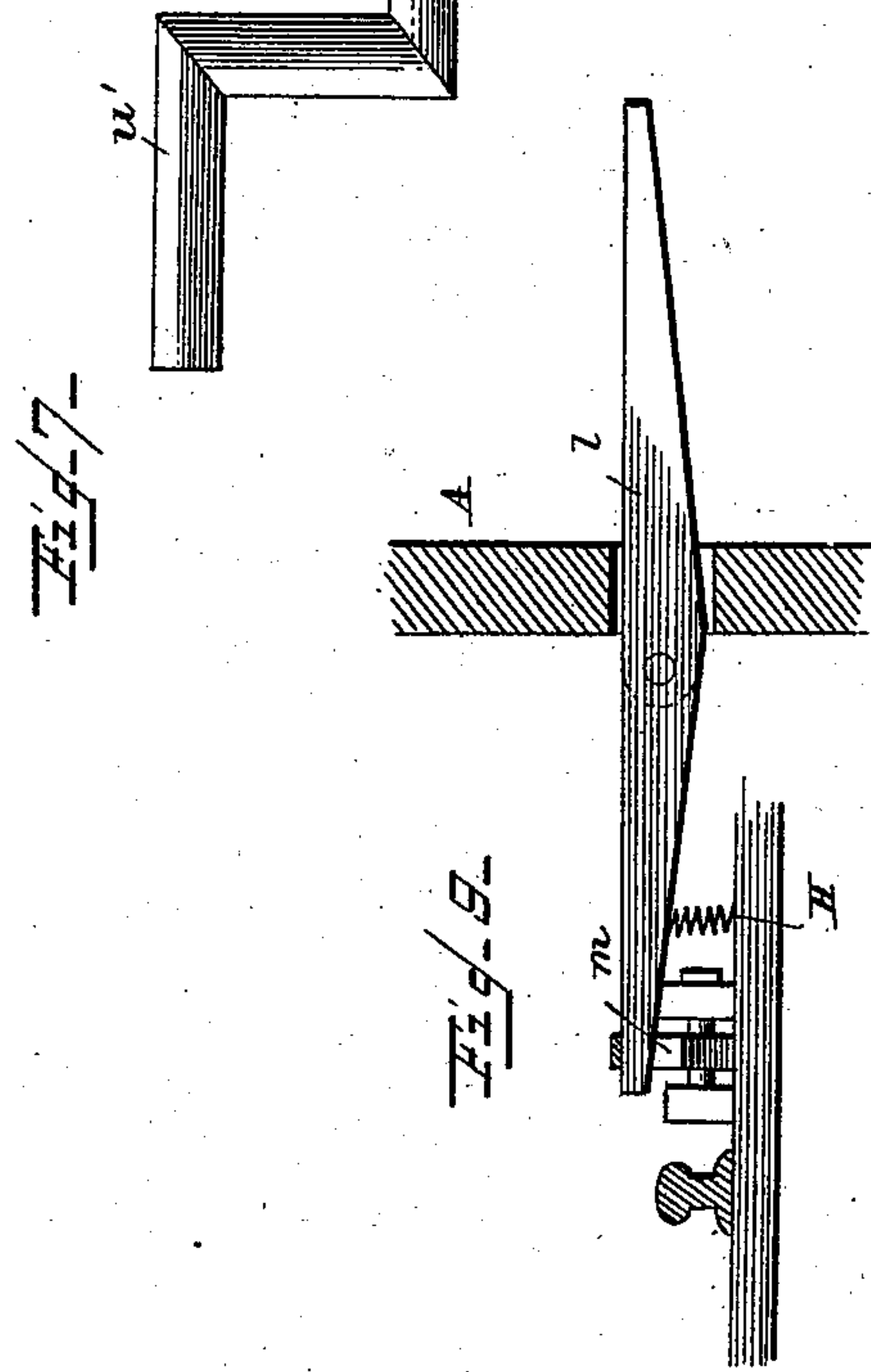
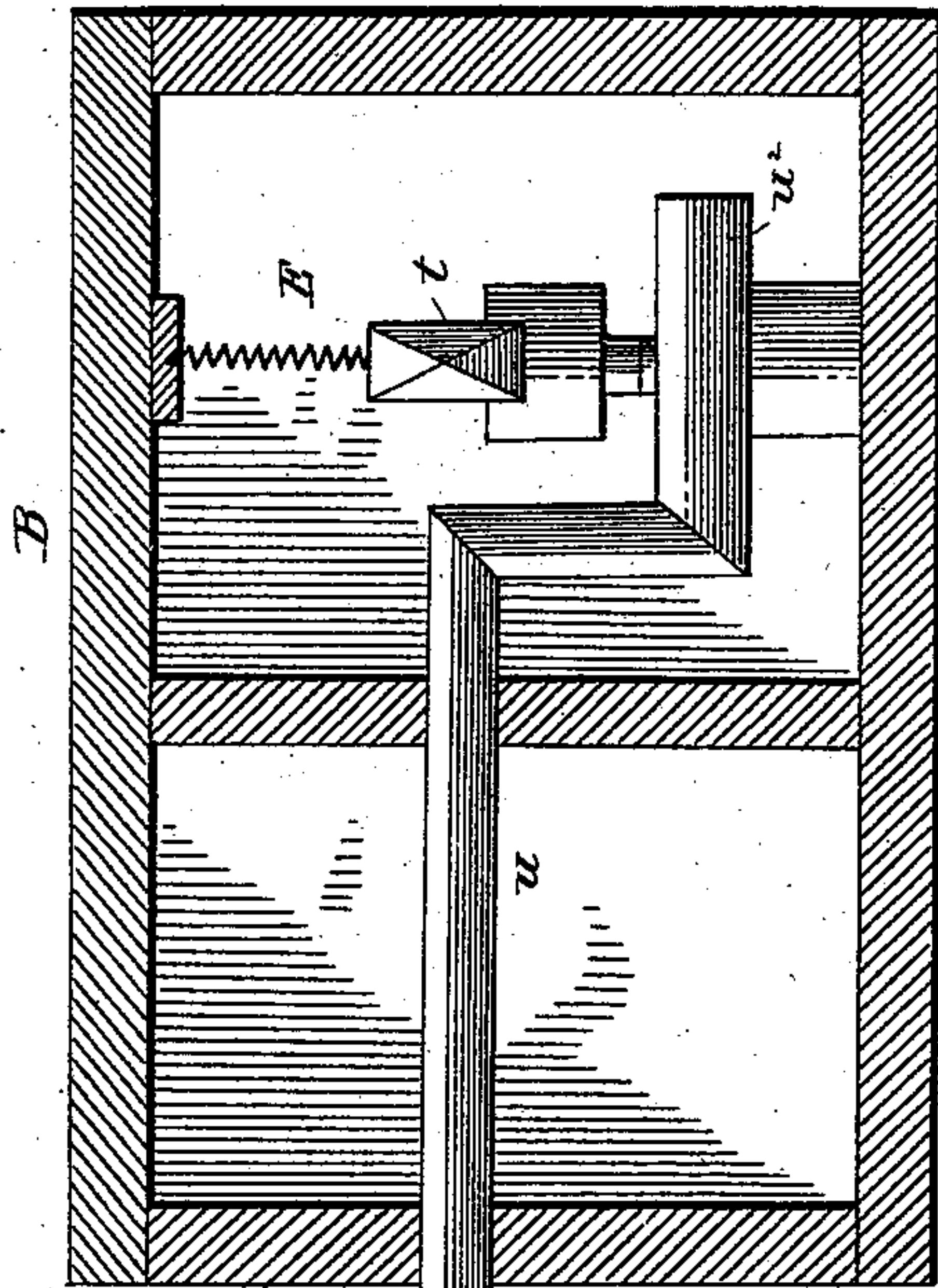
3 Sheets—Sheet 3.

A. W. BENNETT & J. M. MILLEN.

RAILWAY SIGNAL.

No. 380,165.

Patented Mar. 27, 1888.



WITNESSES.

Edwin T. Jewell,
A. C. Rawlings.

INVENTORS,

Arthur W. Bennett,
John M. Millen,
By W. A. Redmond
Attorney.

UNITED STATES PATENT OFFICE.

ARTHUR WESLEY BENNETT AND JOHN MARSHALL MILLEN, OF FONTANELLE, IOWA.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 380,165, dated March 27, 1888.

Application filed May 11, 1887. Serial No. 237,843. (No model.)

To all whom it may concern:

Be it known that we, ARTHUR WESLEY BENNETT and JOHN MARSHALL MILLEN, citizens of the United States, residing at Fontanelle, in the county of Adair and State of Iowa, have invented certain new and useful Improvements in Block-Signal Stations for Railroads, &c.; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to that particular class of signals for preventing collisions on railroads now generally known as "block-signals," and which employ an electric current for resetting an indicator that has been operated by a passing train.

The object of our invention is to provide devices and mechanism of this class which will be simple, less expensive, and more reliable in operation than those heretofore employed.

The invention consists in the apparatus hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 illustrates in plan view a railroad-track provided with our signaling apparatus; Fig. 2, a view in side elevation of a truck of a car provided with means for operating the signal. Fig. 3 is a detail perspective of the means for operating the signal; Fig. 4, a longitudinal vertical section of the box containing apparatus for operating the signal; Fig. 5, a similar view on a plane at right angles to that on which Fig. 4 is taken and indicated by the line $x x$ in the latter figure. Fig. 6 is a top view of the cylinder on the shaft supporting the indicator. Figs. 7 and 8 are vertical sectional views (taken at right angles to each other) of the box containing devices for breaking an electric circuit. Fig. 9 is a detail view of the lever by means of which the signal is operated from the passing train. Fig. 10 is a modification of the trip-operating device in Fig. 3; Fig. 11, a perspective view of one of the blocks for guiding the wheel of the tripper, and Fig. 12 a perspective view of the cylinder.

Like letters of reference, where they occur in different figures, indicate corresponding parts.

In carrying out our invention we place in a box or other suitable inclosure, A, a vertically-arranged rotatable shaft, a , supported at its lower end in a suitable bearing, b , and near its upper end in the cover or roof of the box or inclosure. If necessary, a cross-beam or shelf like that shown at c may also be employed to support the shaft. The lower end of the shaft a is made or provided with a cylinder, d , having a projecting edge, d' , extending in a line at angles to the direction of the axis of rotation. When this edge coincides with the surface of the cylinder, it will be necessary that the incision made in the cylinder enlarge as it approaches its lower end. If, however, this edge projects beyond the surface in the form of a bead, this will not be necessary. Near the lower end of the projecting edge d' is pivoted a block, n , triangular in outline. The extent of oscillation of this block is limited by a pin, d^2 . The purpose of this block will be explained farther on. Upon the upper end of the shaft a , which projects above the roof, there is secured an indicator of any suitable form.

On a cross-beam, c , there is secured an electro-magnet, e , and a pivoted lever, f , which carries an armature, f' . Pivoted between lugs secured to the side of the box A is a pawl, h , to which is attached a pendent rod, g , the end of which rests on the lever f when the parts are in the position shown in Fig. 1. The shaft a is provided at a proper point below the pawl h with a toothed or notched disk, i , with which the pawl engages to lock the shaft in a given position. That end of the lever f opposite the end having the armature has attached to it a suitable spring, k . The tendency of this spring is to lift the armature from the magnet, and consequently the pawl from the ratchet i . This spring is preferably attached to a horizontally-arranged thumb-screw mounted in a suitable bracket in the box A. By means of a cord or chain and by turning said thumb-screw the tension of the spring may be varied and adjusted to suit circumstances, the normal strength of the same not being sufficient to overcome the power of the magnet. If desired, a weight may be substituted for the spring.

A lever, l , which is pivoted between lugs upon or near the lower end of the box or case

A, has one arm extending into the box and the other end extending to near the side of the railroad-track. The outer end of this lever has hinged over it two inclined bars, m m , extending in opposite directions parallel to the rail between two guard-beams, and rests on a spring, H , or a weight may be attached thereto, while the inner end has a pin, n' , extending behind the projecting edge on the cylinder d . A spring, o , is attached to an adjustable bar, o' , and to the shaft a at such a point that its tendency is to turn and hold the shaft in a position to indicate that there is no danger.

A rod, p , that is attached to or rests upon the inner end of the lever l , is made to engage that end of the lever f opposite the armature by any suitable means, that shown being an angle-bar secured to the upper end of the rod, so that when the inner end of the lever l rises the armature is drawn down and the pawl h permitted to drop upon the wheel i .

At a suitable distance from the apparatus just described we place adjacent the track a circuit-breaker inclosed in a suitable box, B . This circuit-breaker is composed of two contact-points, r r' , one of them being fixed upon suitable insulating material, s , in the bottom of the inclosing-box, and the other secured upon like material on the lever t , the latter being pivoted at one end and held down by a spring, E , the tension of which is adjusted by a thumb-screw, D . A shaft, u , having cranks u' and u'' extending in opposite directions from the shaft, is journaled in the box at right angles to the direction of the contact-lever t , so that the horizontal portion of the crank u'' will extend under the lever t , and crank u' will be outside the box. The crank u'' is made heavier than that lettered u' , so that its normal position will be that shown in Fig. 7.

Conductors w w connect the contacts r r' with the electro-magnet e and an electric battery or other source of electricity. The circuit is normally closed.

To use the apparatus above described we provide a car in the train with an auxiliary wheel, D . This wheel is attached to the truck by suitable brackets, as clearly shown in Figs. 2, 3, and 10, in such position that it will pass over and depress the bar m , and consequently elevate the inner end of the lever l .

Our improved means for attaching the auxiliary wheel to the truck consists of two bracket-like arms, C , adapted to be secured to the truck. The yoke or rod B' , carrying the wheel, is pivoted near or at its upper end in the upper of these arms and passes through a vertical slot, h^2 , in the lower arm. The lower arm is curved and slotted at h^3 horizontally as well as vertically in an arc of a circle having for its radius the distance from the pivotal point of the rod B' to the cross-pin h^4 , which extends through the horizontal slot and the rod B' . A spring, v , connected with the rod B' and the truck, holds the rod in the proper position, which should be about midway between the ends of the slot. By this construction it will

be seen that the wheel has a play in either direction in the slot, and may consequently rise to pass over slight obstructions without danger of breakage.

The operation of our signal is as follows: A car or locomotive having the auxiliary wheel just described, in passing along, will depress the bars m , and consequently the outer end of the lever l . This will cause the inner end of the lever l to rise, and, by the action of pin n' therein on the inclined edge d' of the cylinder d , the shaft a , with its indicator, will be caused to make a partial rotation. When the inner end of the lever was raised the rod p was raised also, bringing down the armature on the lever f to such a position that it would be attracted and held down by the magnet. In this position of the armature the pawl will engage one of the teeth or notches in the disk or wheel i , and thereby lock the shaft from further rotation. This position of the indicator (whatever it may be) will indicate that the train has just passed and that care must be observed by a train following. After the train first described has passed along the road to such a distance that a collision at the rear would not be probable, (at which place the circuit-breaker is located,) the wheel D strikes and operates the crank u' , turning it down and that lettered u'' up, which latter strikes the lever t , lifting the contact r from that lettered r' , thus breaking the electric circuit. When the circuit is thus broken, the electro-magnet is demagnetized, and the spring k (or its equivalent, a weight) will lift the armature, and consequently the pawl h , out of the tooth or notch with which it was engaged, and the spring o will turn the shaft a and its indicator to its original position, indicating that the track is clear for the distance between such indicator and the circuit-breaker at least. When the shaft was turned to the position indicating "danger," the inner end of the lever l was pressed down and the outer end up by the spring or a weight and the bars m placed into their original position also. If our device is used on a single-track road, and a train is coming in the opposite direction to that for which the indicator is adjusted, the circuit will not be broken by the lever u' being struck by the wheel, for the reason that in such event the crank u'' will be carried beyond the end of lever t and not under it, and, owing to the greater weight of said crank u'' , will, after the passage of the train, immediately resume its position.

The triangular block d' , hereinbefore referred to, will permit the pin in the lever l to pass under it when the shaft is turned to its normal position by the spring o , and when the pin n' is between it and the projecting edge d' the shaft cannot be turned, as by wind, until the lever l is operated by a passing train.

We do not limit ourselves to the particular constructions nor to the combination of all the parts herein shown and described, because the constructions are susceptible of obvious

changes and some of the parts can be used in connection with other devices without departing from the spirit and scope of our invention.

5 Having now fully disclosed our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a railway-signal, the box or frame A, a rotatable indicator-shaft supported in said
10 box or frame, the said shaft being provided with a cylindrical portion having a projecting edge on its surface extending in a direction inclined to the axis of rotation of the shaft, combined with a pivoted lever arranged and
15 adapted to engage the projecting edge on the cylinder and to be operated by a passing train to cause the shaft to turn, substantially as and for the purpose described.

2. In a railway-signal, the box or frame A, a rotatable indicator-shaft supported in said
20 box or frame, the said shaft being provided with a cylindrical portion having a projecting edge on its surface extending in a direction inclined to the axis of rotation of the shaft, combined with a lever arranged and adapted
25 to engage the projecting edge on the cylinder and to be operated by a passing train, a pivoted lever, *f*, actuated by the aforesaid lever and provided with an armature, an electro-
30 magnet in position adjacent to said armature and provided with connections forming a normally-closed electric circuit, a notched disk on the indicator-shaft, and a pawl in position to
35 engage with said disk, substantially as and for the purposes described.

3. In combination with a rotative indicator-shaft and mechanism, substantially as described, for turning the shaft from its normal position, a notched disk secured to the shaft,
40 a pivoted lever, *f*, provided with an armature and a retaining-spring, a pawl adapted to engage with said disk and to be disengaged by means of said lever, an electro-magnet adjacent to said armature and having connec-
45 tions with an electric circuit, substantially as set forth and described.

4. A rotative indicator-shaft provided with cylinder *d*, having an inclined edge, *d'*, pivoted

angular block *n*, and stop-pin *d''*, in combination with a pivoted lever adapted to engage
50 with said inclined edge and to be operated by a passing train of cars, substantially as set forth and described.

5. In a railway-signal of the class described, employing a normally-closed electric circuit,
55 a circuit-breaker provided with separable insulated contacts *r r'*, one of which is carried by a pivoted lever and both being connected with electric conductors, a shaft, *u*, having
60 cranks *u'* and *u''* at its extremities, one of which is heavier than the other, the said shaft being journaled in a frame located near the railway-track, so that one of the crank portions may
be operated to cause the other to separate the contacts and thus break the electric circuit,
65 substantially as set forth, for the purpose described.

6. In a railway-signal of the class described, employing a normally-closed electric circuit,
the herein-described circuit-breaker, consisting
70 of separable insulated contacts *r r'*, with which the electric conductors are connected, the shaft *u*, having cranks *u'* and *u''*, one of which is heavier than the other, the shaft *u* being jour-
naled and arranged in a frame located near the
75 railway-track, so that one of the crank portions may be operated to cause the other to separate the contacts and break the electric circuit, substantially as and for the purpose described.

7. A railway car or truck provided with an
80 auxiliary wheel, C, supported in position to move on an inclined yielding bar adjacent to a railway-track, said wheel being carried by a movable bar pivoted in one arm of a bracket,
a curved bracket-arm provided with two slots—
85 one through which this rod extends and one to receive a retaining-pin in the wheel-rod—and a spring connecting the said rod with the car, substantially as described.

In testimony whereof we affix our signatures 90 in presence of two witnesses.

ARTHUR WESLEY BENNETT.
JOHN MARSHALL MILLEN.

Witnesses:

G. W. KANOFF,
GEORGE RODGERS.