April 10, 1951

G. R. HALL

TRAFFIC COUNTER

2,547,937

Filed June 5, 1946

2 Sheets-Sheet 1

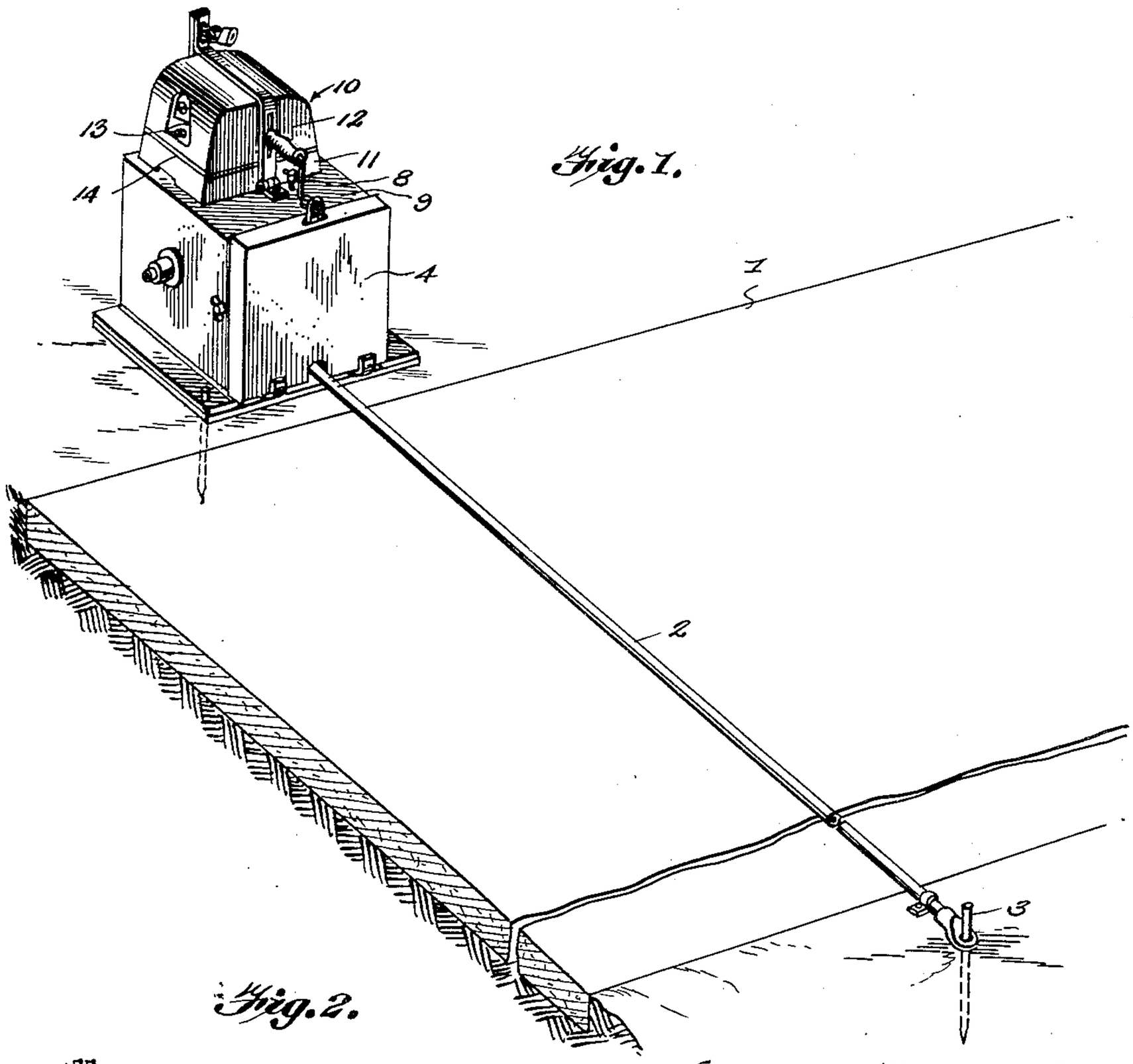


Fig. 1.

Fig. 2.

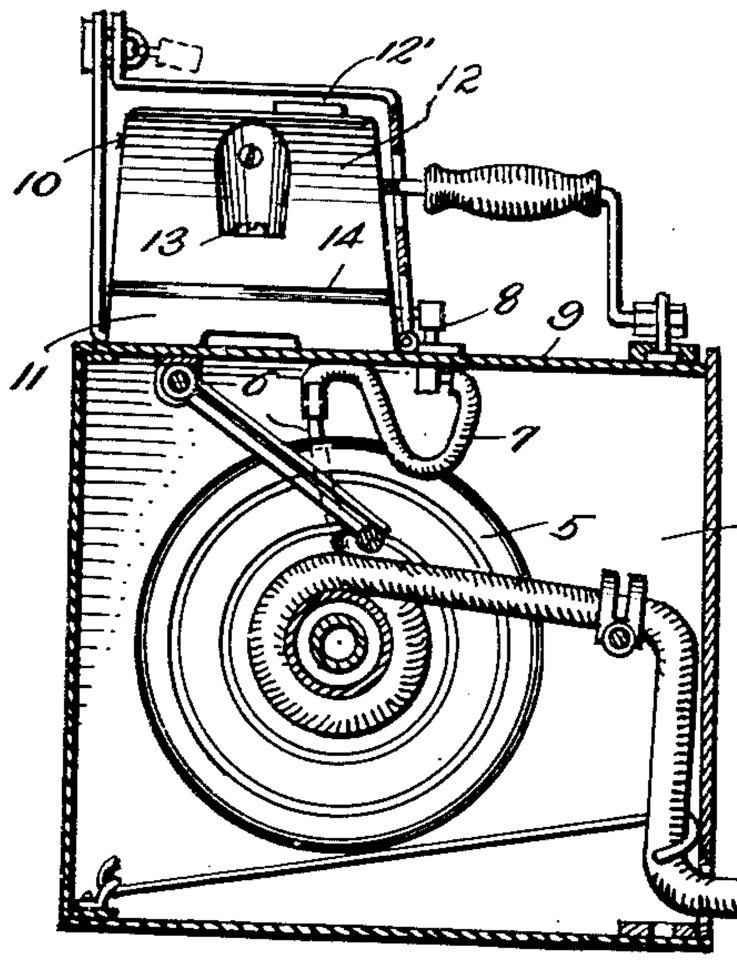
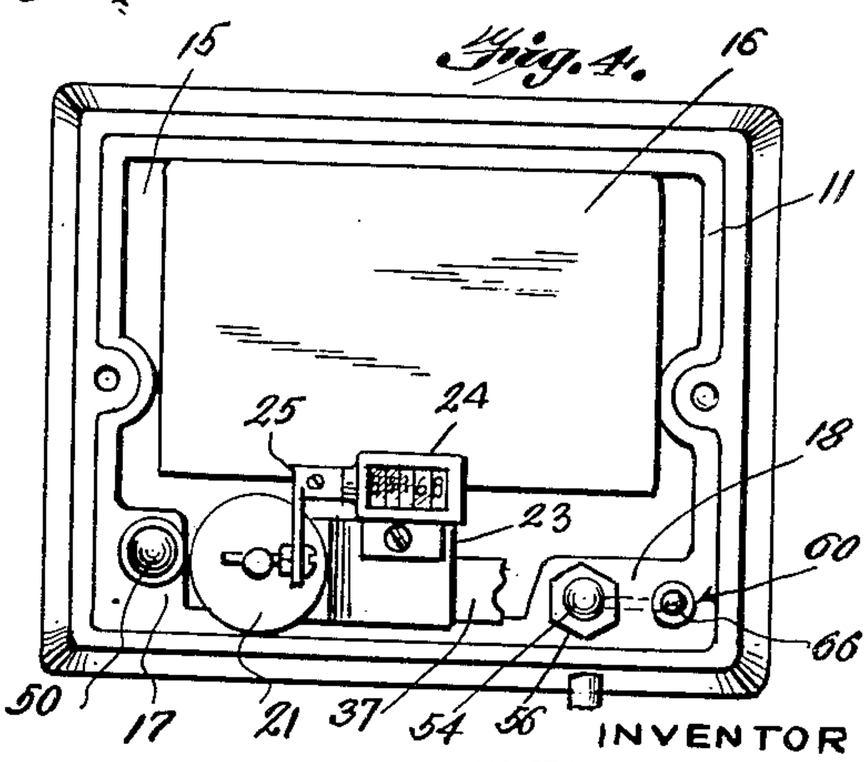


Fig. 4.



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2 Sheets-Sheet 2

Fig. 3.

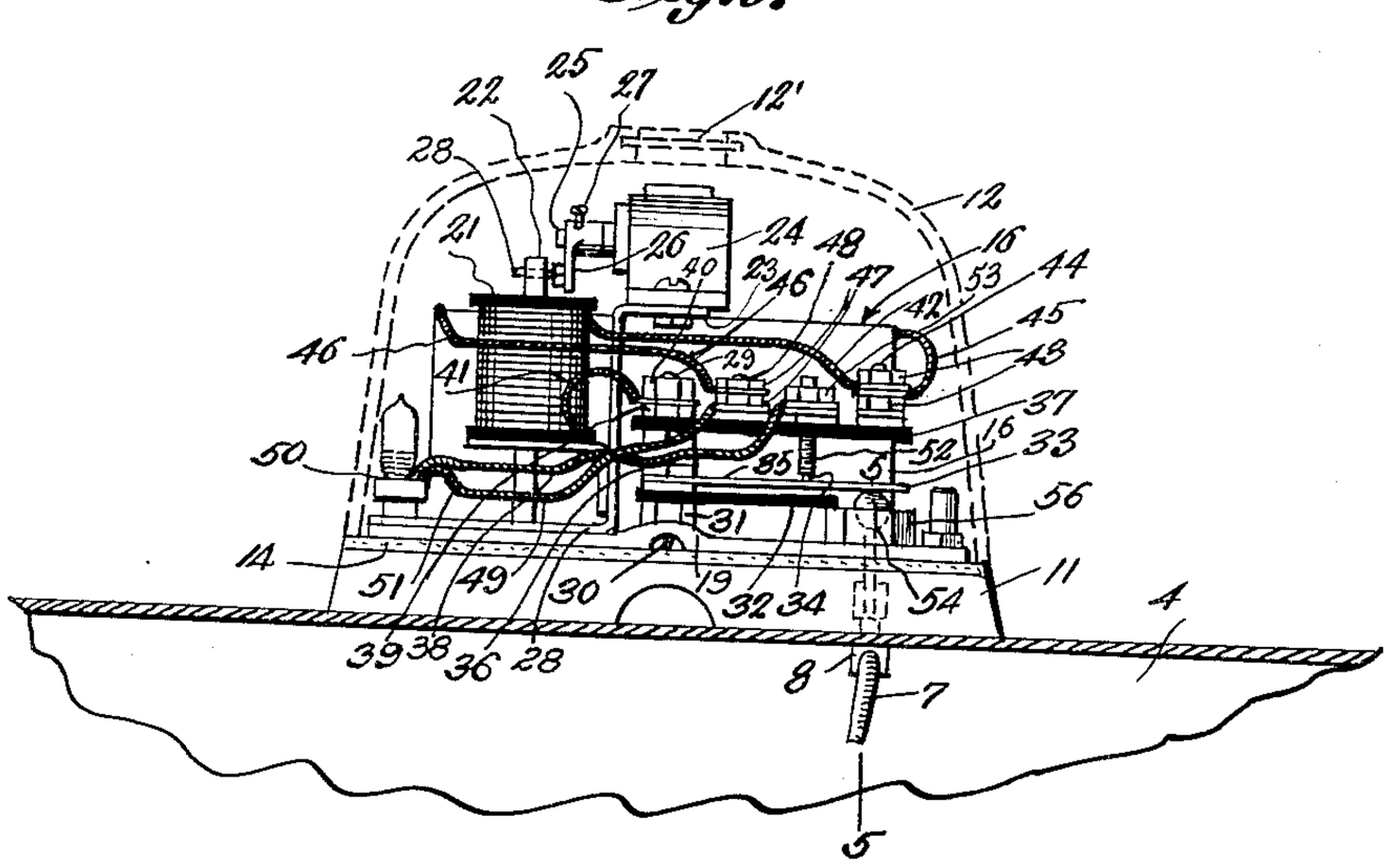


Fig. 5.

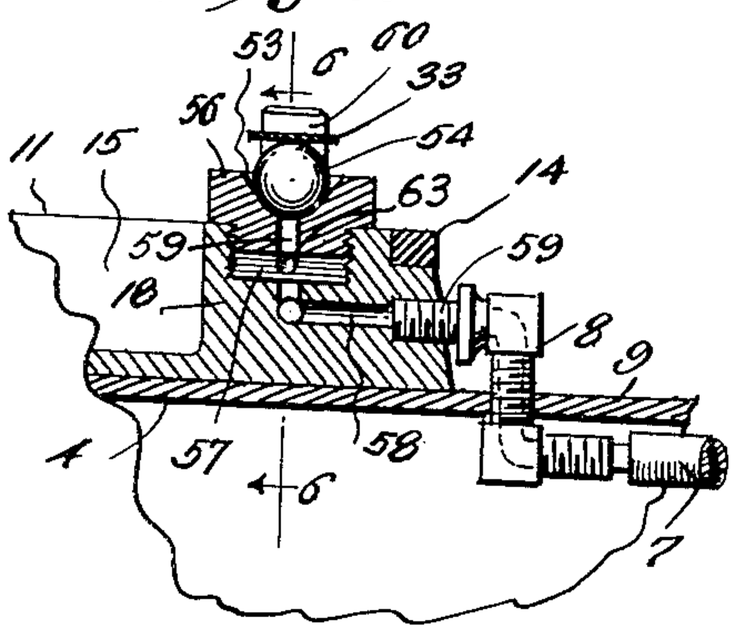


Fig. 6.

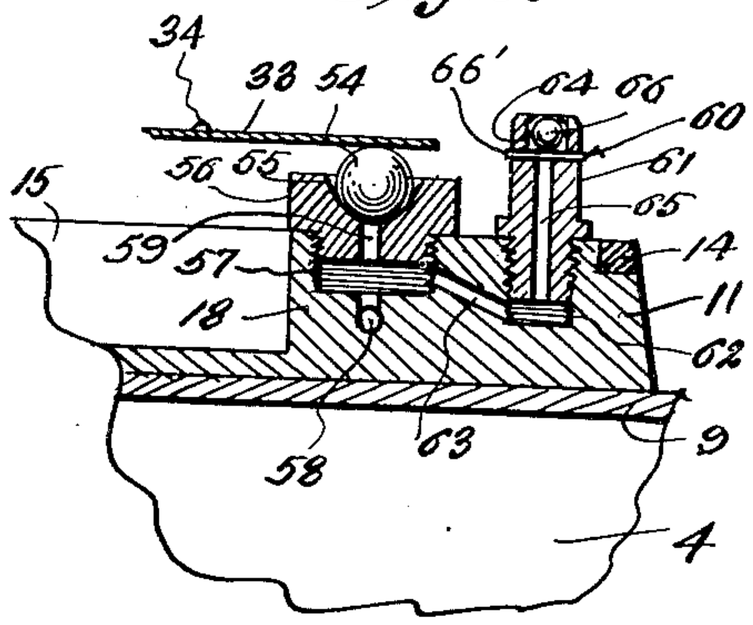
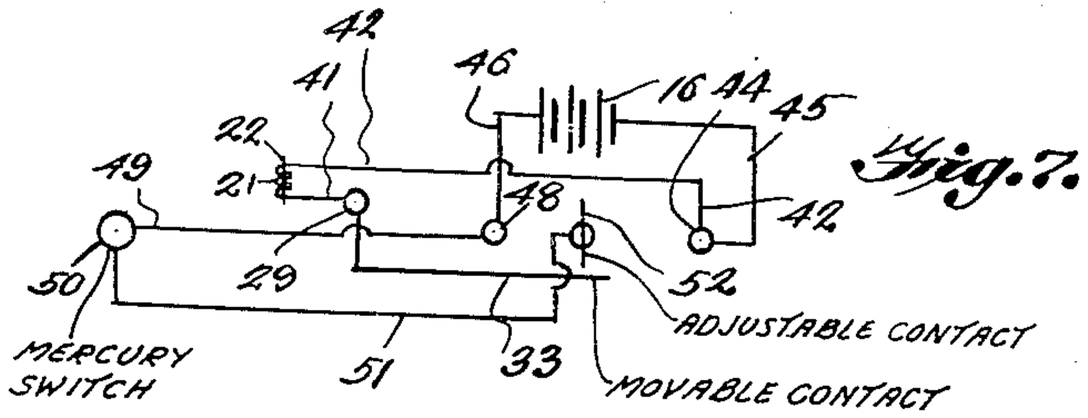


Fig. 7.



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UNITED STATES PATENT OFFICE

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TRAFFIC COUNTER

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9 Claims. (Cl. 235—92)

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This invention relates to a traffic counter and the present application constitutes a continuation in part from my co-pending application filed November 17, 1941, Ser. No. 419,473, and issued as Patent No. 2,403,277 on July 2, 1946.

One object of the invention is to provide a traffic counter including counter mechanism enclosed in a casing which is actuated by electrical mechanism including a circuit closer moved to a closed position by air forced in a direction to close the circuit closer as wheels of a vehicle pass over a rubber tube laid across a street or highway.

Another object of the invention is to provide a counter wherein the switch or circuit closer is closed by direct contact of a ball with the movable contact when the ball is shifted upwardly by an air impulse.

Another object of the invention is to provide a counter wherein the ball for closing the circuit closer also serves as a valve for allowing escape of air from the hose when the hose is collapsed by wheels of a vehicle passing over it, there being an auxiliary valve controlled passage which is closed during upward movement of the ball and opened during seating of the ball so that air may flow into the hose and quickly fill it and thus allow the counter to operate accurately during a heavy flow of traffic along a street.

Another object of the invention is to provide the counter with an auxiliary valve which is closed by air pressure when the ball of the main valve is shifted upwardly to close the circuit closer and returns to its lowered or opened position so that ample air will enter the hose to fill it after wheels of a vehicle pass across the hose. Therefore during heavy traffic the hose will be completely refilled each time wheels of a vehicle pass across the hose and accurate operation of the counter will be effected.

Another object of the invention is to provide a traffic counter wherein the counter has a crank arm pivoted to the upper end of the core of a solenoid which is energized when the circuit closer is closed and directly operates the counter.

The invention is illustrated in the accompanying drawings wherein:

Fig. 1 is a perspective view showing the traffic counter in position for use.

Fig. 2 is a sectional view taken vertically through the traffic counter.

Fig. 3 is a view showing the counting mechanism in end elevation with the hood of its casing indicated by dotted lines.

Fig. 4 is a top plan view of the counting mechanism shown in Figure 3.

Fig. 5 is a fragmentary sectional view upon an enlarged scale taken along line 5—5 of Figure 3.

Fig. 6 is a sectional view taken along the line 6—6 of Figure 5.

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Fig. 7 is a wiring diagram.

This traffic counter is used for counting the number of vehicles which pass a predetermined location along a street or highway 1 and is actuated by wheels of vehicles passing across a rubber hose 2 stretched across the highway and secured by the peg 3 or in any other desired manner. This hose enters a casing 4 where it is wound upon a reel 5 carrying a tube 6 with which a rubber hose 7 is connected, and referring to Figure 5 it will be seen that the other end of the hose 7 is connected with the inner end of a coupling 8 mounted through the top wall 9 of the casing 4.

The counting mechanism constituting the subject matter of this invention is mounted upon the top of the casing 4 and has a casing 10 consisting of a base 11 and a hood 12 which is removably secured to the base by screws 13 which pass downwardly through openings in end portions of the hood and into sockets formed in the base. A gasket 14 forms a water tight joint between the base and the hood. It will be understood that while the casing 10 has been shown mounted upon a casing 4 enclosing a reel upon which the hose 2 is wound the counting mechanism may be used independently of the housing or casing 4 and the hose 2 directly connected with the counting mechanism if so desired.

The base 11 is hollow and open at its top to provide a pocket 15 in which fits a dry battery 16. Blocks 17 and 18 are formed at corners of one side of the base and intermediate the length of this side is a block 19, it being understood that the blocks may be formed as a single unit if so desired. A bracket 20 is mounted upon the block 17 and this bracket carries a solenoid 21 having a vertically movable core 22. At its upper end the bracket is bent to form an arm 23 upon which is mounted a counter 24 viewed through a window 12' in the cover 12 and having the usual mechanism operated when its rocker shaft 25 is turned by a crank 26. The crank is secured to the shaft by a set screw 27 and carries a pin 28 which passes through an opening formed through the upper end of the core so that when the solenoid is momentarily energized and the core moves upwardly and then returns to its normal lowered position the counter will be actuated.

The intermediate block 19 carries a post 29 secured to the base by a set screw 30 and about this post is a collar 31 upon which rests a strip of insulation 32. Over the insulating strip is a movable contact consisting of a strip of thin resilient metal 33 carrying a contact point 34, the strip 33 being held in spaced relation to the insulating strip by a metal spacer or washer 35 and secured by a nut 36. Over the nut 36 is a strip of insulation 37 clamped between nuts 38 and 39 carried by the post 29 and over nut 39 is a nut 40 so that a conductor 41 leading from one

end of the coil of the solenoid may be secured to the post between the nuts 39 and 40. The conductor 42 leading from the other end of the coil is secured between nuts 43 threaded upon a post 44 carried by the insulating strip 37 and to this post 44 is also secured a conductor 45 leading from one side of the battery 16. The conductor 46 extending from the other side of the battery is secured between nuts threaded upon a post 48 carried by the insulating strip 37, and this post 48 also has secured to it a conductor 49 leading from a mercury switch 50 carried by the block 17. The second conductor 51 for the mercury switch is secured to a stationary contact 52 by a nut 53 and this stationary contact 52 is threaded through the insulating strip 37 directly over the contact point 34 of the movable contact strip 33. By adjusting the stationary contact 52 vertically the distance its lower end is normally spaced upwardly from the contact point 34 may be regulated and the extent to which the movable contact strip must be flexed upwardly to close a circuit through the solenoid coil controlled. In case the counter should be accidentally turned over the mercury switch will open and the circuit can not close and exhaust current of the battery.

The movable contract strip 33 is moved upwardly into engagement with the stationary contact 52 by a ball 54 loosely mounted in a seat or recess 55 formed in a plug 56 which is screwed into a threaded socket 57 formed in the block 18. A passage 58 communicates with the socket 57 and into the enlarged and threaded outer end portion of this passage is screwed a nipple 59 with which the coupling 8 is connected. Therefore when the wheels of a vehicle pass over the rubber tube 2 air in the tube will be forced through passage 58 into the socket 57 and upwardly through the opening 59 of the plug and act upon the ball to shift the ball upwardly and cause it to raise the movable contact strip 33 upwardly into engagement with the stationary contact 52. The circuit through the solenoid will thus be closed and the core 22 shifted upwardly to actuate the counter 24. When the ball moves upwardly air escapes from the plug about the ball and the ball will then drop to its normal position and the circuit will be broken. During return of the ball to its normal position air will be sucked into the hose or tube 2 by expansion of the tube after the vehicle wheels have passed across it and the device will be ready for another counting operation when vehicle wheels again pass across the tube 2 providing there has been a sufficient time interval for complete filling of the tube.

During heavy traffic it has been found that since wheels pass over the tube 2 in rapid succession it often happens that sufficient air will not be sucked inwardly through passage 59 to fill the tube before the tube is again compressed by vehicle wheels and an accurate count is not obtained. In order to overcome this there has been provided an inlet valve 60 having a barrel 61 which is disposed vertically and has its lower end portions screws into a socket 62 formed in the block 18 near the socket 57, a passage 63 being provided to establish communication between the sockets. A pocket 64 is formed at the upper end of a passage 65 which extends vertically through the barrel 61 and in this pocket a valve ball 66 which normally rests upon a pin 66′ in a lowered or opened position, and closes the inlet at the upper end of the pocket when shifted upwardly. When air is forced through the passage 58 into socket 57 to raise the ball 54 and close the circuit a portion of the air flows through passage 63 into pocket 62 and upwardly through passage 65 to act upon the ball 66 and move the ball to a closed position which stops flow of air from the upper end of the pocket 64 and insures a full force of air upon the ball 54 and causes quick movement of the ball 54 to the raised position. After the vehicle wheels have passed over the tube 2 the ball 66 drops downwardly to an opened position and air may flow inwardly through valve 60 and since this air will flow through passage 63 into pocket 57 and through passage 58 to the tube, the tube 2 will be quickly filled and returned to a fully extended condition. Therefore when the wheels of another vehicle pass across the tube the counter will be actuated and an accurate count of the number of vehicles which have passed across the tube 2 obtained.

Having thus described the invention, what is claimed is:

1. In a traffic counter, a base formed with an air passage having a vertically extending inner end portion, means for connecting a hose with the outer end of said air passage, a counting unit, electrically actuated means for operating the counting unit having a circuit including a stationary contact and a movable contact extending horizontally under the stationary contact with a free end portion disposed over the inner end of the air passage, an annular seat about the inner end of the air passage disposed under the free end of the movable contact, a ball normally resting upon the annular seat and upon which the free end of the movable contact rests, said ball being movable upwardly by air forced inwardly through the air passage by a vehicle wheel passing across a hose connected with the air passage, the ball when shifted upwardly raising the movable contact into engagement with the stationary contact and thereby closing a circuit through the operating means and also allowing rapid escape of air from the inner end of the air passage about the ball for quick return of the ball and the movable contact to a normal position, and said movable contact applying pressure to the ball and returning it to the seat after the vehicle wheel moves off of the hose.

2. In a traffic counter, a base formed with an air passage having a vertically extending inner end portion, means for connecting a hose with the outer end of said air passage, a counting unit, electrically actuated means for operating the counting unit having a circuit including a stationary contact and a movable contact extending horizontally under the stationary contact with a free end portion disposed over the inner end of the air passage, an annular seat about the inner end of the air passage disposed under the free end of the movable contact, a ball normally resting upon the annular seat and upon which the movable contact rests, said ball being movable upwardly by air forced inwardly through the air passage by a vehicle wheel passing across a hose connected with the air passage, the ball when shifted upwardly raising the movable contact into engagement with the stationary contact and thereby closing a circuit through the operating means and also allowing rapid escape of air from the inner end of the air passage about the ball, said movable contact urging the ball downwardly and reseating the ball after the vehicle wheel has passed across the hose, said base being formed with a second air passage having its inner end communicating

with the first air passage below the seat, an outwardly closing check valve for controlling flow of air through the second air passage, said check valve being normally open and being closable by pressure of air forced through the second air passage from the first air passage during passage of the wheel over the hose, the check valve opening to allow flow of air inwardly through check valve opening to allow flow of air inwardly through the second air passage and the first air passage and thereby effect quick filling of the hose after the vehicle wheel has passed across the hose.

3. In a traffic counter, a base formed with an air passage having a vertically extending inner end portion, means for connecting a hose with the outer end of said air passage, a counting unit, electrically actuated means for operating the counting unit having a circuit including a flexible stationary contact and a movable contact extending horizontally under the stationary contact with a free end portion disposed over the inner end of the air passage, an annular seat about the inner end of the air passage disposed under the free end of the movable contact, a ball normally resting upon the annular seat and upon which the free end of the movable contact rests and adapted to be moved upwardly by air forced inwardly through the air passage by a vehicle wheel passing across a hose connected with the air passage, the ball when shifted upwardly raising the movable contact into engagement with the stationary contact and thereby closing a circuit through the operating means and also allowing rapid escape of air from the inner end of the air passage about the ball, said movable contact urging the ball downwardly and reseating the ball after the vehicle wheel has passed across the hose, said base being formed with a second air passage having its inner end communicating with the first air passage below the seat and its outer end communicating with the bottom of a vertical socket opening through the upper face of the base, and a normally open upwardly closing check valve mounted vertically in the socket adapted to be closed by pressure of air forced through the second air passage and upwardly thrcugh the valve as the vehicle wheel passes across the hose and then returning to its open condition to allow inward flow of air through the second air passage and thereby effecting rapid refilling of the hose with air.

4. In a traffic counter, a base formed with an air passage having a vertically extending inner end portion, means for connecting a hose with the outer end of said air passage, a counting unit, electrically actuated means in said casing for operating the counting unit having a circuit including a stationary contact and a movable contact extending horizontally under the stationary contact with a free end portion disposed over the inner end of the air passage, an annular seat about the inner end of the air passage disposed under the free end of the movable contact, a ball normally resting upon the annular seat and upon which the free end of the movable contact rests, said ball being adapted to be moved upwardly by air forced inwardly through the air passage by a vehicle wheel passing across a hose connected with the air passage, the ball when shifted upwardly raising the movable contact into engagement with the stationary contact and thereby closing a circuit through the operating means and also allowing rapid escape of air from the inner end of the air passage

about the ball, said movable contact urging the ball downwardly and reseating the ball after the vehicle wheel has passed across the hose, said base being formed with a second air passage having its inner end communicating with the first air passage below the seat and its outer end communicating with the bottom of a vertical socket opening through the upper face of the base, and a check valve consisting of a valve casing mounted in the socket through the upper end thereof and formed with a vertical bore and with a pocket at the upper end of its bore surrounded at its top by an annular valve seat, and a valve ball in said pocket normally resting upon the bottom of the pocket directly over the bore out of closing relation thereto and adapted to be shifted upwardly to a closed position against the valve seat of the casing by pressure of air forced through the second air passage and upwardly through the bore as the vehicle wheel passes over the hose, said valve ball moving downwardly by its weight to its opened position after the vehicle wheel passes across the hose and thereby allowing flow of air inwardly through the bore and the second mentioned and the first mentioned air passages for quick refilling of the hose.

5. In a traffic counter, a base formed with a socket open at its top and with an air passage having its inner end communicating with the socket, means for connecting an air hose with the outer end of said air passage, a counting unit, electrically actuated operating means for said counting unit including a circut having an upper contact and a flexible movable contact disposed horizontally under the upper contact in spaced relation thereto with a free end portion disposed over the socket, a block at the upper end of said socket formed with a vertical bore and with a seat about the upper end thereof, and a ball normally resting upon said seat and disposed under the movable contact with the free end portion of the movable contact over the ball, the ball being freely shiftable upwardly off of the seat by air forced upwardly through the bore by action of a vehicle wheel passing across the hose and when moved upwardly momentarily holding the movable contact by direct engagement therewith in engagement with the upper contact and allowing escape of air from the bore around the ball.

6. In a traffic counter, a base formed with a vertical socket open at its top and with an air passage having its inner end communicating with said socket, means for connecting an air hose with the outer end of said air passage, a valve seat mounted in said socket through the upper end thereof, a counting unit, electrically actuated means for operating the counting unit including a circuit closer having an upper contact and a resilient movable contact strip extending horizontally under the upper contact and having a free end portion disposed over said seat, and a ball normally resting upon said seat in closing relation to the socket with the free end portion of the movable contact disposed over the ball, said ball being shiftable upwardly by air forced from the hose when a vehicle wheel passes over the hose and thereby allowing rapid escape of air from the hose and also serving to flex the movable contact upwardly by direct engagement therewith into engagement with the upper contact and momentarily close the circuit.

7. In a traffic counter, a base formed with an air passage, means for connecting a hose with the outer end of said passage, a counting unit,

electrically actuated operating means for said counting unit having a circuit including an upper contact and a movable contact extending horizontally under the upper contact and normally spaced downwardly therefrom, an annular seat over the inner end of said passage disposed under the movable contact, and a ball normally resting upon said seat and being freely movable upwardly by action of air forced through the passage by a vehicle passing across the hose, said ball when shifted upwardly momentarily holding the movable contact in engagement with the upper contact by direct engagement with the movable contact and also allowing quick escape of air from the passage about the ball during upward movement of the ball and permitting return of air around the ball and through the passage into the hose during downward movement of the ball onto the seat.

8. In a traffic counter, a body formed with an air passage open at inner and outer ends, means for connecting a hose with the outer end of said air passage, a counting unit, electrically actuated operating means for said counting unit having a circuit including a contact spaced from the inner end of said air passage and a movable contact normally spaced from the first contact and having a portion extending across the inner end of the air passage, a seat at the inner end of the air passage, and an unconfined member entirely free from and normally resting against said seat and overlapped by the movable contact, said member being freely movable away from the seat and when so moved applying pressure to the movable contact by direct engagement therewith to momentarily hold the movable contact in circuit closing engagement with the first contact, said member while moving away from the seat allowing rapid and unobstructed escape of air from the inner end of the air passage about the member, and said member also allowing return of air through the air passage into the hose during return movement of the member into engagement with the seat.

9. In a traffic counter, a body formed with an air passage open at inner and outer ends, means for connecting a hose with the outer end of said air passage, a counting unit, electrically actuated operating means for said counting unit having a circuit having a normally open switch including a contact spaced from the inner end of the air passage and a movable contact normally spaced from the first contact and having a portion extending across the inner end of the air passage, a seat about the inner end of the air passage, and a ball normally resting against said seat in closing relation to the air passage and overlapped by the movable contact, said ball being movable away from the seat by air pressure exerted when pressure is applied to the hose and when so moved away from the seat applying pressure to the movable contact by direct engagement therewith to momentarily hold the movable contact in circuit-closing engagement with the first contact, said ball when moved away from the seat allowing rapid escape of air from the hose through the air passage and about the ball and during return movement towards the seat allowing flow of air about the ball and through the air passage into the hose to refill the hose.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,626,620	Mentzer	May 3, 1927
1,915,167	Salsbury	June 20, 1933
2,188,948	Huebner	Feb. 6, 1940
2,334,143	Basquin et al.	Nov. 9, 1943
2,340,634	Wiley	Feb. 1, 1944
2,403,277	Hall	June 2, 1946