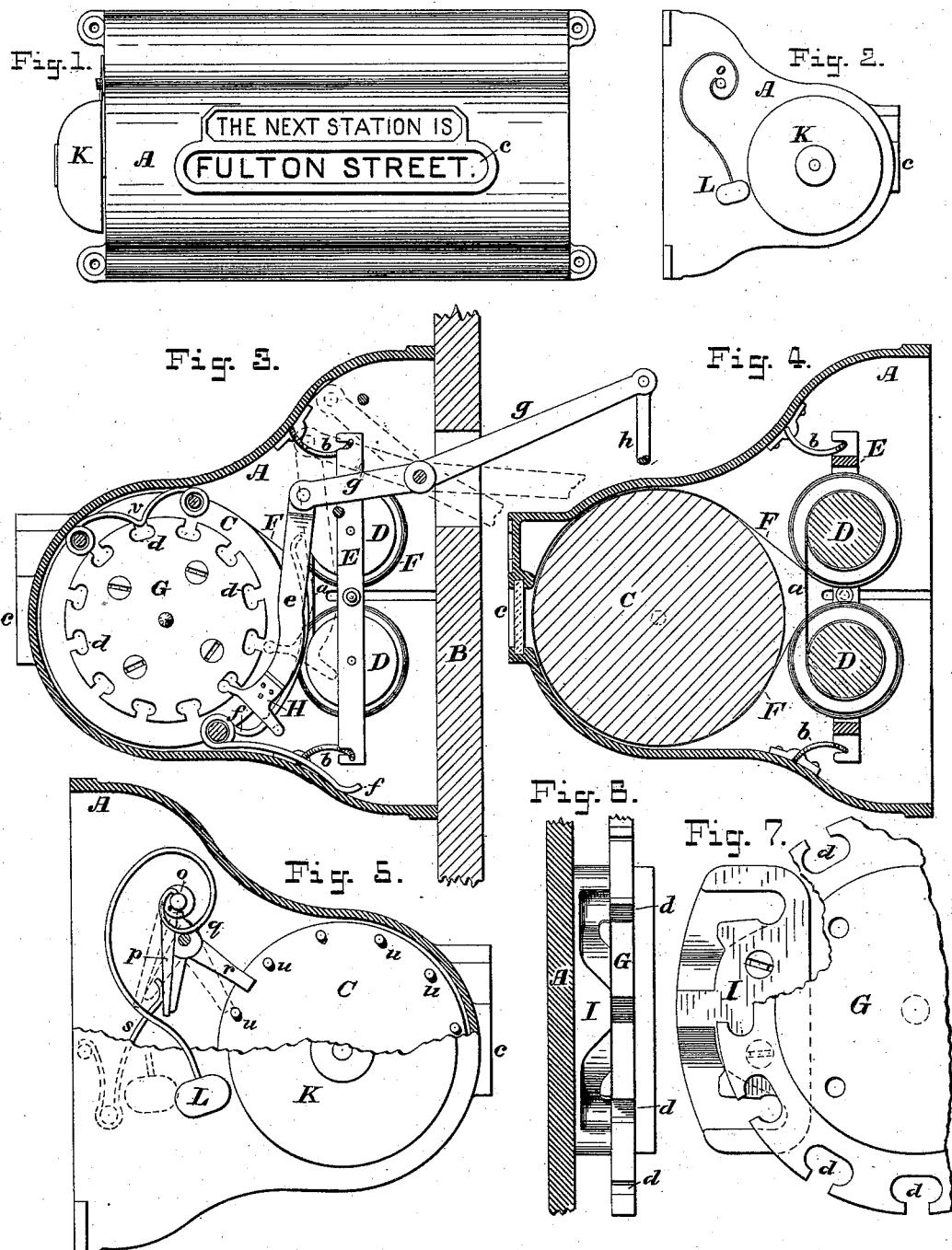


J. BUTCHER.  
Station-Indicator.  
No. 217.198. Patented July 8, 1879.



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By his Attorneys,  
Burke, Fraser & Commett

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Fig. 8.

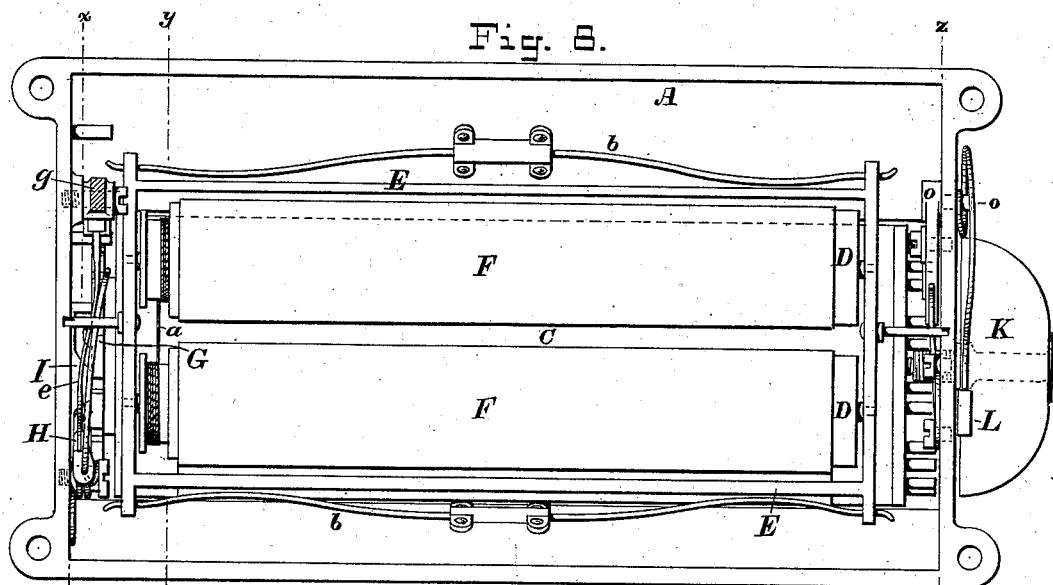


Fig. 9.

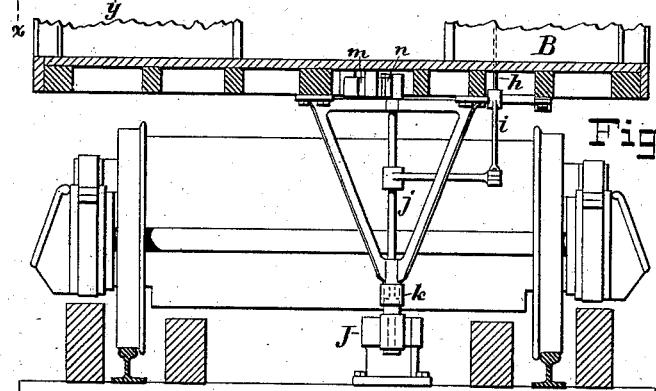


Fig. 10.

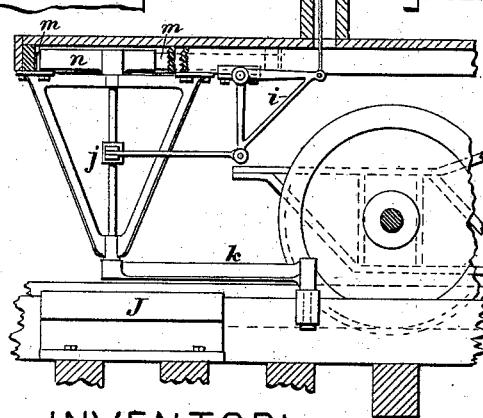
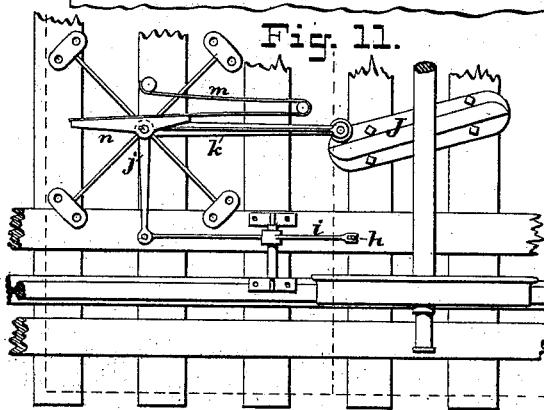


Fig. 11.



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# UNITED STATES PATENT OFFICE.

JOSEPH BUTCHER, OF NEW YORK, N. Y.

## IMPROVEMENT IN STATION-INDICATORS.

Specification forming part of Letters Patent No. **217,198**, dated July 8, 1879; application filed November 5, 1878.

*To all whom it may concern:*

Be it known that I, JOSEPH BUTCHER, of the city, county, and State of New York, have invented certain Improvements in Station-Annunciators, of which the following is a specification.

The object of this invention is to announce to the occupants of a car or conveyance the name or designation of the next station or street-crossing ahead in the line of travel, so that they may not be carried beyond the point at which they wish to get off, and it relates to a device to be operated automatically or by hand, arranged to exhibit to the passenger in the conveyance the name or number of the next station ahead. It also provides for sounding a bell or gong, or their equivalent, at the moment the change takes place, so as to attract the attention of the occupants of the car.

The entire apparatus is adapted to operate equally well whether the car be run backward or forward, and to operate automatically, all as will be hereinafter set forth.

In the drawings, Figure 1 is a front, and Fig. 2 is an end, elevation of my annunciator on a small scale. Fig. 3 is a transverse section on a large scale, taken in the plane of the line  $x$ , Fig. 8. Fig. 4 is a transverse section taken in the plane of the line  $y$ , Fig. 8. Fig. 5 is a transverse section in the plane of the line  $z$ , Fig. 8. Figs. 6 and 7 are enlarged detail views of the cam and notched wheel. Fig. 8 is a rear elevation, showing the interior mechanism. Figs. 9, 10, and 11 are views, illustrating the mechanism for automatically operating the annunciator, being, respectively, vertical, transverse, and longitudinal sections and a plan.

A is a casing, arranged, as a matter of convenience, to be screwed to some interior part of a car, B, so as to be visible to the occupants.

C is a roller mounted in bearings in the end plates of the casing; and D D are rollers hung in a frame, E, pivoted in slots at the ends of the casing. The roller C should, by preference, be roughened or rendered tractive on its surface. This may be done by means of a coating of emery or grit, or by an india-rubber surface.

F is a strip on which are printed or other-

wise marked the names or numbers to designate stations or streets on the line of travel. The ends of this strip are attached one to each of the rollers D, and the bight passes around the roller C.

By turning the roller C the strip is caused to roll upon one of the rollers D and unroll from the other. To facilitate this operation, a cord or thread, a, preferably of catgut, is arranged to wind from one roller to the other, winding upon the roller as the strip unwinds therefrom.

To keep the strip taut and in close contact with the roller C, as well as to compensate for the increasing and decreasing diameters of the rollers as the strip winds and unwinds therefrom, the frame E is hung on pivots at the ends, and is acted upon by yielding springs b b, secured to the casing and arranged to press upon the frame at the corners or elsewhere.

By rotating the roller C the names on the strip F may be brought in succession to an opening at c in the front of the case, so as to be easily read by the occupants of the car. This rotation is produced intermittently by means of the following-described mechanism:

To the end of the roller C is attached a wheel, G, (see Fig. 3,) with notches or recesses d d in its periphery, whereby it and the roller are rotated. The bottoms of these notches are rounded, and are somewhat wider than the opening at the periphery.

H is a pawl, the shank e of which is elastic. The nose of this pawl is narrow enough to drop into the recesses d d when brought into direct coincidence with them, and it is pressed toward the wheel G by a spring, f, or its equivalent. The pawl is arranged to stand normally a little out of the plane of the wheel G, so that to engage the notches the head must be sprung or pressed over laterally. To accomplish this a cam, I, is provided, constructed substantially as represented in Figs. 6 and 7. This consists essentially of an oblique cam-groove, which deflects the pawl to the plane of the wheel G, as well as raises it to the level of its periphery, so that the nose may drop into the notch coincident therewith.

When engaged the pawl drives the wheel around, the wall of the cam-groove interpos-

ing to prevent the escape of the nose laterally, and the peculiar shape of the nose and notch prevents it from lifting out. Just as the stroke of the pawl is terminated the notch containing the nose of the pawl passes the end of the wall of the cam-groove, and the elasticity of the pawl-stem *e* forces the nose laterally from the notch into the lower end of the cam-groove. On the pawl being released it is again driven up the groove, and its nose drops into the next notch, ready for the succeeding stroke.

The cam *I* is double, as will be seen, to enable the pawl to rotate the roller in either direction.

The rear end of the pawl or stem is attached to a pivoted lever, *g*, one end of which is linked to an operating-rod, *h*. This rod extends down to the bottom of the car, and takes hold of one arm of a bell-crank, *i*, which vibrates in a vertical plane, the other arm of which connects by a rod with an arm of another bell-crank, *j*, which vibrates in a horizontal plane. The other or free arm, *k*, of the latter crank is or may be provided with a friction roller or wheel to engage a cam-piece, *J*, secured to the track or some fixed part, preferably between the rails. These cam-pieces should be arranged so as to operate the annunciator in whichever direction the car may be running; but in the case of a double-track road, where the travel is in but one direction on the same track, cams will be provided on each track, arranged to drive the indicator-strip as desired.

I am aware that cams on the track have been used to automatically operate indicators; but in these the upper surface has been relied on to actuate the mechanism through a pendent rod. In such a case it is obvious that the unequal depression of the car-body on its springs at different times would seriously affect the accurate working of the device.

In my arrangement the cam acts through its lateral faces upon the operating-arm *k*, and moves it in a horizontal plane, so that it is only necessary that the cams be high enough to insure the accurate operation of the mechanism.

The operation, so far as described, is as follows: As the car provided with my annunciator reaches any station or passes any street-crossing, the roller on the arm *k* impinges against the cam-piece *J*, which deflects it to one side or the other, depending upon the direction in which it approaches the same. This movement acts, through the cranks *i j*, rod *h*, and lever *g*, to operate the pawl *H*, and, through it and the wheel *G*, to rotate the roller *C*. This roller, as before stated, feeds the strip *F* along until the name of the next succeeding station or street appears at the opening *c* in the casing. When the cam-piece *J* is passed, a spring, *m*, (see Fig. 11,) retracts all of the parts and arranges them in their normal positions ready for the next shift. On reaching the end of the route or any point on the road, the car may be run backward to the

place of starting, and the stations in both directions will be properly indicated automatically. Indeed, if the cam-pieces are properly arranged, the car may be run back and forth over any section of the road, and the indicators will properly announce the stations without requiring any alteration of the device. This result is partly due to the double cam shown in Figs. 6 and 7 and the peculiar formation of the pawl and notches in the wheel *G*.

It will also be observed that on the vertical spindle of the bell-crank *j* is fixed a plane-faced follower, *n*, against which the spring *m* bears. Thus, when the arm *k* is pushed in either direction by the cam-piece *J*, one end of this follower is caused to press back the spring, and the spring, reacting, returns the parts to their normal positions in whichever direction the arm *k* is moved. Though shown as placed beneath the car, the follower and spring, *n m*, may as well be connected with the mechanism at or near the annunciator-case, if preferred.

To announce the shifting of the strip *F* to the occupants of the car, I provide a bell or gong, *K*, mounted on or near the case *A*.

At the same moment that the instrument is operated this gong is sounded by means of the following-described mechanism: *L* is a hammer, the stem of which has bearings at *o* in the case. On the inner end of the projecting bearing is fixed a hammer-arm, *p*, which is a straight piece arranged to rest against a follower, *q*, hung on a pin in the case. This follower has an arm, *r*, which projects radially with respect to the roller *C*. A spring, *s*, keeps the hammer-arm pressed normally against the follower. The hammer stands close to the gong.

In the end of the roller *C* are fixed pins *u u*, arranged to engage the follower-arm *r* in whichever direction the roller *C* may be rotated. These pins are arranged to correspond with the notches in the wheel *G*, so that the gong will be sounded the moment the strip is shifted. In whichever direction the roller *C* is turned, a pin, *u*, acting upon the arm *r* of the follower *q*, lifts the hammer-arm and draws back the hammer. As the roller moves on the pin escapes from the arm *r* and allows the hammer to strike the bell a smart blow.

To prevent the roller *C* from rotating too far, a spring, *v*, may be arranged, as shown in Fig. 3, to engage the notches *d d* and act as an intermittent check.

It is obvious that, in lieu of the pawl-stem *e* being elastic, it may be stiff, and a separate spring be arranged to press it laterally away from the wheel *G*.

It will be seen that the arms of the followers *n* and *q* are unequal in length. The object of this is to compensate for the difference in leverage where they act upon the hammer arm or spring, and to equalize the power required to operate the instrument in whichever direction the train is run.

The precise form of the cam-piece *J* is not

essential so long as it properly actuates the mechanism. I have shown in plan, Fig. 11, a good arrangement for the purpose.

I wish it understood that I am aware that "station-indicators," so called, provided with annunciators, have before been invented and patented; but so far as I am aware none of them possess the advantages of the one herein described.

I claim—

1. The means employed to compensate for the varying sizes of the rollers D D as the strip is wound on and off the same, and to keep the said strip stretched, which consists of a frame in which the said rollers are mounted, pivoted at its center on lugs having bearings in slots or grooves, and suitable springs to keep the frame pressed normally away from the roller C, substantially as set forth.

2. The combination of a strip having the names or designations of the stations or crossings marked thereon with a shifting-roller, C, and take-up rollers D D, the latter connected by a driving-cord, a, or its equivalent, whereby the roller giving off the strip causes it to be taken up on the other, substantially as set forth.

3. The combination of the roller C, strip F, rollers D D, connected and operating substantially as shown, the pivoted frame E, and the springs b b, all arranged substantially as set forth.

4. The roller C, strip F, rollers D D, wheel

G, provided with notches, substantially as shown, the pawl H, cam I, and a suitable operating-arm, g, all arranged and combined substantially as set forth.

5. The gong or annunciator K, the hammer L, hammer-arm p, follower q, with arm r, roller C, provided with pins u u, and the spring s, all arranged to operate substantially as set forth.

6. The combination of the cam-piece J, the arm k, the follower n and spring m, and the operating-rods g h, whereby the indicator-strip is shifted, the said rods being connected with the arm k through the medium of suitable mechanism, substantially as set forth.

7. The roller C, provided with a notched plate or wheel, G, at one end and pins u u at the other, a gong or other annunciator, K, arranged to be sounded by the rotation of the roller C, a pawl, H, arranged to rotate the roller intermittently in either direction automatically without shifting, a strip, F, on which are marked the names of the stations or stopping-places, and rollers D D, to carry the strip, all combined and arranged to operate substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOSEPH BUTCHER.

Witnesses:

ARTHUR C. FRASER,  
HENRY CONNETT.