

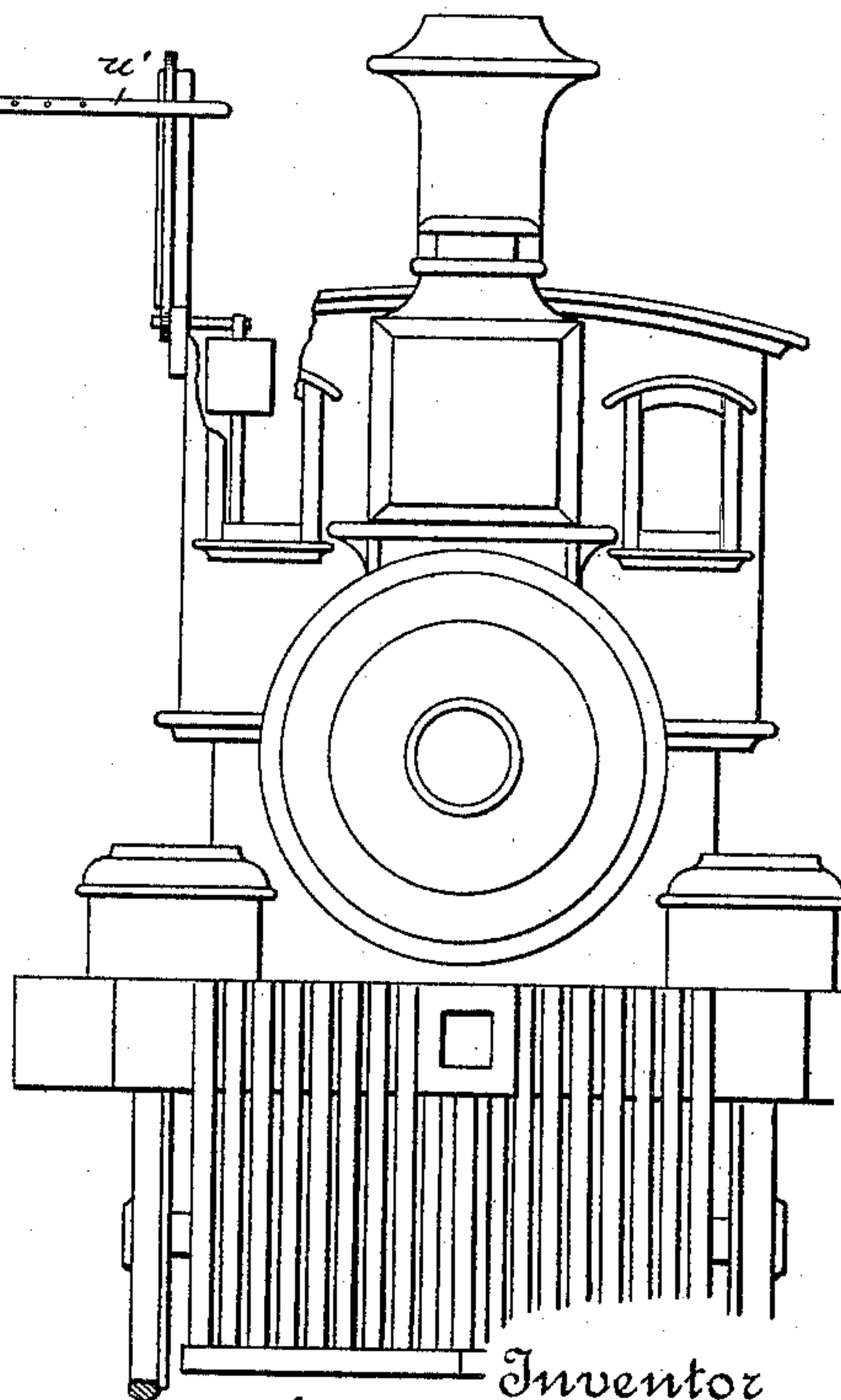
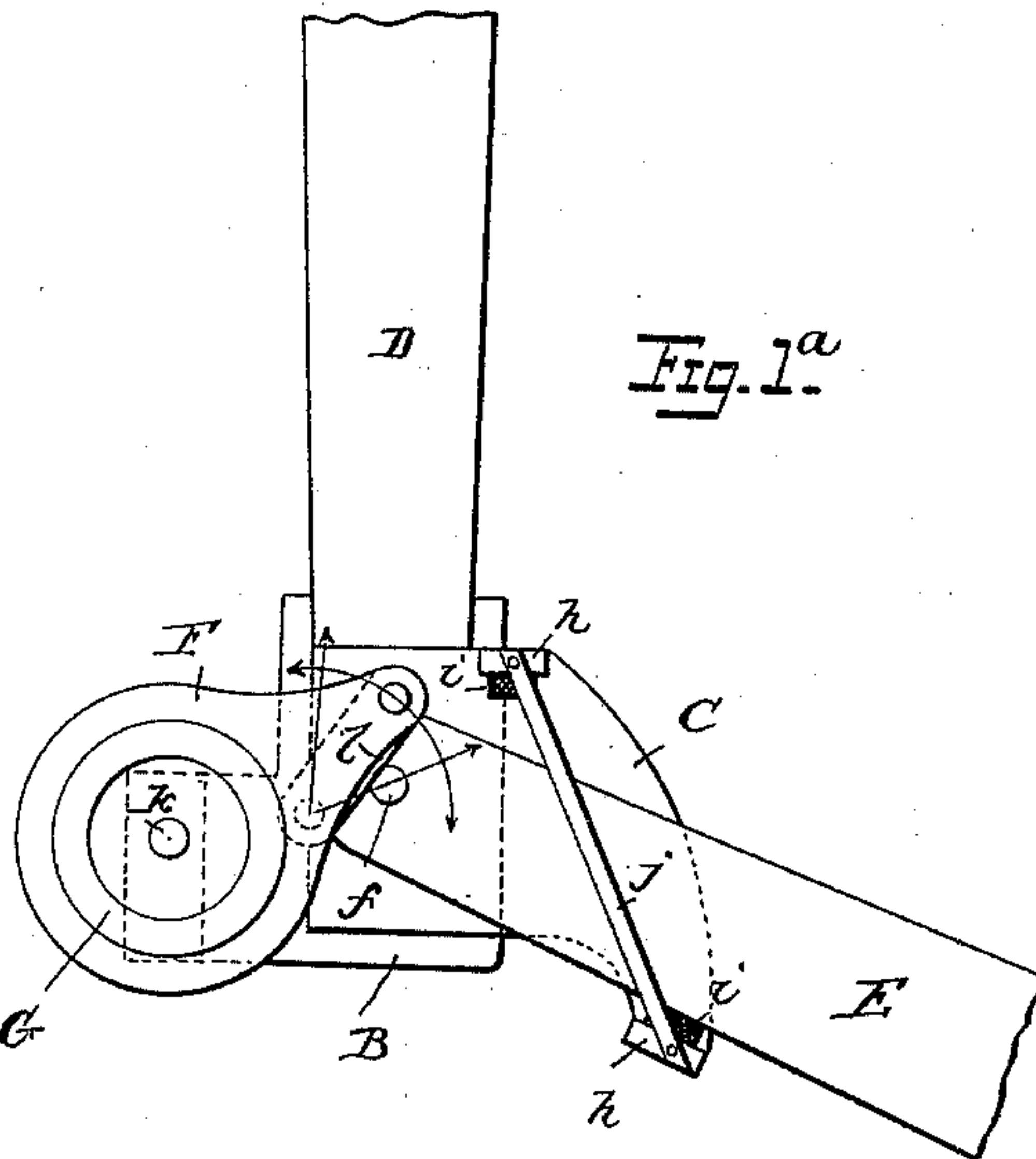
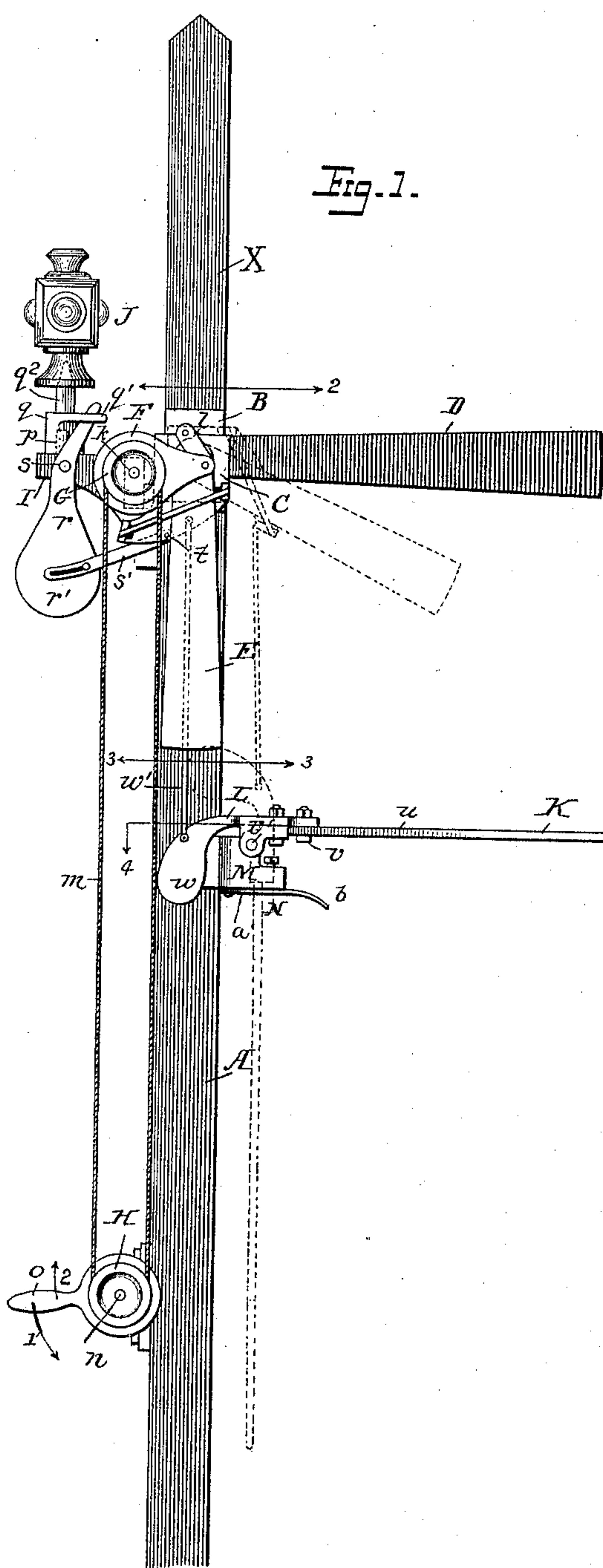
(No Model.)

3 Sheets—Sheet 1.

H. B. POTTER.  
RAILWAY SIGNAL.

No. 464,990.

Patented Dec. 15, 1891.



Witnesses  
Jno. G. Hinkel.

St. S. McArthur.

By his Attorneys

Foster Freeman

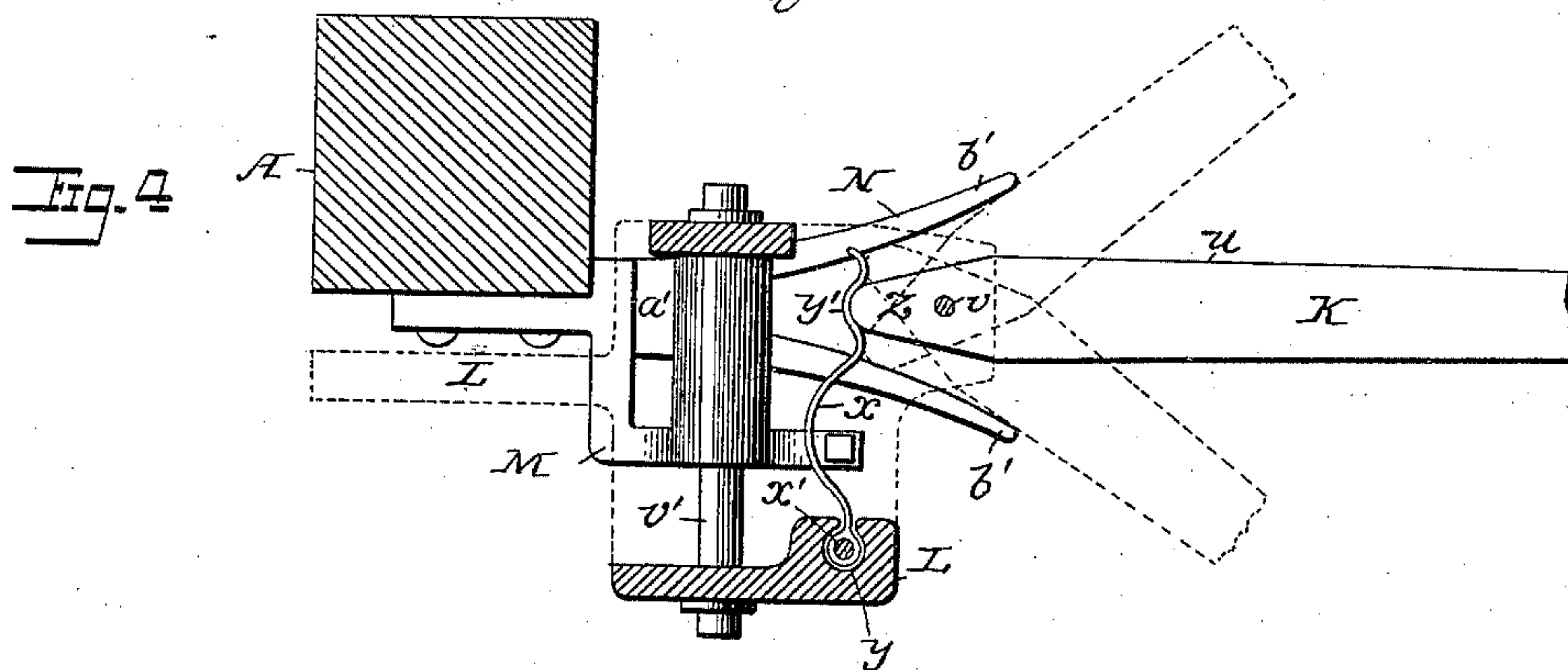
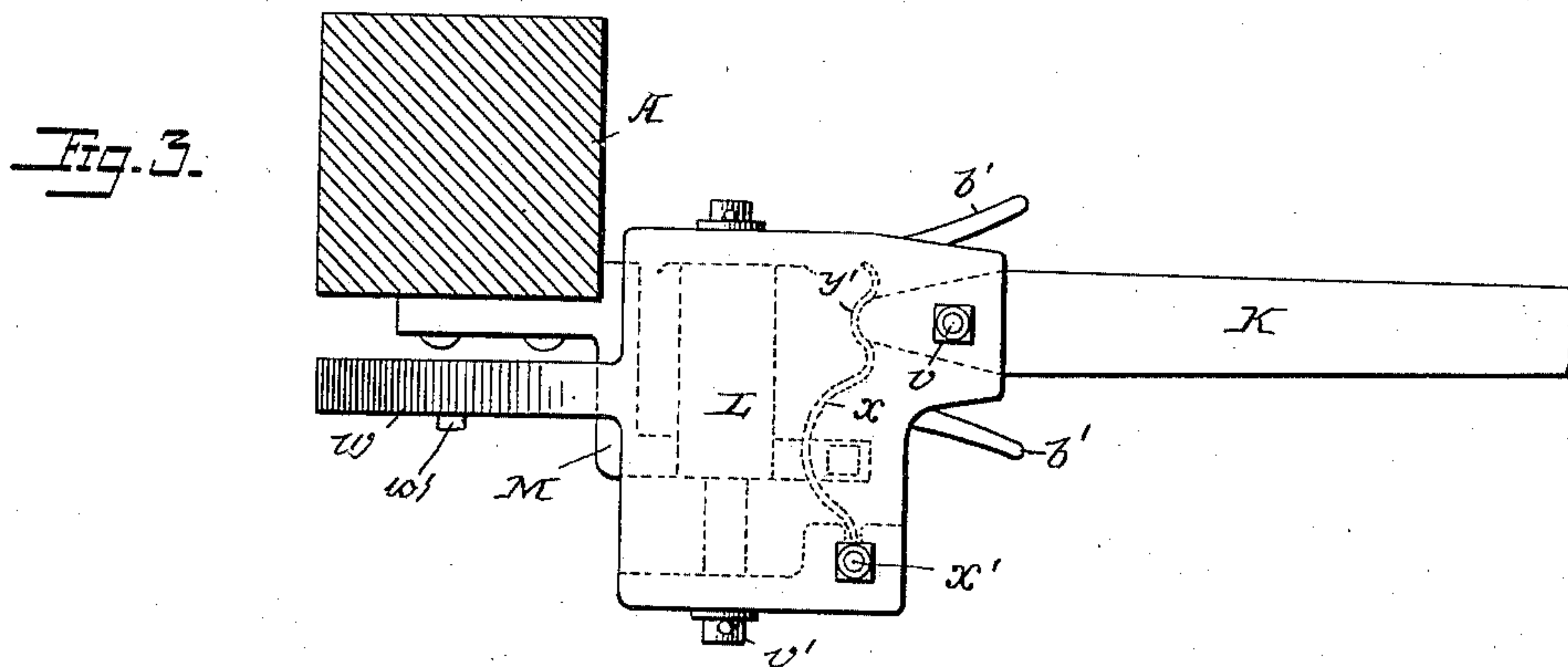
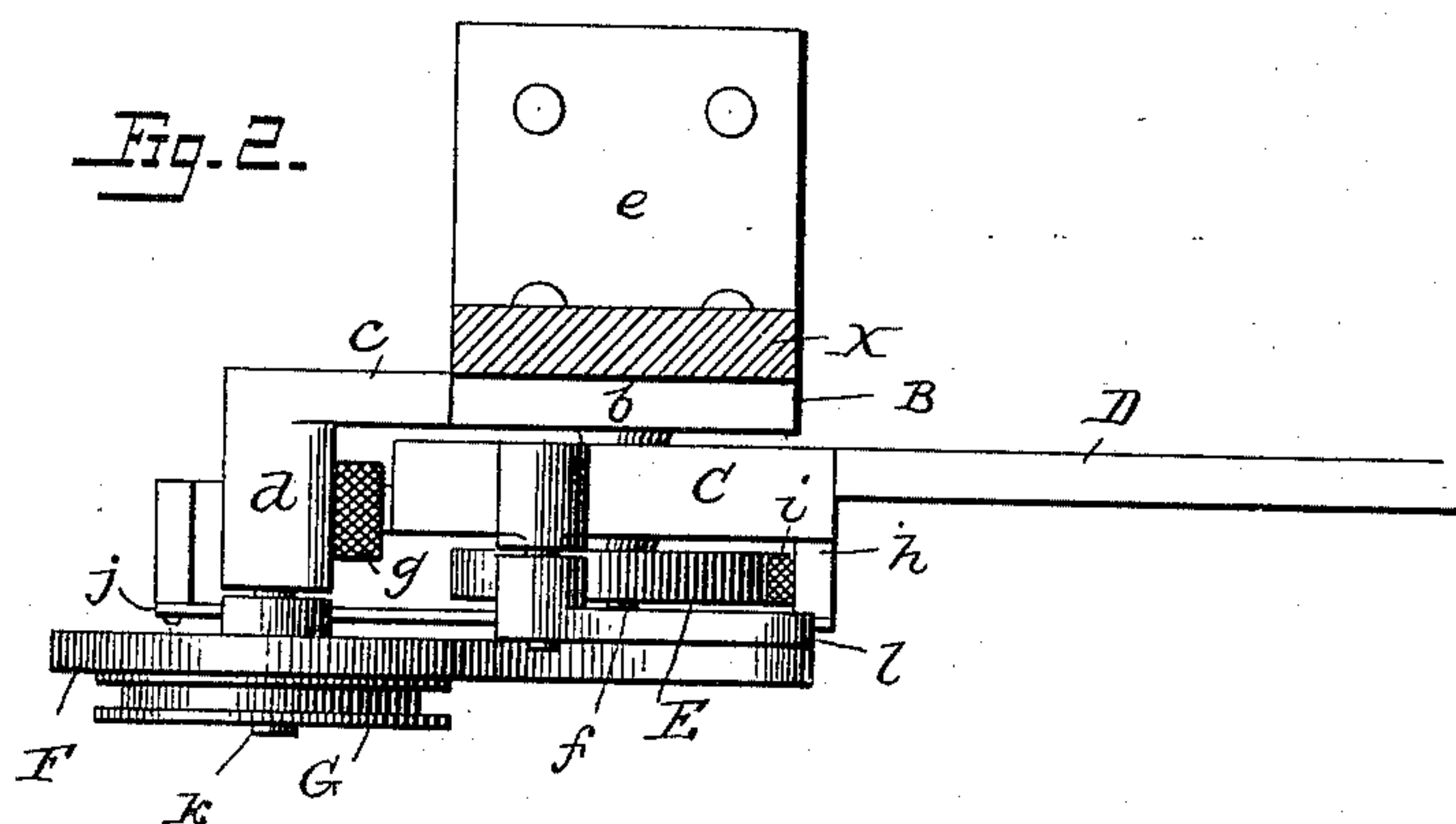
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Ch. S. McArthur.

Inventor  
Robert B. Potter,

By Foster Freeman  
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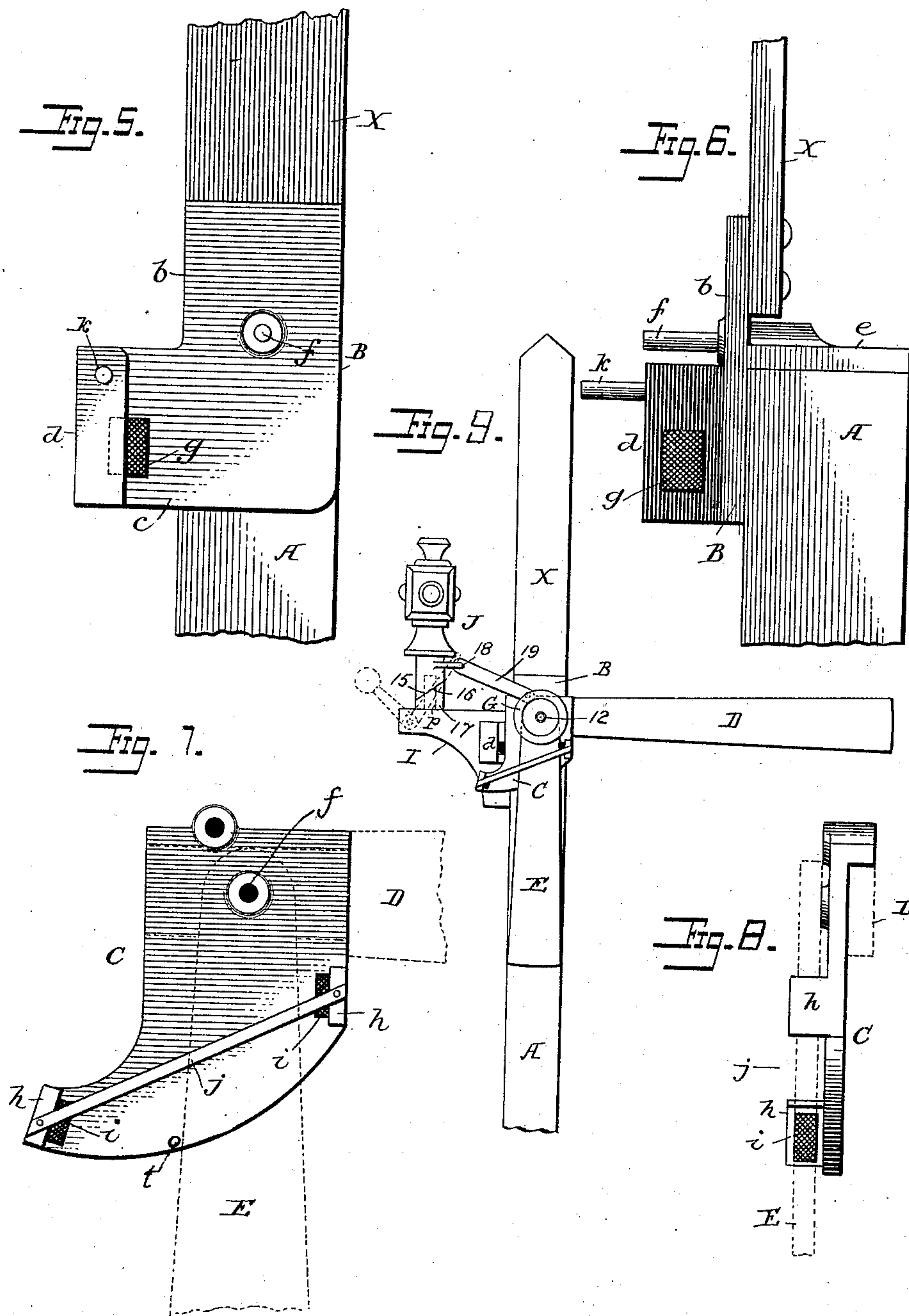
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# UNITED STATES PATENT OFFICE.

HOBERT B. POTTER, OF HILLBURN, NEW YORK.

## RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 464,990, dated December 15, 1891.

Application filed February 5, 1891. Serial No. 380,368. (No model.)

*To all whom it may concern:*

Be it known that I, HOBERT B. POTTER, a citizen of the United States, residing at Hillburn, county of Rockland, State of New York, have invented certain new and useful Improvements in Railway-Signals, of which the following is a specification.

My invention is a combined visual and audible signal for railways, by which the engineer of a train may be signaled, as usual, by the display of a suitable target, or whereby, in case he fails for any reason to observe the visual signal when set to indicate "danger" and runs by the same, an audible signal located upon the cab of the locomotive is operated to direct his attention to the fact, all as hereinafter fully set forth, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved signal device, showing it located by the side of a railway-track having a locomotive thereon. Fig. 1<sup>a</sup> is an enlarged view of part of Fig. 1. Fig. 2 is an enlarged sectional plan view of the signal device on the line 2 2, Fig. 1. Fig. 3 is a similar view on the line 3 3, Fig. 1. Fig. 4 is a similar view on the line 4 4, Fig. 1. Figs. 5 and 6 are respectively side and edge views, enlarged, of the stationary bearing plate or bracket at the top of the signal-post. Figs. 7 and 8 are similar views of the swinging target-bracket, and Fig. 9 is a modification.

At a suitable point adjacent to the railway-track is located a stout post A, adapted to support the visual-signal mechanism, as usual. At the upper end of the post and preferably at one side thereof is firmly seated a metal bracket B, of any desired or convenient form, and constituting a bearing-plate for some of the principal operative parts of the apparatus. This bracket, as shown, consists of an upright body portion *b*, having a lower rearward extension *c* terminating in an outwardly-projecting flange *d*, while on the opposite side of the body is a horizontal web *e*, resting upon the end of the post. On a stud carried by the bracket and constituting a journal *f* is loosely mounted a swinging bracket C, and securely attached to this latter bracket to move therewith is a danger-signal target D, a cushion *g* on the flange *d* of the bracket B being arranged to make contact with the

rear edge of the swinging bracket to limit its downward movement. A second or clear-track-signal target E, preferably smaller than the target D, is also mounted upon the journal *f* to swing freely thereon adjacent to the outer face of the bracket C, which latter is provided at or near its extreme outer edges with flanges *h h*, having cushions *i i* thereon, and these cushioned flanges determine the extent of movement of the target E independent of the swinging bracket. A metal strap *j*, secured to the outer faces of the flanges *h h*, prevents lateral play of the target E and keeps it confined between the cushions on said flanges.

The targets are successively displayed and withdrawn from view, as desired, by means of an arm F, journaled upon a stud *k*, projecting from the flange *d* of the bracket B, the free end of the arm being pivotally connected by a link *l* to the upper portion of the swinging bracket C, preferably to the left of its pivotal support, as shown. A drum G, secured to the side or forming part of the arm F, is operatively connected by an endless chain or band *m* to a similar drum H, mounted on a journal *n*, carried by the post A and located within convenient reach of the ground, a handle *o*, secured to the latter drum, serving as a convenient device for rotating it, although of course the signal may be operated from a distance, as usual.

Any suitable and well-known means for securing and locking the drum H in its adjusted position may be employed, and instead of the handle *o* for operating the drum any preferred form of gearing or crank mechanism may be adopted, and other means than those shown may be used for turning the arm.

The link connection between the arm F and the swinging bracket C, Fig. 1<sup>a</sup>, is very important, especially where the signal is to be operated from a distant point, as the link permits a limited movement of the arm after the bracket has been adjusted thereby without materially affecting the position of the latter, thus compensating for any slight variation in the length of the operating connections due to atmospheric changes or otherwise.

To the rear edge of the post, at or near its upper end, is secured a bracket I, provided



with a vertical stud  $p$ , on which is rotatively mounted a hub  $q$ , having a lateral loop  $q'$  and an upwardly-projecting pin  $q^2$ , terminating, preferably, in a tapering end of angular cross-section, the pin fitting into a correspondingly-shaped opening in the base of a signal-lantern J and detachably supporting the latter.

A lever  $r$ , with a counterweighted lower end  $r'$ , is pivoted at  $s$  to the bracket I immediately below the lantern, the upper end of the lever being reduced in size or tapered and projecting through the loop  $q'$  of the hub  $q$ , a link  $s'$  pivotally connecting the end  $r'$  of the lever to the lower portion of the swinging bracket C at the point  $t$ . These parts are so proportioned and adjusted relatively to each other that when the danger-target D is swung to its vertical or retracted position in rear of a shield X and the white or clear track target E is projected by the mechanism previously described, and as shown in dotted lines, Fig. 1, the signal-lantern is simultaneously given a quarter-turn, thereby displaying a white light to correspond with the white target brought to view. In the reverse position of the parts a red light is of course displayed to conform to the danger-target D, which is then in its outward position, while the target E is withdrawn, as will be apparent.

In order to direct the engineer's attention to the fact in case he accidentally passes the signal when set at "danger" and, if desired, at the same time automatically apply the brakes to bring the train to rest, I combine with the visual-signal mechanism a tell-tale arm K, adapted to project into the path of the locomotive to simultaneously operate an audible signal thereon and set the air-brakes. This tell-tale arm, as shown, consists of a stout wooden staff  $u$ , provided at its free end with a metal shoe  $u'$ , and pivoted near its inner end at  $v$  to the forward portion of a lever L, which is supported by and hinged at  $v'$  to a bracket M, secured to the post A at a suitable height above the ground, the end  $w$  of the lever being counterweighted and connected by a link or rod  $w'$  to the target-bracket C, so that the latter and the tell-tale arm will swing together in a vertical plane, but in opposite directions. The body portion of the lever L is comparatively wide to afford a steady bearing on its supporting-bracket and at the same time provide a seat, preferably on its under face, for a stiff spring  $x$ , secured at one end by a bolt  $x'$  in a recess or socket  $y$  near one side of the lever-body, the free end of the spring being curved, as shown, to form a seat  $y'$ , into which the extreme inner beveled end  $z$  of the tell-tale arm normally projects. From this construction it will be seen that although the normal position of the arm K is at right angles to the axis of the pivot  $v'$  and to the path of movement of the train the spring  $x$  nevertheless permits the arm to swing laterally upon its pivot  $v$  either to the right or left. As the arm is thus swung to one side and its inner

end is freed from the spring-seat  $y'$  a portion of the spring adjacent to the seat is brought against one of the beveled faces of the arm and thereby holds it in its lateral position.

To return the tell-tale arm from its lateral to its normal position preparatory to again setting the signal at "danger," I secure upon the post A, or preferably to the bracket M, a cam device N, consisting of a base-plate  $a'$ , bolted to the under face of the bracket immediately below said arm and provided with two horns or fingers  $b' b'$ , diverging from the plate and adapted to receive between them the tell-tale arm as the latter is turned down to a vertical or substantially vertical position by the tilting of the lever L on its pivot, as shown in dotted lines, Fig. 1. By this means as the said arm is swung downward, as indicated, it contacts with or rides against the one or the other of said diverging fingers, and is thereby swung laterally upon the pivot  $v$  until the inner end  $z$  of the arm enters its seat  $y'$  in the spring  $x$ , and the arm is thus locked again in its normal position at right angles to the track.

In the modified form of the visual signal shown in Fig. 12 the swinging target-bracket C and the target E are supported by a rotatable shaft 12, mounted in a suitable bearing on the post A, the swinging bracket being keyed to the shaft to move therewith, while the target E is loosely suspended therefrom, as in the other views. The operating-drum G in this instance is likewise keyed to said shaft, so as to rotate with the latter. The signal-lantern in this embodiment is also carried by a rotatable hub; but the latter is beveled off on its under face 15 and works upon a correspondingly-shaped face 16 on the upper side of a stationary block 17, surrounding the center pin  $p$ , carried by the bracket I, a pin or loop 18 on the rotatable hub being directly connected by a link 19 to the swinging target-bracket C. By this arrangement a number of intermediate connections are dispensed with and the apparatus is simplified in construction and operation, although the advantage incident to the compensating device previously described is lost. The parts in the modified construction are of course properly proportioned and arranged in respect to each other to work in unison, as required.

Different forms of audible signals and automatic brake-setting devices upon the locomotive or other suitable or preferred part of the train may be employed in connection with the stationary signal mechanism thus far set forth and be operated by contact with the tell-tale arm, as already indicated; but as the particular construction of such audible-signal and brake-setting mechanism forms no part of the present invention it is not herein specifically set forth.

From the foregoing description the operation of the signal device will be readily understood, and is briefly as follows: It may be stated at the outset that the normal position



of the visual-signal apparatus is at "danger," and that the parts thereof are so proportioned and adjusted relatively to each other that they will always assume that position automatically in case of breakage of the operating parts or otherwise. Thus if the parts should be set to indicate a clear track, as in dotted lines, Fig. 1, and full lines, Fig. 1<sup>a</sup>, and the endless operating-chain should slip or break, the drums be freed, or the arm F become disconnected from the swinging target-bracket, the target E would naturally assume its inward position, while the danger-target D, by its weight, would fall to its horizontal or displayed position and thereby throw the tell-tale arm up and across the track, as indicated in full lines, Fig. 1. If, on the other hand, the connection between the target-bracket and the tell-tale arm should break, the weighted end of the arm would automatically swing the latter into its projected position. Again, if the connection between the swinging target-bracket and the lever *r* for rotating the signal-lantern should break while the apparatus is set to "clear track," as stated, the weighted end of the lever would automatically return the lantern to its "danger" position. If it is desired to change the position of the apparatus from "danger" to "clear track," this may be readily done by swinging the operating-handle *o* in the direction of the arrow 1, Fig. 1, and securing it in place, thereby rotating the drums in a like direction and imparting a corresponding movement to the target-bracket on its journal *f* by means of the arm F and link *l*. This movement of the target-bracket throws the red target D to a vertical position in rear of the shield X, swings the white target E out to and maintains it in its projected position by the contact of the rear cushion *i* on the bracket with the edge of the said latter target, and at the same time depresses the outer end of the tell-tale arm and moves it out of operative position and in between the diverging fingers *b'* *b'*. As these parts assume the positions just described the signal-lantern is simultaneously given a quarter-turn by its connection with the target-bracket through the medium of the link *s'*, pivoted lever *r*, and loop *q'* on the rotatable hub *q*, supporting the lantern, thereby displaying a white light in opposite directions in the line of the track. In this latter position of the parts, as best shown in Fig. 1<sup>a</sup>, it will be seen that a limited movement of the arm F in either direction will have no appreciable effect on the position of the targets, inasmuch as the link connection between the arm and the swinging target-bracket permits the arm to move slightly without imparting a corresponding movement to the bracket. It follows, therefore, that any slight variation in the length of the operating chains or rods due to atmospheric changes or otherwise is compensated for, as by the first movement of the arm F a rapid and extended movement is given to said bracket to swing

the targets toward the positions indicated in said figure, while as the parts approach or assume said positions there is a diminishing movement of the bracket and the signals carried thereby. In the position of the apparatus last described the white or clear-track target does not occupy a horizontal position, as does the danger-target when displayed; but it is inclined at more or less of an acute angle toward the ground; and it will likewise be observed that the clear-track target is considerably smaller than the other target. The objects of these differences in position and size are to enable the engineer or other proper person to more readily and positively distinguish the signals at a distance, or when for any other reason the colors alone of the targets cannot be easily and accurately determined. If now the apparatus is to be returned to its normal or danger position, this may be easily done by releasing and turning the operating-handle *o* in the direction of the arrow 2, Fig. 1; or under ordinary conditions it is only requisite to release the handle, when the parts will automatically take that position, as already fully explained, and as clearly shown in full lines in said Fig. 1, the tell-tale arm being elevated simultaneously with such movement and swung into the path of the locomotive. In assuming the latter position the downward swing of the target-bracket on its journal *f* is gently arrested at the proper point by the contact of the rear straight edge of the bracket with the cushion *g*, carried by the stationary bracket B, thus relieving the parts of any undue strains or shocks. The apparatus being set at "danger," if now a train from either direction runs past the signal the outer end or shod portion of the tell-tale arm makes forcible contact with and operates suitable audible-signal and brake mechanism upon the cab of the locomotive or other convenient part of the train, thereby giving notice to the engineer and, if desired, simultaneously applying the brakes to arrest the movement of the train. The blow received by the tell-tale arm at its outer weighted end by the contact therewith of the audible-signal and brake mechanism on the cab being a comparatively sharp one, especially in the case of high-speed trains, the arm is thereby swung on its pivot *v'* in a horizontal plane entirely out of the path of the train and until its inner end clears the spring-seat *y'*, when the spring will bear firmly against one of the side or beveled faces of the arm and maintain the latter in such lateral position, as best shown in dotted lines, Fig. 4. The arm now remains in this position until a clear-track signal is again displayed, as previously explained, when the arm will be swung downward on the pivot *v*, to a vertical position between the diverging fingers *b'* *b'* of the cam device, and the arm will, by contact with the one or the other of said fingers, be moved laterally on its pivot *v* until it again occupies its normal position rela-



tively to the horizontal pivot  $v'$ , the inner end of the arm then projecting into its spring-seat and the arm being thereby movably secured in place.

5 The operation of the modification shown in Fig. 9 will be obvious. The drum G and the target-bracket C being keyed to the rotatable shaft 12, the rotation of the drum by the means described serves to directly adjust the  
10 targets as desired without the intervention of intermediate connections, and the signal-lantern being likewise connected immediately to said bracket the lantern is given a quarter-turn at each complete adjustment of  
15 the targets. The beveled faces of the rotatable hub supporting the lantern and of the block 17 insure the automatic return of the lantern to its danger position in case of breakage of the connection or otherwise, the parts  
20 being so disposed that when said faces are parallel or wholly in contact the red light will be displayed.

Without limiting myself to the precise details shown and described, I claim—

25 1. The combination, in a signal apparatus, of two targets and means for concealing each when the other is displayed and one having a bearing arranged to make contact with and project the other target as the first approaches  
30 its concealed position, substantially as described.

2. The combination, in a signal apparatus, of a pivoted bracket, a target supported normally horizontal thereby, a bearing on the  
35 bracket, a second target suspended loosely in the line of said bearing and normally vertical, a hand operating device, and connections between the latter and the bracket, the parts being so proportioned relatively that as the  
40 first target has been moved partially toward and approaches its retracted position the second target is projected, substantially as described.

3. The combination, in a signal apparatus,  
45 of a pivoted bracket, a target attached to and supported normally horizontal thereby, bearings on the side of the bracket, a second target suspended from a pivot and extending loosely between said bearings and normally  
50 vertical, a hand operating device, and connections between the latter and the bracket, the parts being so proportioned relatively that as the first target is retracted the second is projected, but at an angle to the normal  
55 position of the first, substantially as described.

4. The combination, in a signal apparatus, of a pivoted bracket having a bearing thereon, a target secured to the bracket, a second target suspended loosely from a pivot in line  
60 with said bearing, a rotatable hub supporting a signal-lantern and connected to said bracket, a hand operating device, and connections between the latter and the bracket, substantially as described.

65 5. The combination, in a signal apparatus, of a pivoted bracket having a bearing, two signal-targets, one carried by the bracket and

the other suspended from a pivot in line with said bearing, a rotatable hub adapted to support a lantern, a weighted lever loosely connected to the hub and to said bracket, a hand  
70 operating device, and connections between the latter and the bracket, substantially as described.

6. The combination, in a signal apparatus,  
75 of a pivoted target, an operating-arm pivoted at one side of the target and extending past the end of the latter, and a connecting-link arranged to permit a limited movement of the arm without any appreciable movement  
80 of the target after the latter is set in position, substantially as described.

7. The combination, in a signal apparatus, of a pivoted bracket, a target carried thereby, an operating-arm pivoted at a point to one  
85 side of the pivot of the bracket and extending past said pivot, a link connecting the arm and bracket and arranged to permit a limited movement of the arm independent of the movement of the bracket after the latter is  
90 adjusted to position, and means for operating the arm, substantially as described.

8. The combination, in a signal apparatus, of a pivoted bracket having a cushioned bearing, two signal-targets, one secured to the  
95 bracket and the other suspended by a pivot in line with said bearings, a rotatable hub adapted to support a lantern, a pivoted lever connected loosely at one end to the hub and weighted at the other end and connected to  
100 said bracket, an operating-arm, a link connecting the latter and the bracket, and a hand operating device and connections, substantially as described.

9. The combination, in a signal apparatus,  
105 of a pivoted bracket having cushioned bearings, two signal-targets, one secured to the bracket and held normally horizontal thereby and the other suspended loosely between said bearings, a rotatable hub having a lateral  
110 loop and adapted to support a lantern, a pivoted lever engaging the loop at one end and weighted and connected at the other end to said bracket, an arm having a bearing in rear of the bracket and connected thereto by  
115 a link, a hand device, and connections between the latter and the arm, substantially as described.

10. The combination, in a signal apparatus, of a pivoted signal-target, a tell-tale arm capable of horizontal movement and pivotally  
120 supported at right angles to the line of the track and connected with said target to be swung vertically by the adjustment thereof across and away from the track, an audible  
125 signal upon the train adapted to be operated by contact with said arm when projected, and an operating device and connections for adjusting the target, substantially as described.

11. The combination, in a signal apparatus,  
130 of the adjustable signal-targets, a tell-tale arm connected therewith and pivoted to be swung across or away from the track and capable of being moved horizontally independently of



the targets, and a signal upon the train in line to be operated by said arm when projected, substantially as and for the purpose set forth.

5 12. The combination, with the signal-target of a railway-signal, of a pivoted tell-tale arm having an independent horizontal movement and operatively connected, as described, with said target to be swung vertically by the ad-  
10 justment thereof across or away from the track, and an audible-signal and a brake-setting device upon the train in line to be operated by said arm when projected, substantially as and for the purpose set forth.

15 13. In a signal apparatus, the combination, with the targets, operating device, and connections thereof, of a tell-tale arm connected to be moved into and out of position on the movements of the target and having a second  
20 independent movement at right angles to the first, substantially as described.

25 14. In a signal apparatus, the combination, with the targets, operating device, and connections thereof, of a tell-tale arm connected with and movable vertically upon the adjustment of the targets and having also a second independent movement in a horizontal plane, a locking device constructed to normally resist

the horizontal movement of the arm and adapted also to engage and temporarily se- 30  
cure the arm in place after its movement horizontally, and a safety device upon the train in line to contact with and be operated by said arm, substantially as described.

15. In a signal apparatus, the combination, 35  
with the targets, operating device, and connections thereof, of a tell-tale arm pivotally supported to move vertically with the targets and having a second independent movement in a horizontal plane, and diverging arms  $b' b'$ , 40  
substantially as described.

16. In a signal apparatus, the combination, with the targets, operating device, and connections thereof, of a tell-tale arm pivotally sup-  
ported to move vertically upon the adjust- 45  
ment of the targets and having also an independent movement horizontally, a spring engaging the arm, and diverging arms  $b' b'$ , sub-  
stantially as described.

In testimony whereof I have signed my 50  
name to this specification in the presence of two subscribing witnesses.

HOBERT B. POTTER.

Witnesses:

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W. J. RICHARDSON, Jr.