(No Model.)

J. J. HANNAN.

INDICATOR FOR BRAKE PISTONS.

No. 469,823. Patented Mar. 1, 1892.

FIG. 1.

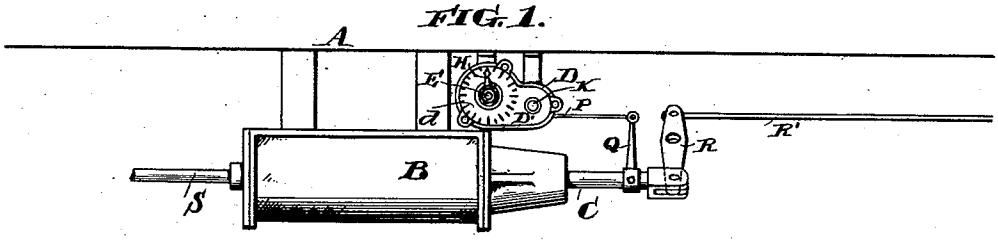


FIG. 2.

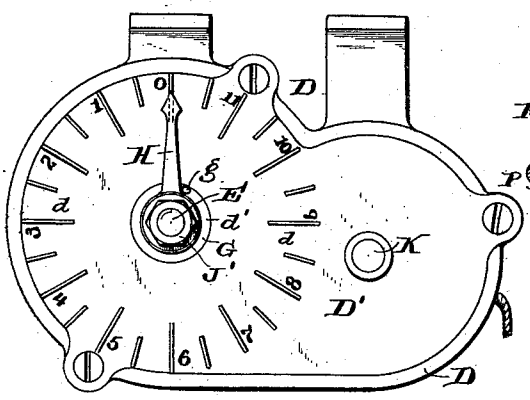


FIG. 3.

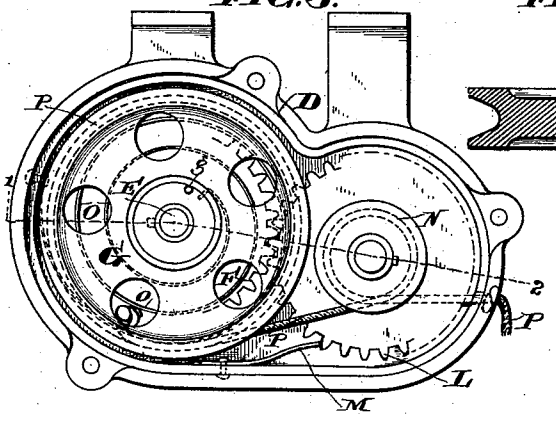


FIG. 7.

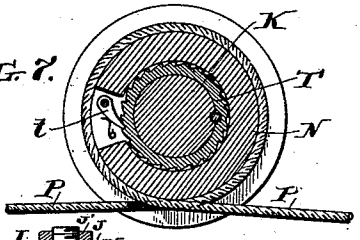


FIG. 4.

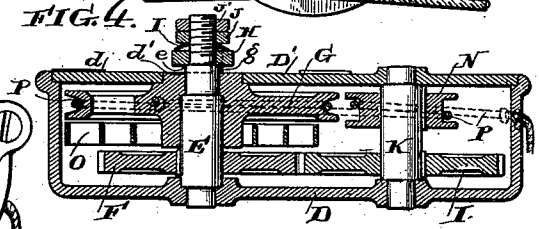


FIG. 5.

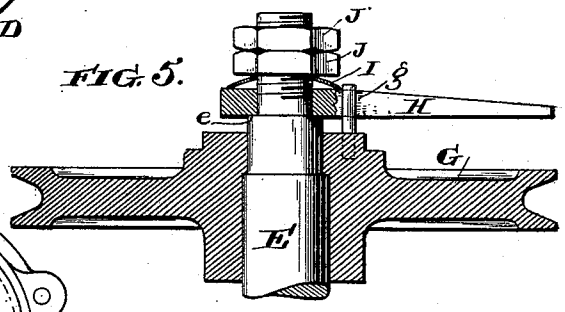
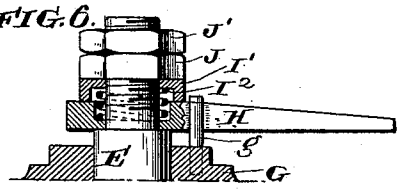


FIG. 6.



Witnesses:
Henry Dumm
Joshua Maltack, Jr.

Inventor:
James J. Hannan
by his atty.
Francis T. Chambers

UNITED STATES PATENT OFFICE.

JAMES J. HANNAN, OF COLUMBUS, OHIO.

INDICATOR FOR BRAKE-PISTONS.

SPECIFICATION forming part of Letters Patent No. 469,823, dated March 1, 1892.

Application filed September 1, 1891. Serial No. 404,468. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. HANNAN, of Columbus, county of Franklin, State of Ohio, have invented a certain new and useful Indicator, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to a certain improvement in indicators for showing the extent of the reciprocatory motion. It is designed chiefly as an indicator to show the travel of the piston in an air-brake cylinder, my object being to so arrange the mechanism that the indicator will always show the extent of the last stroke made by the piston. To do this it is of course necessary that the indicator-finger should move backward to or nearly to the zero-point between each of its forward motions to the point indicating the piston-travel; and it is also necessary that the finger should remain at the point indicating the piston-travel after the piston has made a stroke and until it makes another stroke. The device by which I have succeeded in filling the above conditions will be best understood as described in connection with the drawings, in which it is illustrated as embodied in simple mechanism, and in which—

Figure 1 is a view showing my indicator connected with the piston-rod of an air-brake cylinder. Fig. 2 is a front elevation of the indicator on an enlarged scale; Fig. 3, a similar view with the front plate of the indicator-casing removed; Fig. 4, a cross-sectional plan view taken on the line 1 2 of Fig. 3; Fig. 5, an enlarged sectional view of a portion of the mechanism; Fig. 6, a view illustrating the same parts as Fig. 5, but showing a modification in the construction of the device; and Fig. 7, a view illustrating another modification.

A indicates the framing of a car-platform, to which is attached an air-brake cylinder B, C being the piston-rod, R and R′ a lever and rod leading to the brakes, (not shown,) S an air-pipe leading to the head of the cylinder.

D is the casing containing the mechanism of the indicator; D′ the face-plate of the said casing, having formed or attached to its face a circular indicator-scale *d*.

d′ is an opening in the face-plate.

E is a shaft journaled in the casing and extending out through opening *d′* in the face-plate. A shoulder *e* is formed on the projecting end of the shaft E, and against this shoulder rests the indicator-finger H, which is clamped against it with sufficient force to make the finger turn with the shaft when no obstacle is interposed to prevent it. As shown in Figs. 4 and 5, a spring washer I rests upon the top of the indicator-hub, being held in place by the binding-nuts J J′.

In the modification shown in Fig. 6 a spiral spring I^3 rests in an annular cavity formed in the hub of the finger and in a washer I′, said washer being held in position and the spring under compression by means of jam-nuts J J′, as before. G is a pulley loosely journaled on the shaft E, and having a projecting finger *g*, which extends up so that it will engage with the finger H under proper conditions. O is a spring secured to the pulley G and to the casing, and so arranged that it will hold or retain the pulley by resilient pressure to one normal position, that position being that which will bring the finger *g* to the position shown in Fig. 2—that is to say, a position which permits the indicator-finger H to point to the zero-mark on the scale.

The parts above described constitute the essential devices of the indicator. In addition to these parts it is only necessary to provide mechanism which will simultaneously rotate the shaft E and the pulley G in opposite directions—that is to say, which will rotate the pulley G from right to left and the shaft E from left to right, or vice versa—this mechanism being set in operation by the reciprocatory movement the extent of which the indicator is to show. It is obvious, of course, taking the parts in the position indicated in Figs. 2 and 3, that the rotation of the pulley from right to left will cause the finger H to make a similar rotative movement, as the finger *g* is resting against it. The backward movement of the reciprocating object whose movement is to be indicated permits the pulley G to move back to its initial position; but it does not act upon the shaft E, and the finger H consequently remains in the position in which it was left by the action of the finger *g*, the next outward movement of the reciprocating object, however, causing the shaft E to move from left to right will carry

back the indicator H toward the zero-point, this backward movement continuing until it meets the advancing finger *g*, which again causes it to move forward on the scale to the point indicating the arc of rotation made by pulley G and the extent of the reciprocatory movement of the piston or other reciprocating object. It is obvious of course that the indicator will not move back to the zero-point except under the very shortest reciprocatory movements. This, however, is immaterial in practice, as under practical conditions the indicator will always move backward to a point on the scale which indicates less than the minimum stroke of the piston.

Referring again to the drawings, I will now describe the mechanism by which I prefer to impart the movements above described to the shaft E and pulley G. F is a gear-wheel secured to shaft E; K, a second shaft lying parallel to shaft E and also journaled within the casing. To shaft K is secured a gear-wheel L, which engages with the gear-wheel F and also a pulley N. It is necessary that the pulley N should engage the shaft, so as to turn with it in one direction, but not necessary that it should turn backward with the shaft, and therefore I prefer to journal the pulley N upon shaft F and to provide a ratchet T and pawl *t*, which will cause them to engage while the pulley is moving forward—that is to say, in the arrangement shown from right to left. P is a cord which is passed around and secured to the periphery of the pulley G, then engaged with the pulley N, and then passed out of the indicator-casing and connected with the reciprocatory part the movement of which is to be measured. In the plan shown it is secured to a standard Q, projecting upward from the end of the piston-rod C. As illustrated in the drawings, the cord P is wrapped around the pulley N, so that it will act upon the pulley by friction. It might, of course, be a sprocket-chain, in which case the pulley N will be a sprocket-pulley and it would not be necessary that the cord or chain should pass around it. The use of a sprocket-chain would be practicable when the ratchet-and-pawl device—such as is shown in Fig. 7—was used to connect the pulley N and shaft K, but not in the special arrangement shown when the pulley N is keyed to shaft K, as shown in Fig. 4, although this would be immaterial were either of the gear-wheels L or F secured to their shafts by the pawl-and-ratchet device.

The operation of the device as a whole is as follows: When the piston-rod C is thrust out, its connected arm Q draws out the cord P. This cord, being fast to pulley G, causes it to revolve from right to left, and, being drawn taut around the pulley N, it turns that pulley and the shaft K in the same direction. The gear L of course turns with shaft K and, engaging with gear F, causes the shaft E to turn in the opposite direction to that in which the pulley G is turning. The indicator-finger H, being clamped by spring I to shaft E, moves with it backward, or from left to right, until the pin *g* of the pulley G comes in contact with it, when it is carried forward by the said pin to the full extent of its movement from right to left. As soon as the outward movement of piston-rod C is completed, and when it moves back, the cord is drawn back again by the action of the spring O returning the pulley G to its normal position. The bite of the cord around pulley N is released, so that the pulley does not turn backward and the shafts K and E are not moved until the next forward motion of the cord. The indicator-finger H therefore remains stationary at the point to which it is pushed by pin H until another forward motion of the cord causes shaft E to revolve backward. To guard against any possible backward movement which would disturb the position of the indicator-finger, I prefer to use the pawl-and-ratchet connection, as shown in Fig. 7, so that even if the pulley does turn it will not turn the shaft upon which it is journaled.

I have shown the device by which motion is communicated from shaft K to shaft E as a pair of gear-wheels; but it will of course be understood that any of the well-known devices for communicating motion in opposite directions from one shaft to another are the full equivalents of such gears and may be used without departure from my invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an indicator, the combination of a shaft E, an indicator-finger H, mounted on said shaft, but turning with it by frictional contact only, a pulley G also journaled on said shaft and having a finger *g*, adapted to engage the finger H, a spring O, arranged to hold and return pulley G to its normal position, and means for simultaneously actuating the shaft E and pulley G in opposite directions, all substantially as and for the purpose described.

2. In an indicator, the combination of a shaft E, an indicator-finger H, mounted on said shaft, but turning with it by frictional contact only, a pulley G also journaled on said shaft and having a finger *g*, adapted to engage the finger H, a spring O, arranged to hold and return pulley G to its normal position, a gear-wheel F, secured to said shaft, a shaft K, a gear-wheel L, secured to said shaft and engaged with gear F, a pulley N, secured to shaft K, and a cord P, secured to pulley G and operatively engaged with pulley N, as described.

JAMES J. HANNAN.

Witnesses:
H. E. STONEMAN,
S. P. BUSH.