

Nov. 20, 1923.

1,475,024

G. A. MORGAN

TRAFFIC SIGNAL

Filed Feb. 27, 1922

2 Sheets-Sheet 1

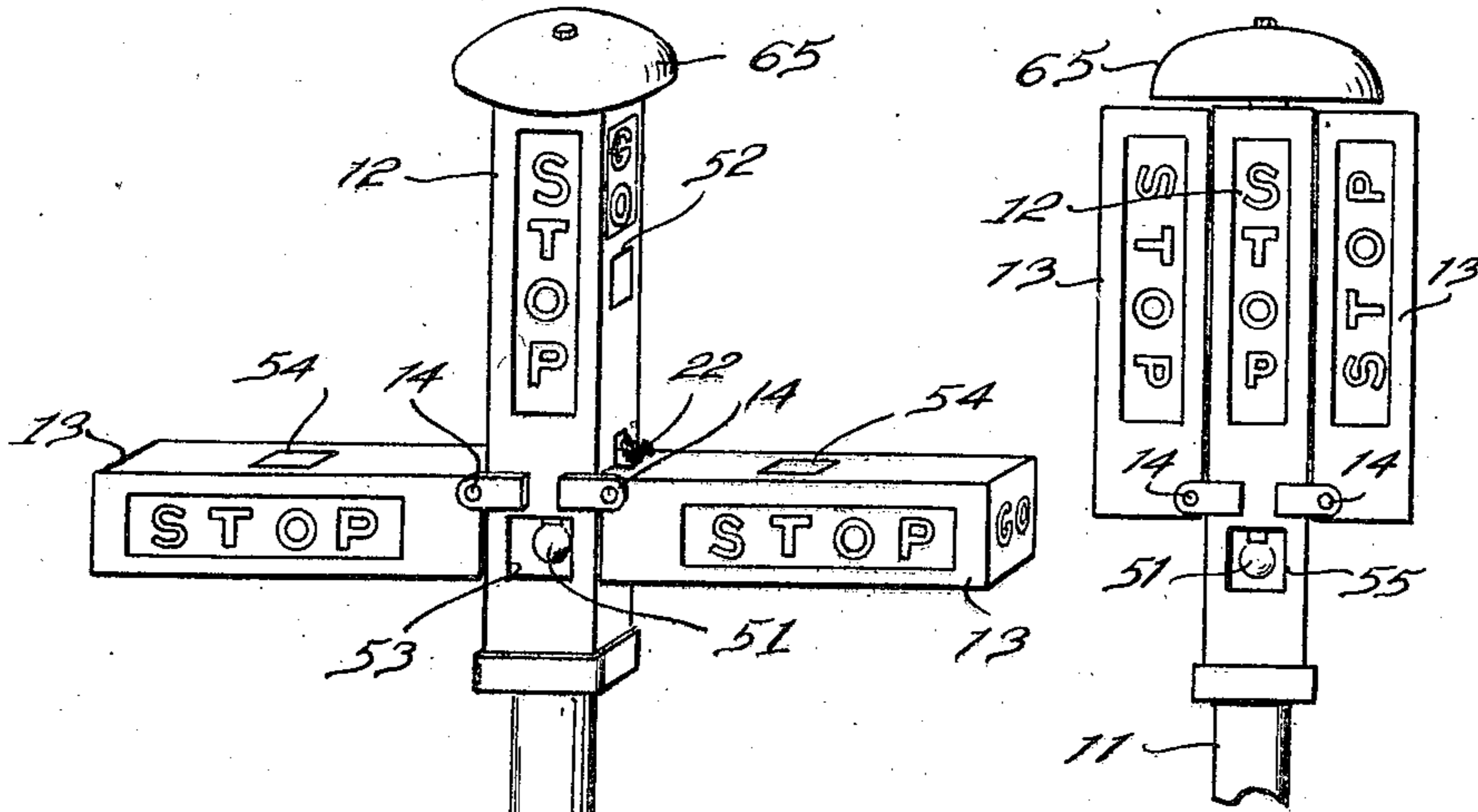


FIG. 2

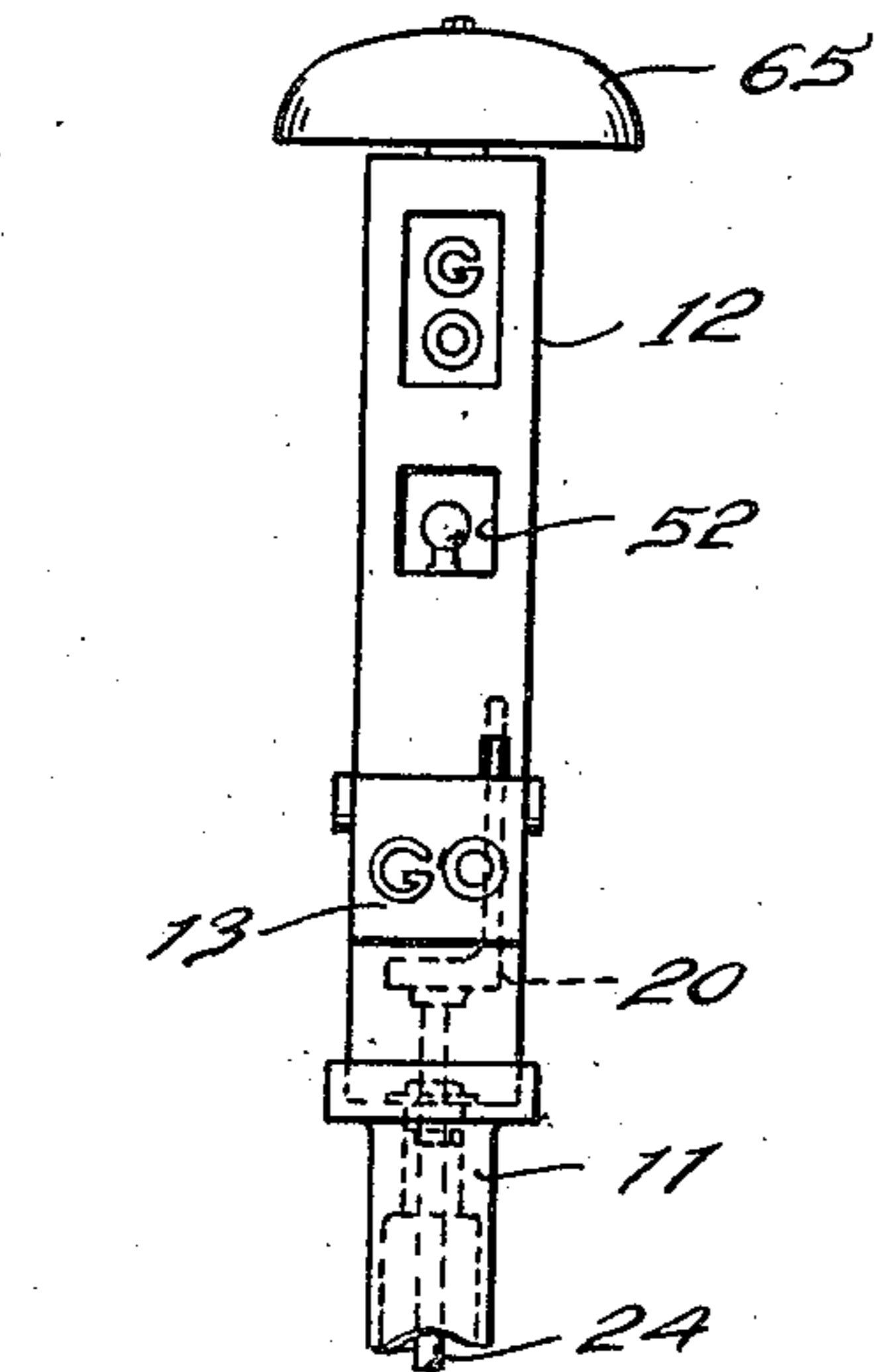


FIG. 3

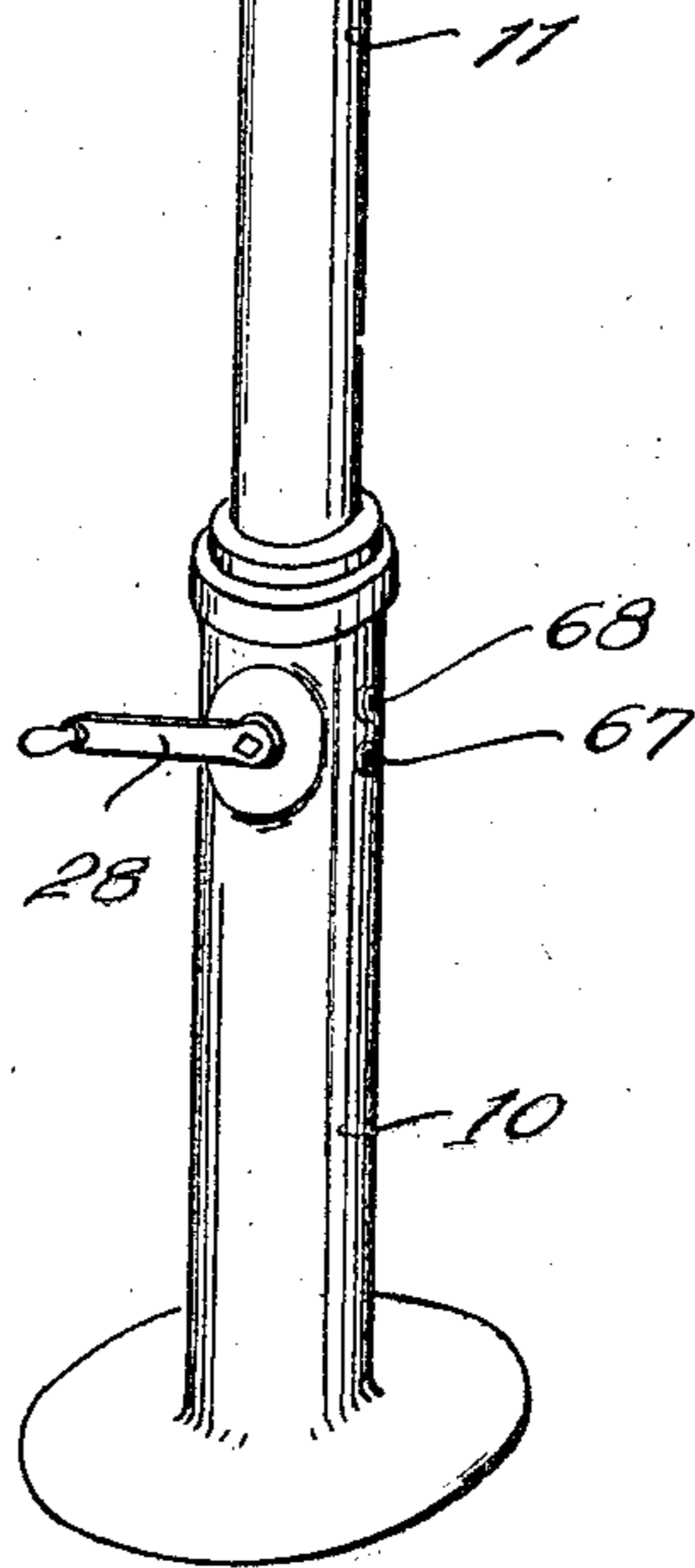


FIG. 1

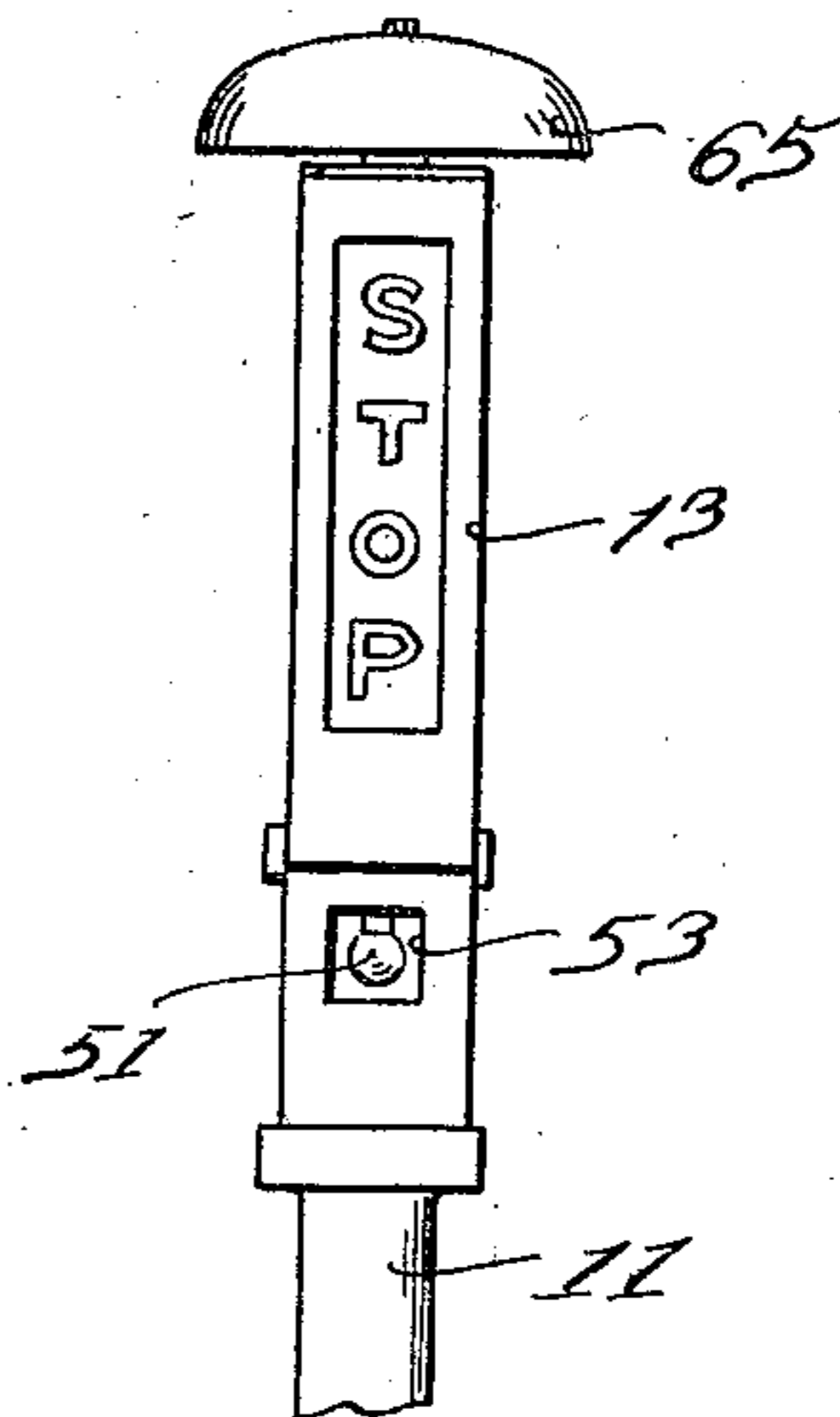


FIG. 4

INVENTOR  
Garrett A. Morgan,  
By Walter Macklin,  
ATTORNEYS

Nov. 20, 1923.

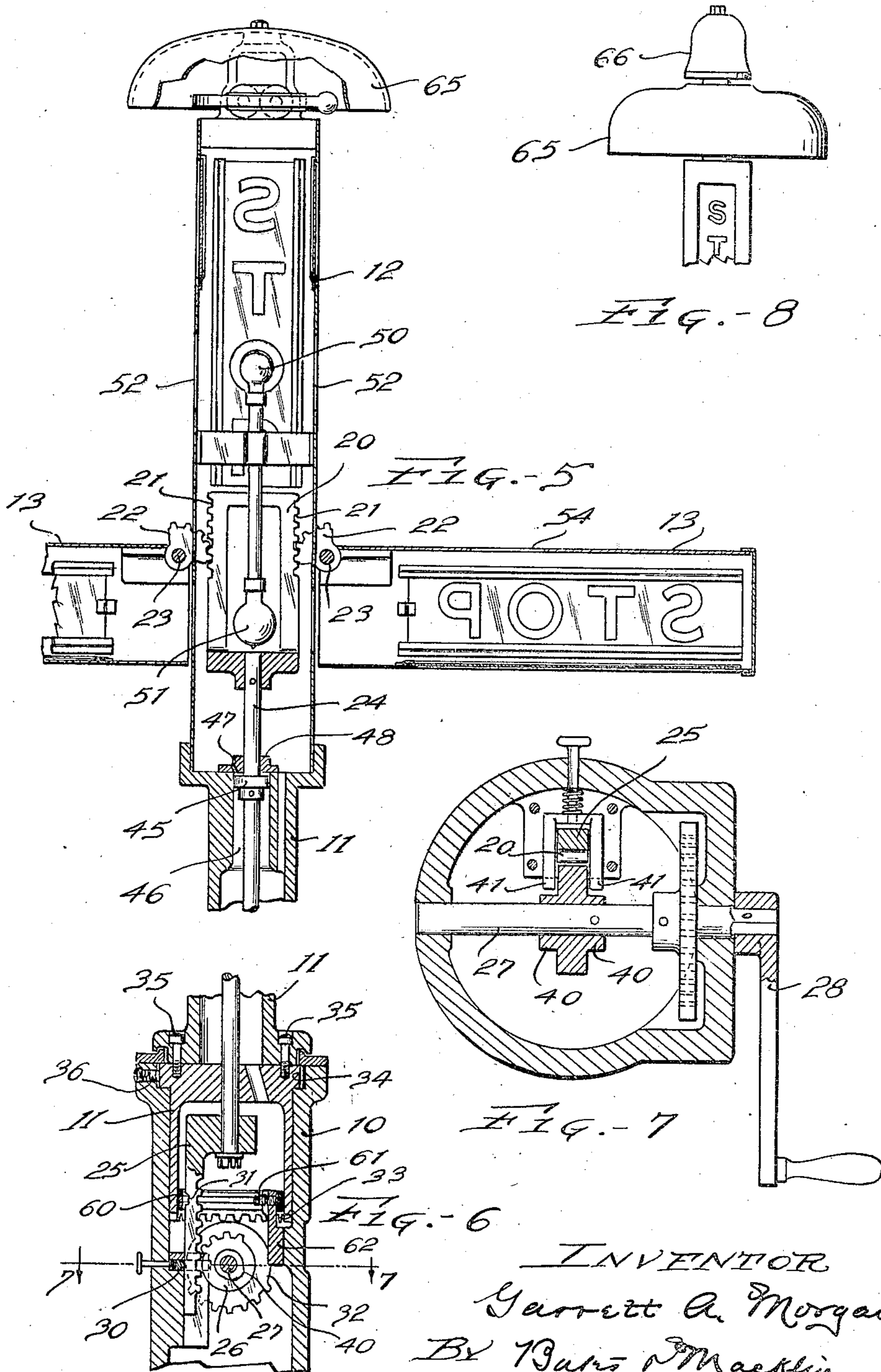
1,475,024

G. A. MORGAN

TRAFFIC SIGNAL

Filed Feb. 27, 1922

2 Sheets-Sheet 2



INVENTOR  
Garrett A. Morgan  
BY Paul Macklin,  
ATTORNEYS

# UNITED STATES PATENT OFFICE.

GARRETT A. MORGAN, OF CLEVELAND, OHIO.

TRAFFIC SIGNAL.

Application filed February 27, 1922. Serial No. 539,403.

*To all whom it may concern:*

Be it known that I, GARRETT A. MORGAN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in a Traffic Signal, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to traffic signals, and particularly to those which are adapted to be positioned adjacent the intersection of two or more streets and are manually operable for directing the flow of traffic.

One of the objects of my invention is the provision of a visible indicator which is useful in stopping traffic in all directions before the signal to proceed in any one direction is given. This is advantageous in that vehicles which are partly across the intersecting streets are given time to pass the vehicles which are waiting to travel in a transverse direction; thus avoiding accidents which frequently occur by reason of the over-anxiety of the waiting drivers, to start as soon as the signal to proceed is given.

Another object is the provision of a semaphore signal which is useful by night as well as by day and which is arranged to be easily and automatically operable by the traffic director. In addition, my invention contemplates the provision of a signal which may be readily and cheaply manufactured.

To this end, I provide a signal wherein the direction indicating arms are pivotally supported and adapted to be moved vertically for stopping the flow of traffic and then to be revolved and dropped to indicate a right of way to vehicles moving in another direction. The raising and revolving movements of the arms are adapted to be accomplished by the turning of a crank, and suitable mechanism actuated by the crank is provided for automatically indexing the arms to the required position, and for permitting their proper functioning in accordance with the wishes of the traffic director.

The means for accomplishing the above objects will be fully set forth in the following description which relates to the drawings, and the essential characteristics

of my invention will be summarized in the claims.

In the drawings, Fig. 1 is a front elevation of a semaphore signal constructed according to my invention; Fig. 2 is an elevation of the direction indicating means showing the arms in vertical position; Fig. 3 is a side elevation of the direction indicating portion when the arms are in horizontal position as shown in Fig. 1; Fig. 4 is a side elevation of the signal when the arms are in vertical position as illustrated in Fig. 2; Fig. 5 is a vertical section through a part of the signalling mechanism; Fig. 6 is a similar section adjacent the operating end of the signal; Fig. 7 is a transverse section taken on the line 7—7 in Fig. 6; and Fig. 8 is a fragmentary view illustrating the signal and alarm bells that may be used with my invention.

My invention is concerned with the provision of a traffic signal which enables a director to control the flow of traffic by stopping the movement thereof in all directions momentarily just prior to allowing the traffic to move in any one direction. Accordingly, in the embodiment shown I have illustrated a standard 10, having a support 11, revolubly mounted therein, which support is provided with direction indicating signals. The signal indicating means may comprise a box-like structure 12 which is rigid with the support 11, and a pair of arms 13 which are pivoted, as at 14, to the opposite sides of the support as illustrated in Fig. 1. The characters shown on the vertical indicator may be the usual "Stop" and "Go" words, as is customary for this class of work.

Each of these arms may be also a box-like structure having a rectangular cross section and having exposed faces provided with direction indicating characters. In the form illustrated the arms are each provided with "Stop" indicating characters on the side and bottom faces, and with "Go" characters on the end faces. The arms are pivoted so that when raised to the position indicated in Fig. 2, the "Go" characters on the indicator 12 are hidden from view, and the "Stop" characters on the bottom of the arms are then visible from the direction in which traffic was moving. The two positions of the arms showing this arrangement are illustrated in Figs. 3 and 4.

My invention is adapted to direct traffic by raising the semaphore arms to stop traffic which was moving in one direction and then by revolving the arms and releasing them, thus indicating the right of way for traffic in another direction. The means for raising the arms as shown in Figs. 5 and 6 may be accomplished by lowering a bracket 20 having racks 21 thereon, which actuate segments of a pinion 22, mounted as at 23, on the semaphore arms. This bracket is adapted to be lowered by moving a shaft 24, on which the bracket is mounted, downwardly. This shaft extends entirely through the support 11 and terminates within the standard 10 adjacent another rack 25, which is adapted to be actuated by a pinion 26 mounted on a crank shaft 27. This crank shaft is supported in the standard and is provided with a crank arm 28 which may be rotated by the director.

The segment 26 is shown as having teeth on only a portion of the periphery thereof so that the rack 25 is lowered only during a fractional turn of the crank shaft. Accordingly, to hold the arms in vertical position, I have illustrated a spring operated plunger 30 which is adapted to engage a notch 31 in the rack 25 just before the teeth in the pinion disengage those in the rack. In this way, the arms are held in vertical position whereby traffic is stopped in all directions as indicated in Figs. 2 and 4 respectively.

After the arms are raised and traffic is stopped, then to direct the flow of traffic in a direction different from the flow previous to the raising of the arms, I have illustrated suitable means for revolving the entire signal. This mechanism is adapted to function while the arms are held in vertical position. In Fig. 6, the means for revolving the indicators is shown as a gear 32 rigid with the shaft 27 and provided with teeth on a portion of the periphery thereof for engaging an annular gear 33, which may be integral with a sleeve 34, within the upper portion of the standard 10. This sleeve is shown as being rigidly attached by securing members 35 to the support 11, and since the vertical indicator is rigid with the upper portion of the support, it follows that whenever the gear 33 is rotated, the indicators are revolved.

The degree of turning usually desired is only 90°. Accordingly, I provide an indexing mechanism comprising a yieldable plunger 36 carried by the standard 10 and adapted to engage suitable notches 34. The number of teeth in the gear 32 are so arranged that they just disengage the gear 33 when the plunger 36 engages a succeeding notch. The turning of the indicators is preferably designed to be accomplished only after the arms are moved to vertical position, and this

is obtained by spacing the teeth on the gear 32 as illustrated in Fig. 6 so that the gear 33 is not engaged until the pinion 26 disengages the rack 25. Then, while the indicators are being turned, the arms may be released by providing a cam 40 which engages the arms 41, to which the plunger 20 is secured; and thereby releases the rack 25. The weight of the arms 13 causes them to drop to horizontal position.

When the arms are released, the inertia of the moving parts is apt to cause damage to the operating mechanism. Accordingly, I have shown a dashpot for absorbing the shock incident to the fall of the arms and I have shown this dashpot as embodying a piston 45 which is carried by the shaft 24 and is movable within a cylinder 46, forming part of the support 11. Suitable openings 47 may be provided in a closure 48 for regulating the outlet of air from the dashpot cylinder.

To adapt a signal constructed according to my invention for use at night, I have shown two electric lamps 50 and 51 which are mounted within the vertical indicator. These lamps may receive electrical energy either from a battery mounted within the standard 10 (not shown) or from any other suitable source of supply, such as through leads depending from an overhead line. The lamp 50 is positioned adjacent the openings 52 above the point of pivotal connection, while the lamp 51 is adjacent the openings 53 below the point of pivotal connection.

Thus, when the arms are in horizontal position, the lamp 50 illuminates characters on the indicator 12, while the lamp 51 gives an additional warning through openings 53. Then, when the arms are raised, two of the openings 53 hidden by the arms are uncovered, whereupon an illuminated signal is flashed out. This occurs substantially simultaneously with the covering of the "Go" signal shown on the vertical indicator. The "Stop" signal which is flashed when the arms are raised, is augmented by light from the lamp 50 which passes through openings 54 in the top of the arms, and illuminates the characters on the bottom face thereof.

When the source of electrical supply is carried by the standard, the current may be carried to the lamps by means of a collector ring 60 mounted on the sleeve 34, and a brush 61 carried by an arm 62 on the standard 10.

If desired, the signal may be provided with alarm mechanism as illustrated by bells 65 and 66 mounted at the top of the vertical indicators. One of these bells may be an alarm bell, while the other may be a signal bell. For selectively operating these bells, circuit controllers 67 and 68 may be mounted on the standard 10.

The operation of a signal constructed according to my invention is as follows:—Assuming that traffic is moving in the direction indicated by the "Go" characters in Fig. 1 and that the director desires to change the right of way, then the crank 28 is turned, whereupon the arms 13 are immediately raised by virtue of the rack and pinion connections actuated by the crank shaft 27. As soon as the arms are raised, the signal which was visible to the moving traffic now changes as shown in Fig. 4, while the signal visible to traffic which was formerly stopped remains the same. Thus, traffic is stopped in all directions. This is accomplished while the signal is moved about  $\frac{1}{4}$  of a revolution. Then as the crank is turned still further, the gear 32 engages the gear 33, whereupon the indicators are revolved while the arms are still held in vertical position. Then while the arms are being revolved, the cams 40 engage the latch arms 41, thereby releasing the plunger 30 and allowing the arms to drop to horizontal position. The dash-pot controlled by the piston 45 permits the arms to descend with slow motion so that by the time the crank has been turned a complete revolution, the arms are in substantially horizontal position and are automatically held in the desired direction by the indexing plunger 36. When the arms are lowered, the right of way is changed from the traffic which was flowing in the direction indicated by Fig. 1 to the traffic which was waiting to move in another direction.

When the lights are used, the signals are illuminated to indicate the direction of travel when the arms are in either vertical or horizontal position, and if desired, this may be augmented by bells which are actuated by the circuit controllers adjacent the hand of the director.

From the foregoing description, it will be seen that my invention provides a signal which is operable for enabling a director to control traffic more conveniently than is accomplished by merely revolving semaphore arms in a horizontal plane. A further advantage of my invention is that the movement of the semaphore arms is entirely automatic whereby the operator may devote his attention to the requirements of traffic and still accomplish his purpose without manually signalling, moving traffic to stop, until the direction of travel is changed.

Having thus described my invention, I claim:—

1. In a traffic signal the combination with a vertically disposed indicator, of semaphore arms pivoted thereto and revoluble thereon, said arms being disposed on opposite sides of the indicator, means for raising and lowering the arms and crank mechanism for controlling said means, said mechanism being so arranged that the arms are raised

during the initial turning of the crank and are then revolved upon continued turning of the crank.

2. A traffic signal comprising in combination, a standard, a vertical indicator carried thereby, a semaphore arm pivoted to the indicator, a crank carried by the standard, means associated with the crank for raising the arm and subsequently revolving the indicator, and other means for permitting the arm to be lowered in a position at right angles to the former position when the crank has been turned further.

3. In a traffic signal, the combination with a standard, of a revoluble indicating member carried thereby, semaphore arms disposed on opposite sides of said member and pivoted thereto, a crank shaft projecting laterally through the standard, mechanism within the standard and member for raising the arms to vertical position subsequently revolving the member and then lowering the arms, whereby traffic is momentarily stopped in all directions and then subsequently permitted to flow in another direction, said mechanism being so arranged that the signal is actuated to automatically stop traffic in all directions on each operation of the crank shaft.

4. In combination, a standard, a revoluble member projecting upwardly therefrom, semaphore arms pivoted to the indicator and disposed on opposite sides thereof, a shaft extending vertically through the member, rack and pinion means at each end thereof for raising said arms, a crank actuated member carried by the standard for controlling the rack and pinion means, a latch carried by the standard for retaining the shaft in lowermost position, and a cam controlled by the crank shaft for releasing the latch, whereby the arms are permitted to drop to horizontal position.

5. In combination, a standard, a revoluble member carried thereby, a vertically disposed indicator secured to the upper end of the member, semaphore arms pivotally disposed on opposite sides of the indicator, mechanism extending within the indicator, a standard for raising the arms, a crank actuated mechanism carried by the standard, said last mentioned mechanism being so arranged that the arms are raised during the initial turning of the crank shaft and then revolved upon continued turning of the shaft.

6. In combination, a standard, a hollow member projecting upwardly therefrom, an indicator rigid with the upper end of said standard, semaphore arms pivoted to the indicator, mechanism controlled from the standard for actuating the arms to move them in a vertical plane and for revolving them with the indicator to a new position, means associated with the standard for in-

dexing the indicator to the proper position, means associated with said standard for retaining the arms in a vertical position during a portion of the turning operation and  
5 for releasing the arms when moved to a new position, and a dash pot associated with said member for cushioning the shock incident to the fall of said arms.

7. In a traffic signal, the combination with  
10 a vertical indicator having openings in opposite sides thereof, of a semaphore arm piv-

oted thereto below the openings, said arm having openings in the upper wall thereof which are adapted to register with openings in the indicator when the arm is raised to  
15 vertical position, a lamp within the indicator adjacent the openings therein, and means for operating said arm.

In testimony whereof, I hereunto affix my signature.

GARRETT A. MORGAN.