

Aug. 20, 1929.

F. HEDLEY ET AL

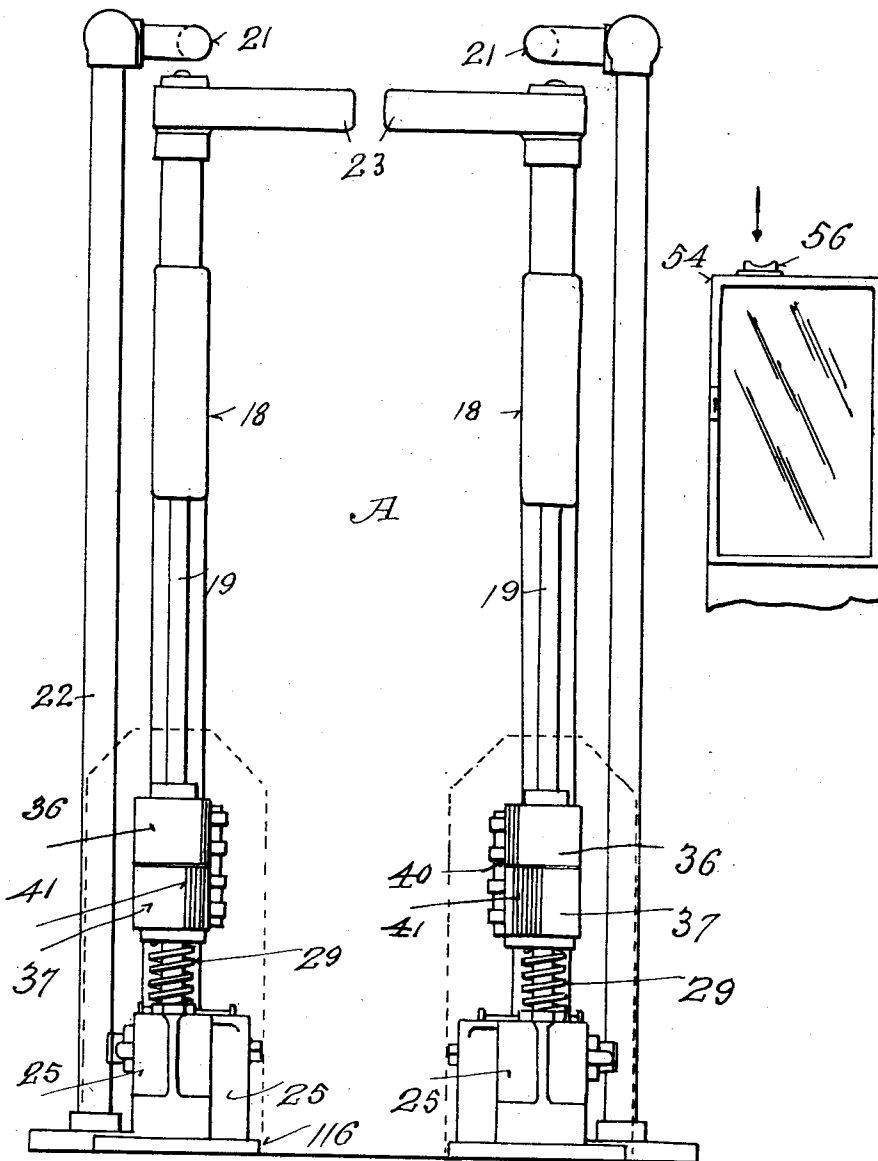
1,724,932

PASSAGEWAY CONTROL MECHANISM

Original Filed Dec. 28, 1920

8 Sheets-Sheet 1

Fig. 1



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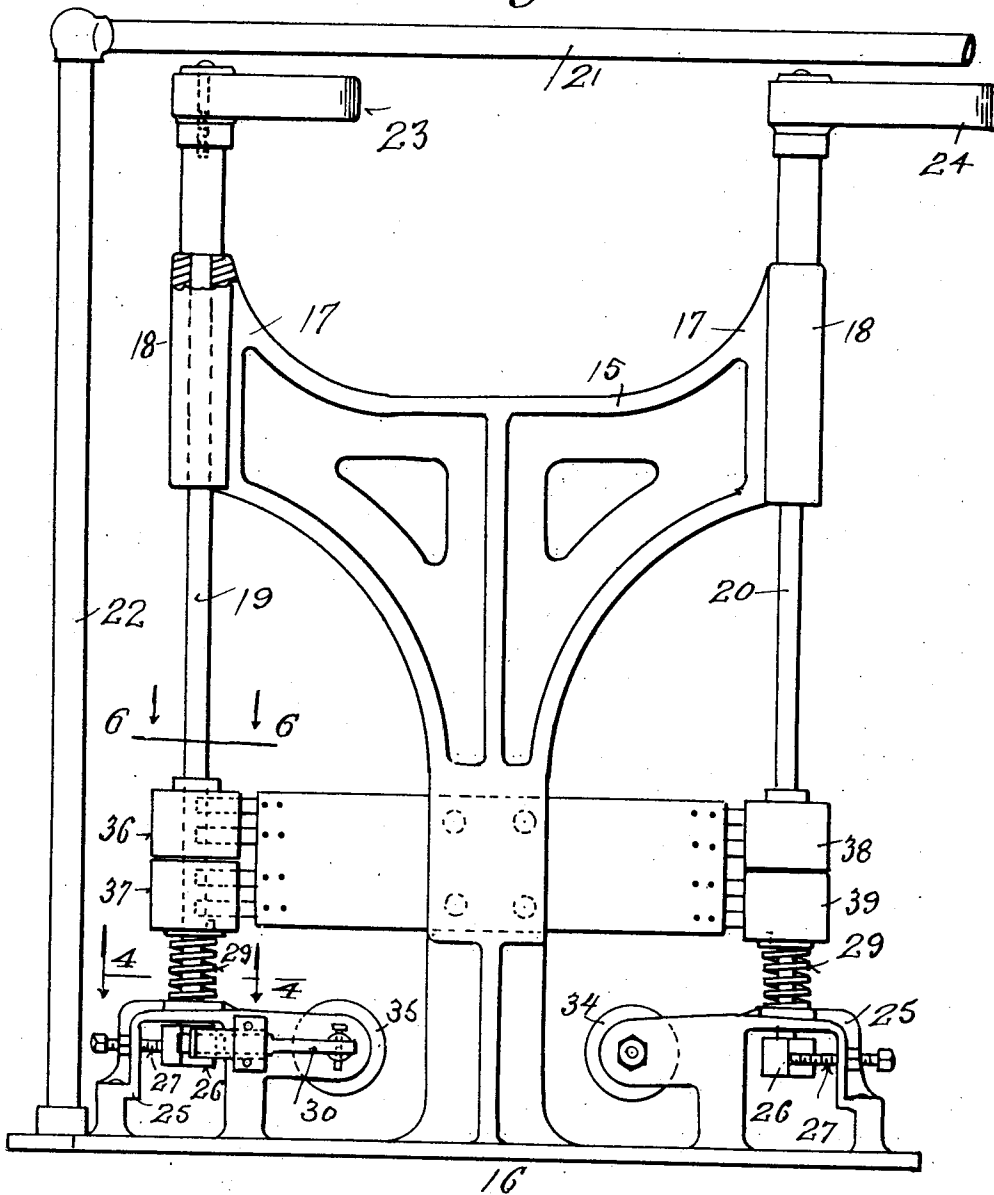
1,724,932

PASSAGEWAY CONTROL MECHANISM

Original Filed Dec. 28, 1920

8 Sheets-Sheet 2

Fig. 2.



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1,724,932

PASSAGEWAY CONTROL MECHANISM

Original Filed Dec. 28, 1920 8 Sheets-Sheet 3

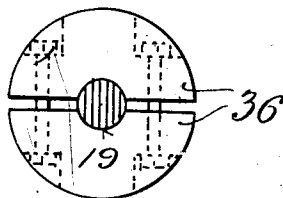
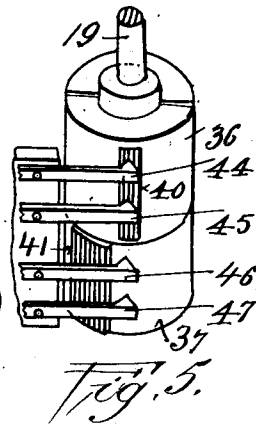
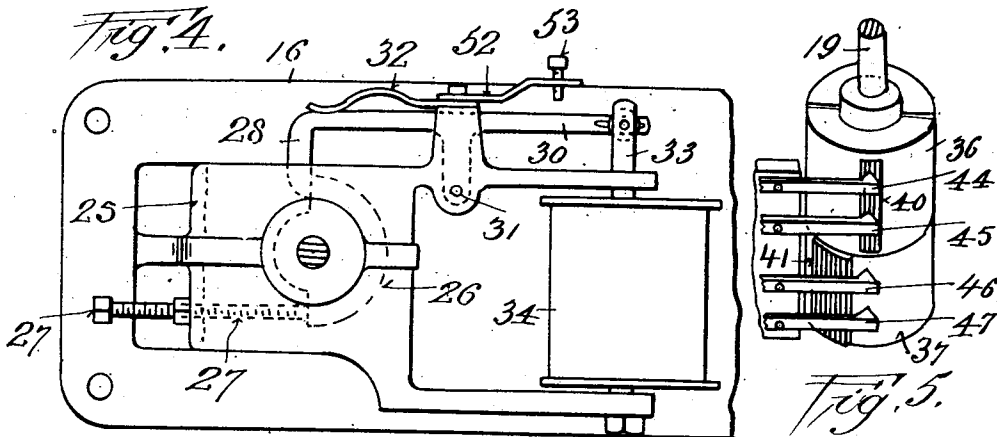
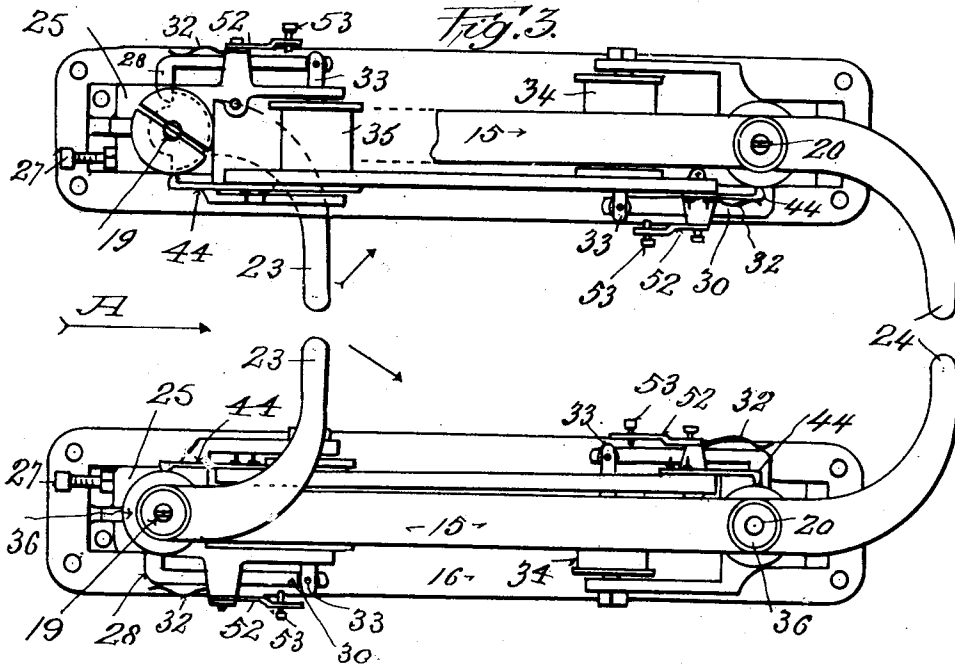


Fig. 6.

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1,724,932

PASSAGEWAY CONTROL MECHANISM

Original Filed Dec. 28, 1920

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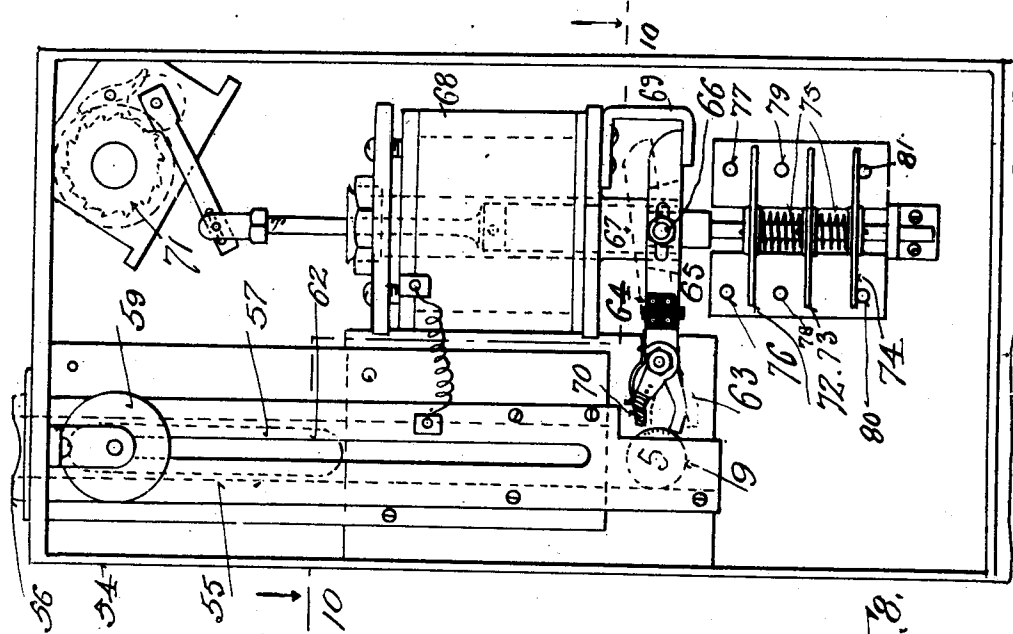


Fig. 8.

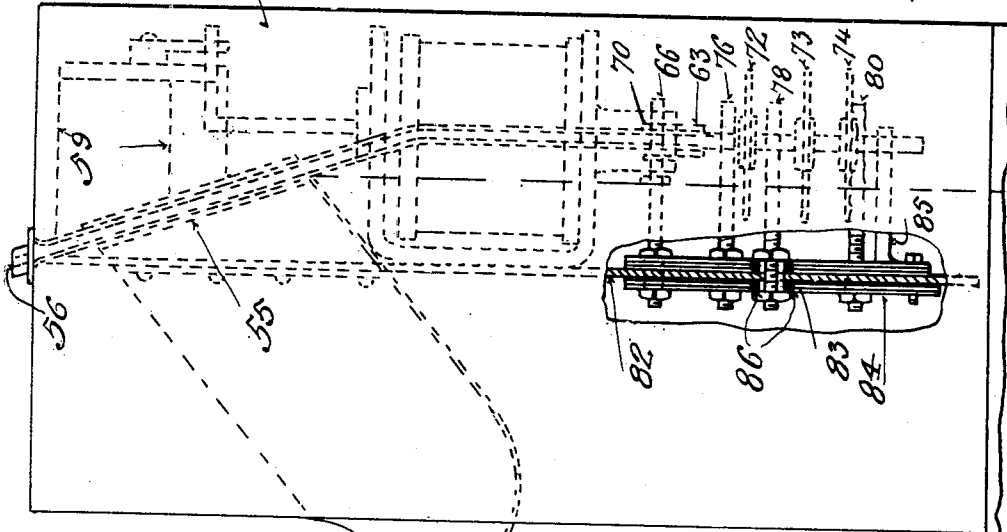


Fig. 9.

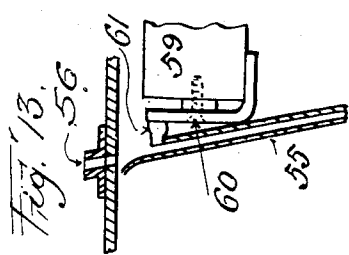


Fig. 13.

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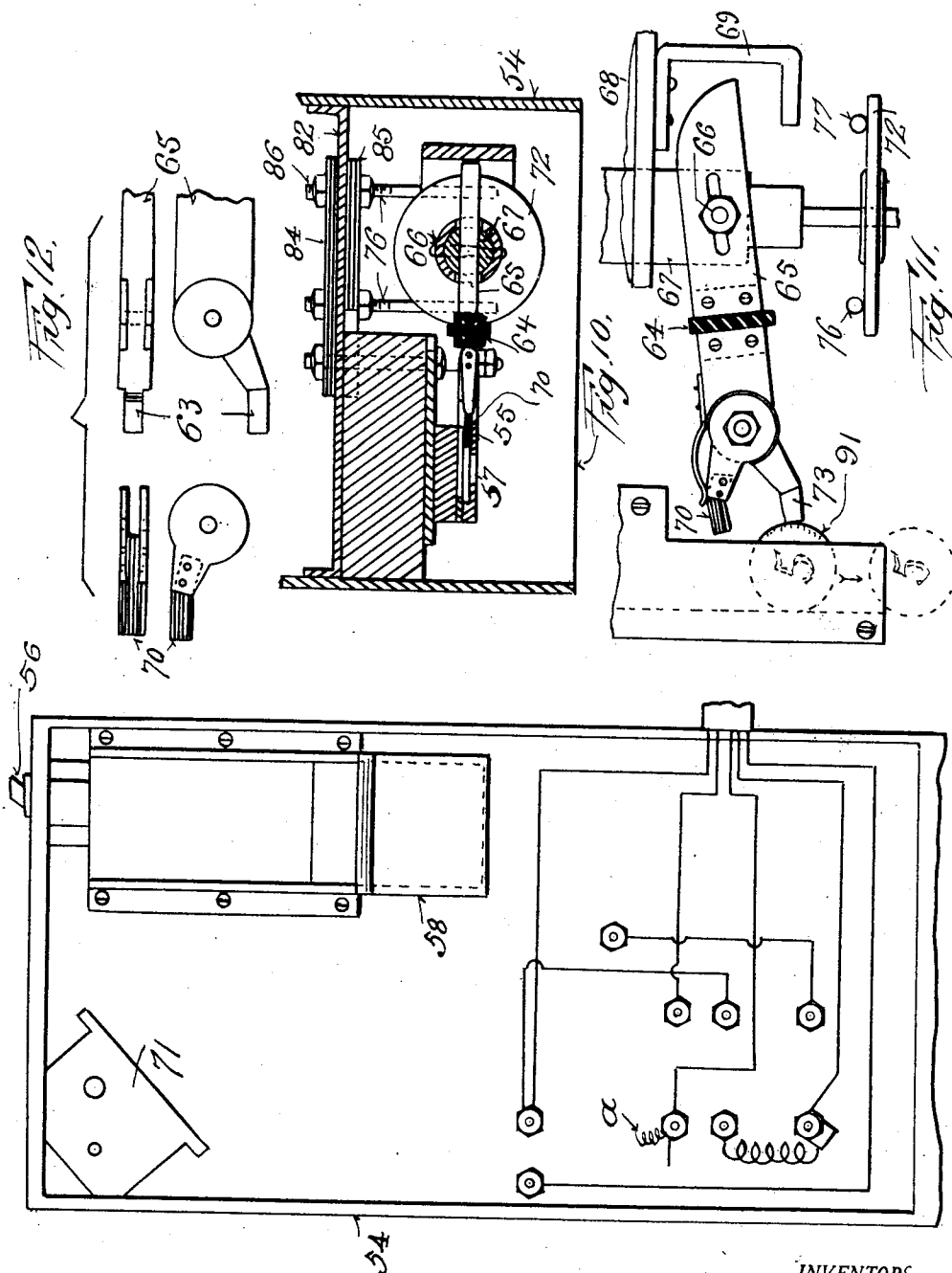
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1,724,932

PASSAGEWAY CONTROL MECHANISM

Original Filed Dec. 28, 1920

8 Sheets-Sheet 5



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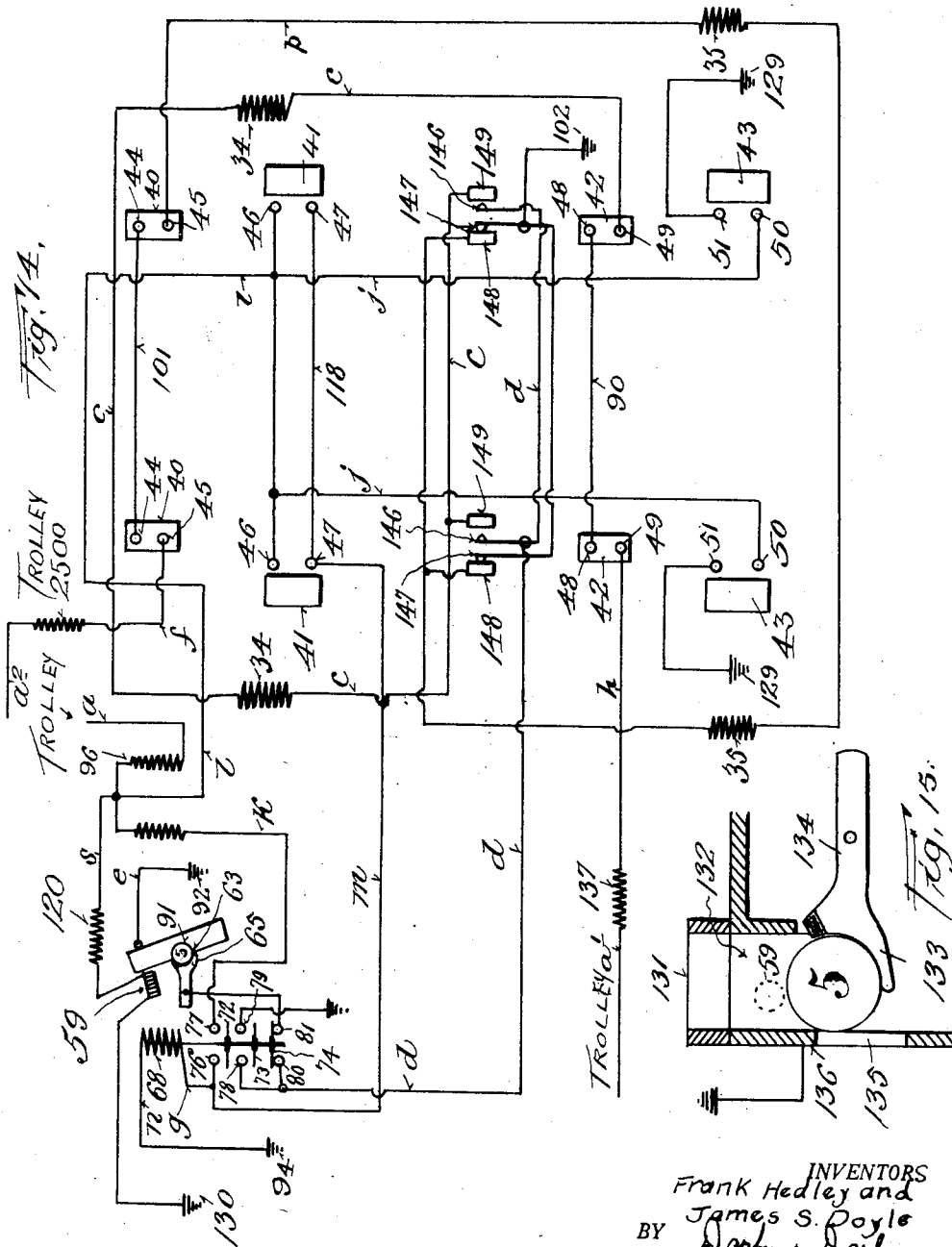
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1,724,932

PASSAGEWAY CONTROL MECHANISM

Original Filed Dec. 28, 1920 8 Sheets-Sheet 6



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1,724,932

PASSAGEWAY CONTROL MECHANISM

Original Filed Dec. 28, 1920 8 Sheets-Sheet 7

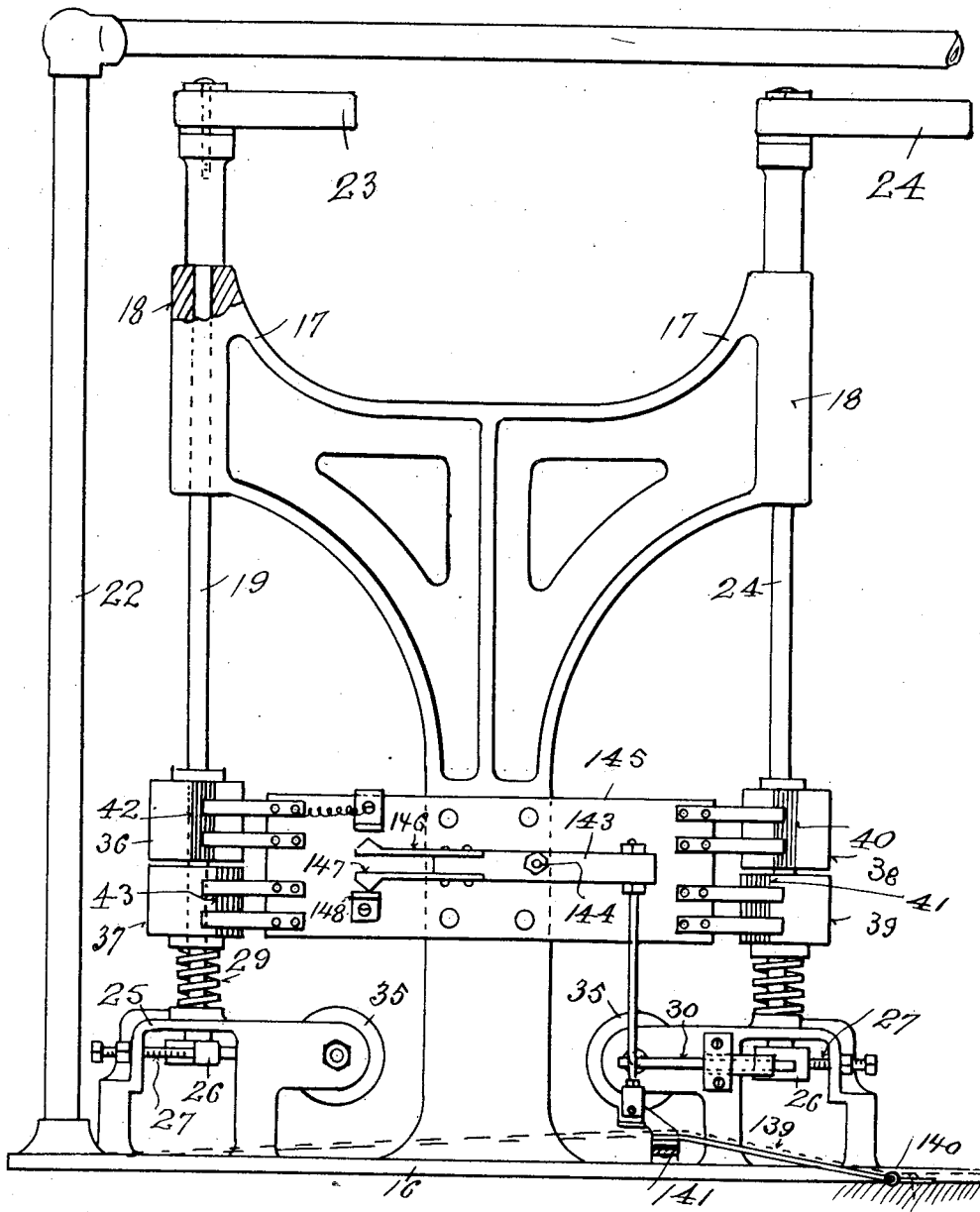


Fig. 16.

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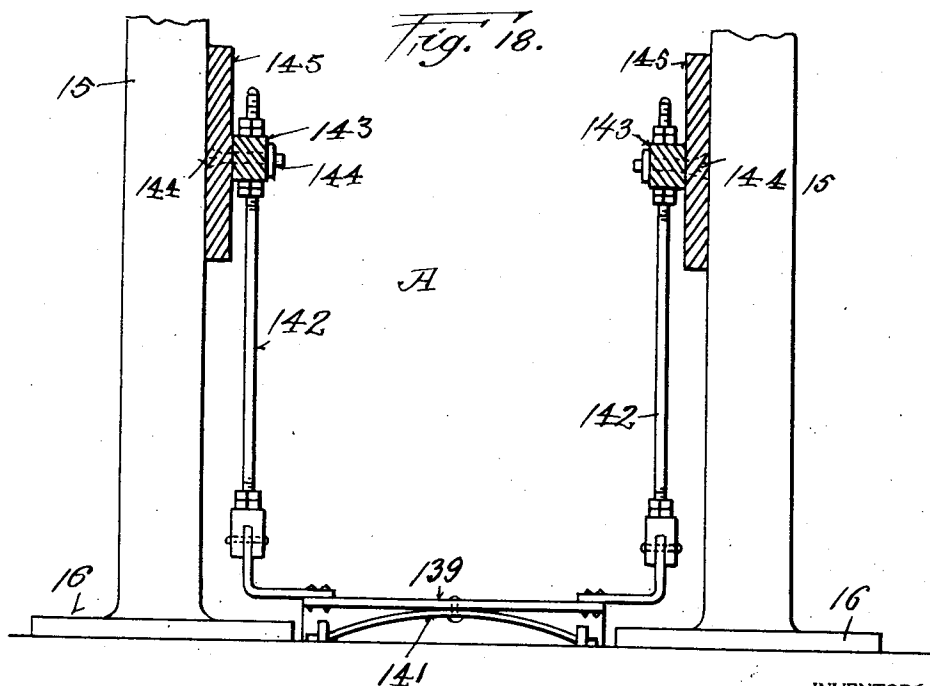
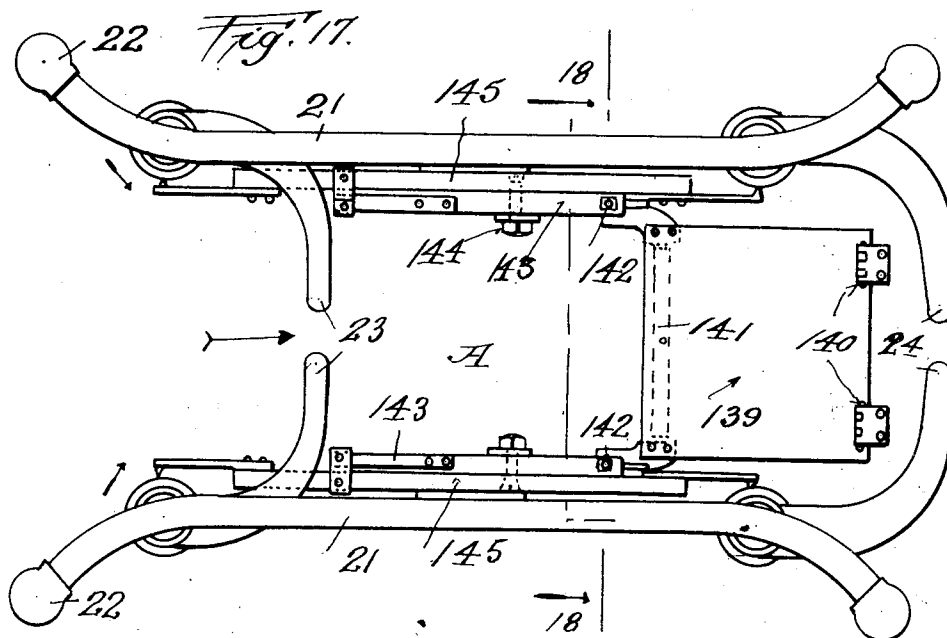
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PASSAGEWAY CONTROL MECHANISM

Original Filed Dec. 28, 1920 8 Sheets-Sheet 8



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PASSAGEWAY-CONTROL MECHANISM.

Original application filed December 28, 1920, Serial No. 433,692. Divided and this application filed
January 20, 1926. Serial No. 82,416.

This case is a divisional application of our
copending application, Serial No. 433,692,
filed December 28, 1920, and is directed to
the provision of a device which rejects coins
or tokens of an improper size, spurious coins,
or tokens, or the like.

This invention relates to control mecha-
nism for passageways.

The object of the invention is to provide
a mechanism which is simple in structure
and efficient in operation for controlling the
passage of persons through a passageway.

A further object is to provide a passage-
way control mechanism of the nature referred
to which interposes a minimum of
resistance to the passage of persons through
the passageway, and yet will restrain and
prevent unauthorized passage therethrough.

A further object is to provide a passage-
way control mechanism of the nature referred
to which affords a maximum capacity
for a given period of time to accommodate
the requirements for the quick and easy
passage of large numbers of persons
through the passageway.

A further object of the invention is to
provide a passageway control mechanism of
the nature referred to which is suitable for
use at stations of subway, elevated and
other railway systems, on street and other
cars, at ferries, amusement places, and else-
where, where it may be desired to permit
persons to enter or leave single or in single
file, and which is simple in structure, eco-
nomical to install and maintain, and is effi-
cient in operation, and wherein ease and
comfort are afforded persons in passing
through such passageway.

A further object is to provide a passage-
way control mechanism of the nature referred
to which enables efficient fare collection
to be made as the persons pass
through, thereby assuring the collection of
a fare for each person, and, in addition, if
required or desired, the registration of the
number of persons passing through the pas-
sageway.

A further object is to provide a passage-
way control mechanism of the nature referred
to which embodies locking devices to
prevent the passage of persons through the
passageway until the locking devices are
released, and wherein provision is made for
controlling the release of the locking devices

by the deposit of a coin or token or the pay-
ment of a fare.

A further object is to provide a passage-
way control mechanism of the nature referred
to which permits the passage of persons there-
through in only one direction.

A further object of the invention is to
provide a passageway barrier mechanism
which is electrically controlled by the de-
posit of a coin or token in a coin box.

A further object is to provide a coin or
token box control for barriers in a passage-
way in which provision is made to reject
coins or tokens of improper size, spurious
coins or tokens, and the like.

In a more restricted embodiment, a fur-
ther object of our invention is to provide
successive sets of barriers for a restricted
passageway in which locking devices for the
first set of barriers are released through the
deposit of a proper coin or token to permit
the passage therepast of a single individual
at a time, the operation of the first set of
barriers by the passage of the individual
therethrough causing the second set of bar-
riers to be locked until the return of the first
set of barriers to their initial position, which
return releases the devices for the second set
of barriers.

A further object of the invention is to
provide an electrically controlled passage-
way barrier mechanism of the nature referred
to wherein the electrical control is
effected by the conjoint action of a person
passing through the apparatus and the de-
posit of a coin or other token.

Other and further objects of the invention
will appear more fully hereinafter.

The invention consists substantially in the
construction, combination, location, and rela-
tive arrangement of parts, all as will be
more fully hereinafter set forth, as shown
in the accompanying drawings, and finally
pointed out in the appended claims.

Referring to the accompanying draw-
ings,—

Fig. 1 is a view in end elevation of one
form of passageway control mechanism em-
bodying the principles of our invention.

Fig. 2 is a view in side elevation of the
construction shown in Fig. 1.

Fig. 3 is a top plan view of the same, the
railing to define and restrict the passageway
being omitted.

Fig. 4 is a view in section on the line 4, 4, Fig. 2, looking in the direction of the arrows, and showing the lock devices and release mechanism therefor.

5 Fig. 5 is a detail view illustrating circuit control contacts for the electrical control of the locking devices.

Fig. 6 is a detail view in section on the line 6, 6, Fig. 2, looking in the direction of the arrows.

10 Fig. 7 is a view in front elevation of one form of fare or coin or token box suitable for use in carrying out our invention, the internal structure being indicated in dotted lines, and a portion broken out to show the mounting of the contact pins.

Fig. 8 is a view in side elevation of the fare, coin or token box shown in Fig. 7, and its associated parts.

20 Fig. 9 is a view in rear elevation of the same.

Fig. 10 is a view in section on the line 10, 10, Fig. 8, looking in the direction of the arrows.

Fig. 11 is a broken detail view showing one arrangement of coin receiving contact lever employed in connection with the form of coin box shown in Figs. 7, 8, 9, and 10.

Fig. 12 are detached detail views of parts of the coin receiving contact lever shown in 30 Fig. 11.

Fig. 13 is a broken detail fragmentary view illustrating one form of construction and arrangement employed in accordance with our invention to arrest and reject a 35 spurious coin.

Fig. 14 is a diagram showing a circuit arrangement employed in connection with an electrical coin controlled system embodying the principles of our invention.

40 Fig. 15 is a broken detail view in section showing another arrangement of fare box and coin controlling lever, designed to eject coins of smaller size than that of the particular coin for which the apparatus is designed.

Fig. 16 is a view similar to Fig. 2, showing a form of means by which the passage of a person through the apparatus is utilized to contribute to the control of the apparatus.

50 Fig. 17 is a top plan view of the same.

Fig. 18 is a view in vertical transverse section on the line 18, 18, Fig. 17, looking in the direction of the arrows.

The same part is designated by the same reference numeral wherever it occurs throughout the several views.

In the following specification we will describe our invention as applied to the collection of fares in the operation of street car systems such as subway, elevated, or surface lines, but it is to be understood that we do not wish to limit or restrict ourselves in this respect as our invention is equally well adapted for use in connection with the collection of fares at ferries, railway stations, 65

or entrance fees at theatres, amusement parks, and the like. Therefore, where we mention stations at which passengers board or alight from cars or trains, such as subway, elevated, surface, or other systems, we wish to include the use of our invention in any situation where the same is applicable.

Experience in the operation of street car systems such as subway, elevated and surface lines has shown that great and serious 75 loss of revenue is sustained, even when the most careful and elaborate methods are employed to prevent it, due to the failure of the operating company to receive a fare for each passenger carried. This loss is especially heavy in rapid transit systems which during certain hours of operation known as "rush hours" must handle abnormally large crowds of passengers, under serious conditions of crowding through the stations and entrance ways to or from the cars or trains in a brief space of time. Under these conditions it becomes impossible to insure the collection of a fare from each individual even with the exercise of the utmost care and precaution.

Again, where it is necessary for passengers to purchase and deposit tickets or to pay fares to station agents, the danger is again incurred of inability to collect from each passenger during the periods of maximum traffic, and under the best conditions of modern practice delays are experienced in handling the crowds.

Various expedients have been resorted to 100 or proposed to overcome these and other difficulties, and various forms of turnstile arrangements are in use. Such expedients, however, are open to many practical and serious objections and have failed to give 105 entire satisfaction. In addition to the fact that the systems at present in general use involve the payment of fares to station agents, which introduces opportunity through dishonesty or inattention to incur 110 loss in fare collections, the turnstile and other mechanically operating arrangements now employed are costly to install and maintain, and from the standpoint of the public comfort and convenience, the resistance offered by turnstiles, the time required, the difficulty of controlling them, and the physical defects and limitations of such devices, render them unsuited to the requirements of severe rush hour traffic conditions. 120 Moreover, such apparatus usually requires the attendance of employees at each turnstile, ticket booth or fare receiving box, and this greatly adds to the cost of operation besides failing to avoid the serious objection 125 from the standpoint of the road management of missed fares.

In the ideal system for collecting fares a fare should be received by the management direct from each passenger carried, without 130

having to pass through the hands of station agents, gatemen, conductors, or the like, and the payment or deposit of a single fare should remove all substantial resistance or barrier to the free end and easy passage of a passenger, and only one, to the car or train, whether the passenger moves at a normal walking speed or faster. The means employed to secure this ideal result must be capable of accommodating a maximum of passengers passing through in a minimum space of time, in order to avoid congestion during the hours of heaviest traffic. There should be no delay, no congestion, no blocking of easy rapid and comfortable passage, with a minimum of resistance.

It is among the special purposes of our present invention to provide a passageway control mechanism which attains the advantages and avoids the objections above noted, and which is simple and rugged in structure, which offers a minimum of resistance to the passage through of individuals, which is efficient and permits a high speed of operation while affording an easy, free and comfortable passage of individuals, one at a time, therethrough, in one direction, but preventing the passage through in the reverse direction which assures the deposit of a fare coin or other token for each individual but the rejection of fare coins or tokens of improper size or which are spurious, and which enables a person upon payment of the required fare coin or token to pass through without substantial resistance or interference.

In carrying out our invention in one practical embodiment thereof, we provide a restricted passageway for individuals to pass through singly or in single file. Extending partially across this restricted passageway, and preferably from opposite sides thereof, are barrier arms, which, in the form shown, are arranged in sets of cooperating pairs, the members of each pair or set yielding easily and readily to the pressure thereagainst imposed by an individual proceeding along the passageway. This yielding movement is permitted in one direction only, and such movement, if desired, is controlled by the deposit of a fare coin or token, and may be utilized whenever required or desired to effect a registration or the number of persons passing through the apparatus, and a signal for each operation. We also propose to employ locking devices for each set of barrier arms and to control such locking devices in such manner that when the locking devices of the first set of said barriers are released and said barriers are shifted or moved to permit the passage of an individual therepast, the next succeeding set of arms are locked and remain locked until the first set of arms return to their normal or initial position, which action releases the locking devices of the second set of arms, and when the second

set of arms are displaced to permit the passage of an individual therethrough, the first set of arms are locked and remain locked against displacement until the second set of arms return to initial or normal position, which action releases the first set of arms. The release of the second set of arms may be effected in various ways. In one form shown as a practical embodiment of our invention, this release is effected by the deposit of a fare coin or token in a fare box, such coin or token operating to control suitable electric circuits which control the locking devices. In another form shown, this release is effected by the joint action of the deposit of a coin and of a person passing through the apparatus.

Referring particularly to the arrangement shown, a restricted passageway A, see Figs. 1, 3, 17 and 18, is formed between oppositely disposed frames 15, which may be of any suitable or convenient construction and arrangement. A simple construction of frames is shown wherein they are formed of metal stampings or castings formed with or secured to base plates 16, and having arm portions 17 extending in the direction of length of the passageway A. The arms 17 carry vertically disposed bearings 18, for vertical shafts 19, 20. If desired, and in order to still further define the restricted passageway A, the frames 15 and their associated parts may have associated therewith longitudinal bars or railings 21 supported by rods 22, each bar or railing being disposed slightly above the upper ends of the shafts 19, 20, and extending parallel with and at opposite sides of the passageway A. This auxiliary railing, while desirable is not essential. The vertical shafts 19, 20, are arranged in cooperating pairs, the members of each pair being respectively disposed at opposite sides of the passageway A. Mounted upon the upper ends of shafts 19, 20, which extend above bearings 18, are the arms 23, 24. These arms are preferably light metal arms and they are curved in the direction of their length and extend in cooperating pairs from opposite sides of and partially across the passageway A. This form and arrangement of the barrier arms presents to the users of the apparatus an inviting entrance way in one direction through the passageway and avoids the deterring effect of a turnstile arrangement of the nature heretofore commonly employed. The width of the passageway is such as to comfortably and easily accommodate individuals singly or in single file, and the space or distance between the pairs or sets of barrier arms 23, 24, should be such as to comfortably accommodate a single person when both sets of arms are in their closed or barrier relation with respect to the passageway A.

At their lower ends the shafts 19, 20, are extended through brackets 25, bolted to the base plates 16, and carry the stop blocks 26, with which cooperate the stop screws 27, and the locking dogs 28.

In order to yieldingly resist the rocking movements of the shafts 19, 20, from an initial position such as to hold the arms 23, 24, in barrier relation across the passageway, we employ springs 29, which, in this case are shown as coiled upon said shafts and which are suitably secured at one end to the shaft and at the other end to the bracket 25, thereby serving as torsion springs, the tension of which is exerted to normally hold the shafts in position for the stop blocks 26 to bear against the stop screws 27.

The locking dogs 28 are carried by yoke levers 30 each of which is pivotally supported, as at 31, upon an extension of the bracket 25, the pivot axis 31, being disposed in line with the engaging portion of the locking dog 28. (See Fig. 4.) A spring 32 bears upon the yoke lever 30 and normally presses the locking dog toward position to engage the locking block 26. One arm of each yoke lever is pivotally connected to the stem 33 of the core of magnet coils 34 and 35, respectively, mounted upon extensions of the brackets 25.

Upon each shaft 19, 20, are mounted insulating blocks carrying contact strips with which cooperate contact fingers for controlling the circuits of the locking magnets 34, 35. The structure of the blocks is the same for all the shafts, and therefore a description of the blocks for one shaft will suffice. These blocks 36, 37, 38, 39, may be of wood, or other suitable insulating material, and each of them, in the form shown, to which, however, our invention is not to be limited, is made in cooperating halves to facilitate their application to the shafts, said halves being bolted together to clamp them upon the shaft, as indicated in Figs. 5 and 6. Upon the blocks are mounted strips 40, 41, 42, 43, of conducting material with which cooperates the contact fingers 44, 45, 46, 47, 48, 49, 50, 51.

It may sometimes be desirable to adjustably limit the travel of the locking dog 28 into locking engagement with the locking block 26. A simple arrangement for accomplishing this result is shown wherein an arm 52 carried by the extension of bracket 25 upon which the yoke lever 30 is mounted, is disposed adjacent each rock lever. An adjustable set screw 53, mounted on arm 52 limits the extent of rocking movement of the yoke lever, thereby limiting the extent of the pull necessary to be exerted by the lock release magnets 34, 35, to effect a release of the lock. We have found it convenient to employ the arm 52 also as a washer or clamp to secure the yoke lever spring 32 in place.

The lock devices for the barrier arms may be controlled in any suitable or convenient manner. In one embodiment of our invention which we have selected to illustrate the principles thereof, and which, in actual use, we have found suitable and satisfactory, we propose to control the locking devices of said arms by the deposit of fare coins or tokens in a conveniently arranged fare receiving box or receptacle, and we employ the deposited fare coin or token to control the circuits of the lock releasing magnets 34, 35, as well as odometer or register actuating devices, a signal device, or the like. In this connection we also provide means whereby only fare coins or tokens of substantially uniform size are effective to accomplish the desired circuit control, fare coins or tokens of a different denomination and size being rejected or eliminated. We also provide means to prevent spurious coins or tokens even of the required size from effecting the desired circuit control.

We have shown one illustrative form of mechanism for accomplishing these results, and which we have found to be satisfactory and successful, wherein we employ a fare or coin box 54, into which extends a coin chute 55, the receiving mouth 56 and the dimensions of the raceway of which is constructed to receive a coin or token of a given size, say, a five-cent piece, but not one of a larger size, say a quarter. A mouth and raceway which will receive a five-cent piece will, of course, receive a smaller sized coin, such as a penny or a dime, but we so construct the raceway of the chute as to eliminate the smaller sizes of coins. The result is accomplished by forming one side wall of the raceway with an opening 57, of a size in transverse dimension to permit coins of smaller size than the five-cent piece, for example, when deposited into the chute to fall out of the raceway instead of sliding down the same, while a coin of the required size when inserted in the chute will engage at its edges behind the boundary edges of the opening 57, and hence will not fall through the opening, but will slide down the raceway. The opening 57, as indicated in dotted lines, in Fig. 8, extends longitudinally of the raceway a distance sufficient to insure the falling out of a coin too small in size. A receiving pan 58, see Figs. 7 and 9, receives the coins which are too small in size, and the one who deposited such coin may recover the same from this pan. Where a spurious token is used, such for example as an iron disk of the proper size to be inserted in the mouth 56, and to slide down the raceway, we provide an electro-magnet 59, see Figs. 7, 8 and 13, having its magnetized armature or pole piece 60, formed with a shoulder 61, which extends through the rear wall of the chute 55 till its inner surface is

approximately flush with the inner wall surface of the chute, down which the coins slide. If an iron slug or spurious coin is inserted in the chute, it will be attracted by the pole piece 60, and will be retained upon or against the shoulder 61 thereof, and will not pass on down the raceway, but will form a clog to prevent the insertion of another coin through the mouth of the chute, until the spurious coin or slug is removed. In order to permit any clog of the raceway to be removed we form the side wall of the raceway opposite the side wall containing the large opening or slot 57, with a long narrow slot or opening 62 to permit the insertion therethrough of a wire or other suitable instrument to clear any blockade that might occur in the raceway.

When a coin of the required size is inserted into the raceway 55, it slides down the same until it is arrested by a finger 63, see Fig. 8. This finger is of conducting material and is carried by but insulated, as indicated at 64, from a lever 65, which is pivotally connected as at 66 to the plunger stem or core 67 of a magnet coil 68. The heel of lever 65 abuts against the arm of a bracket 69, to form a stop therefore when the circuit of magnet 68 is opened, to hold the finger 63 in position to receive and form a stop for the coin. Also mounted on lever 65, but pivotally and yieldingly connected thereto, is a cooperating finger 70 of insulating material, which, when the lever 65 is rocked to release a coin which has been arrested by contact finger 63, is moved into the raceway to form a stop for the next succeeding coin until the release of the previously deposited coin has been completed and the parts controlled by the electric circuit which is completed by the coin through contact finger 63, have returned to their initial position. One of the purposes for making finger 70 yieldable is that as lever 65 rotates to the dotted position shown in Fig. 8 to release the coin held by finger 63, it contacts with the coin and tends to rotate in a clockwise direction around its pivot point against the action of the spring so that when the coin is fully released by finger 63, yieldable finger 70 gives the coin a downward kick, insuring positive release thereof. This is clear when it is considered that as the left hand end of lever 65 rotates downwardly yieldable finger 70 contacts with the periphery of the coin and tends to slide upwardly thereon with continued movement of lever 65. This stresses the spring pressing on the finger so that the coin is snapped downwardly just as finger 63 releases it.

In Fig. 15 we have shown another simple arrangement for eliminating under-sized coins. In this arrangement the mouth 131 of the raceway 132 will, of course, reject oversizes of coins. In case an undersize

coin is inserted through the mouth it will fall down the chute till arrested by the finger 133, of the coin stop lever 134. This finger is prolonged to extend a substantial distance into the raceway and its upper or coin supporting edge is inclined downwardly towards an opening or slot 135 in the proximate wall of the chute. This opening or slot is of such dimension as to permit an undersized coin to pass therethrough without contact with the conducting portion 136 of the chute but will prevent a proper sized coin from passing through, which latter coin of proper size will be arrested by the finger 133 in position to also contact with the conductor member or portion 136. With this arrangement the undersized coins will roll down the inclined upper edge of the finger 133 and will pass out through the slot 135 without completing the coin controlled circuit.

If desired, any suitable or desired counter device, signal or other mechanism, indicated at 71, may be actuated by the plunger stem or core 67 of magnet 68, so that a signal, registration, or the like, may be effected with each energization of magnet 68.

Also connected to and actuated by the plunger stem or core of magnet 68, are contact disks 72, 73, 74, which are yieldingly mounted on said plunger stem or core by means of coil springs 75, and which respectively cooperate with the pairs of contacts 76, 77; 78, 79; 80, 81; to bridge the space between them.

The contacts 76, 77, 78, 79, 80, 81, are preferably in the form of screws, see Fig. 7, and extend in a direction parallel to the planes of the contact disks 72, 73, 74. By screw threading these contact pins efficient circuit contact is insured between them and the disks, which is not liable to be impaired by accumulation of dust, dirt, and the like. These pins are adjustably mounted in one of the wall plates 82 of the frame or casing of the coin box, and extend through enlarged slots 83, formed in said wall plate so as to be out of contact therewith, and through insulating plates 84, 85, placed on opposite sides of said wall plate. The pins are held in adjustable position by means of set nuts 86.

In some cases we prefer to interpose an additional switch or contact device in the coin controlled circuit, which is actuated by the person or individual passing through the apparatus so that the deposit of a coin and the passage of a person through the apparatus jointly control the circuit of the lock magnets and one pair or set of barrier arms. This auxiliary or additional switch or contact may be arranged for operation by the passage of a person through the apparatus in many different ways. We have shown one arrangement which we have found to be practical and efficient, but to which our in-

vention is not to be restricted or limited, wherein the flooring of the apparatus is provided with a depressible portion 139, which is hinged at one end, as indicated at 140, see Figs. 16 and 17, and is maintained yieldingly elevated at its opposite end by means of a spring 141. As a person steps upon this yielding floor section in passing through the apparatus said section yields or is depressed and this movement is utilized to open and close contacts in the desired circuits. In the form shown, the yielding floor section 139 is connected to rods 142, the upper ends of which are connected to rock levers 143, pivotally mounted as at 144, upon the insulating member 145 which carries the contacts 44, 45, 46, 47, 48, 49, 50, and 51. The rock levers 143 carry insulated contact fingers 146, 147, so disposed with reference to each other and to cooperating contacts 148, 149, that when the floor section 139 is depressed, the levers 143 are rocked to carry the fingers 146 into contact with the contacts 149, and when said section is relieved of the depressing pressure and returns to normal position, said levers 143 are returned to initial position and cause contact fingers 147 to contact with the contacts 148. The contacts 148, 147, control the circuits of the lock magnets 35 of the first pair of barrier arms while the contacts 149, 146, together with the coin contacts, control the circuits of the lock magnets 34 of the second pair of barrier arms.

The operation of the electrical part of the apparatus will be made clear by reference to the circuit diagram of Fig. 14.

Current is derived from any suitable source, as from trolley, through wires *a*, *a*¹, *a*². From the wire *a*¹ one circuit is completed through resistance 137, wire *b*, contact 49, strips 42, contact 48, and jumper 90, these parts being controlled by the first pair of barrier arms, thence through wire *c*, the coils of the magnets 34 which release the locks for the second pair of barrier arms, contacts 149, fingers 146, when the latter are closed upon each other by a person passing through the apparatus, wire *d*, contact 80, contact disk 74, contact 81 to lever 65 and the conducting finger 63 thereof, through a coin 91, wire *e*, to ground at 92. The completion of this circuit, it will be seen, is dependent upon the first pair of barrier arms being in their normal position to form a barrier across the passageway A; also upon the auxiliary contacts 146, 149 being closed; and also upon a coin having been deposited in the chute 55, and completing the circuit between the conductor finger 63, and a grounded circuit connection. In other words, when a proper coin has been deposited the floor section 139 has been depressed and the first pair of barrier arms are in their closed position the magnets which control the locking devices for the second pair of arms are energized, and

the said second pair of arms are released. This permits a passenger upon deposit of the coin to pass through the second pair of barrier arms thereby displacing them. This action brings contact strips 41 into bridging relation with respect to contacts 46, 47. Thereupon another circuit is completed from trolley wire *a*, through resistance 96, wire 1, contacts 46, strips 41, contacts 47, wire *m*, the coils of magnet 68, wire *n*, to ground at 94. This energization of the magnet 68 causes the plunger core thereof to actuate the register, counter, signal, or other devices 71, and also causes the lever 65 to be rocked and the contact finger 63 thereof to be withdrawn from arresting relation with respect to the coin, permitting the coin to continue down through the raceway 55, and projects the yielding finger 70 into the raceway to form a stop for the next succeeding coin until the parts have been again restored to their operating relation. The energization of magnet 68 also opens the circuit through the coin lever 65 and its contact finger 63 by breaking the circuit between contacts 81, 80. At the same time circuit is completed between contacts 79, 78, through disk 73, and between contacts 77 and 76, through disk 72. The completion of circuit between contacts 79, 78, maintains the circuit through the release magnets 34 closed as long as the first pair of barrier arms remain in their normal closed position, that is, as long as contact strips 42 remain in bridging relation with respect to contacts 48, 49, and as long as the contacts 146, 149 are closed upon each other, that is, as long as the yielding floor section remains in its normal raised position. As soon, however, as the first pair of arms is displaced and a person depresses the floor section, this circuit is opened by the strips 42 and contacts 146 breaking their bridging relation with respect to contacts 48, 49, and 149. Initially with the second pair of barrier arms in their closed position and the contacts 148, 147 closed, a circuit is established from trolley, through wire *a*², resistance 100, wire *f*, contacts 45, 44, strips 40, and jumper 101, wire *p*, the coils of release magnets 35 for the first pair of arms, contacts 148, 147, to ground at 102, so that when the second pair of arms are in their normal closed positions the lock devices of the first pair of arms are released. When, however, the second pair of arms are displaced the circuit through the coils of magnet 35 is broken by the strips 40 being moved away from bridging relation with respect to contacts 44, 45, thereby causing the first pair of arms to be locked and to remain locked as long as the second pair of arms are displaced from their closed positions. The closing of disk 72 upon contact 76, 77, closes a circuit from trolley through wire *a*, resistance 96, resistance 97, wire *h*, through 77, 72, 76, and con-

nection *g*, the coils of magnet 68, wire *n*, to ground at 94, thus constituting an interlock. This condition continues as long as the first pair of arms remain in their normal closed position. When these arms are displaced the strips 43 bridge the contacts 50, 51, thereby completing a circuit from trolley through wire *a*, resistance 96, wire 1, wire *j*, contacts 50, strips 43, contacts 51, to ground at 129. The resistances 96, 97, are so chosen that the one is of less resistance value than the other. For example the resistance 96 may be 1250 ohms while 97 may be 2500 ohms. Therefore, upon completion of the last named circuits the magnet coil 68 is short circuited and the contact disks 72, 73, 74, are restored to their normal positions. When the first pair of arms is displaced into their open positions the circuit of release magnets 34 of the second pair of arms is opened through contact strips 42, leaving the contacts 48, 49, and consequently the second pair of arms become locked.

When the slug arresting magnet 59 is employed its circuit is completed from trolley or other current source through resistance 96, wire *s*, resistance 120, magnet 59 to ground as at 130.

From the foregoing description it will be seen that the second pair of arms must be in their closed position, which means that they must be locked and the floor section in its raised position before the circuit can be completed of the release magnets for the first pair of arms. It will also be seen that the first pair of arms must be closed, which means that they must also be locked, before the second pair of arms can be released. It will also be seen that a coin must be deposited and the floor section depressed before the lock devices for the second pair of arms can be released. It will also be seen that the second pair of arms must be displaced before the circuit is completed of the coin releasing magnet, and that when the second pair of arms are restored to their closed position the circuit of the releasing magnet is opened permitting the deposit of the coin.

From the foregoing description it will be seen that we provide an exceedingly simple, effective and reliable passageway controlling apparatus. We have found in the practical test of this apparatus that the percentage of loss in collected fares is almost inappreciable. We have found that the apparatus is capable of accommodating without interference or interruption the conditions of rapid transit even under the most trying necessities of the rush hour where traffic is exceptionally heavy, thus attaining a maximum of capacity with a minimum of re-

sistance, affording a comfortable, rapid passage of passengers by merely the deposit of the required fare coin or token, which accommodates the traveling public by avoiding delays incident to congestion, crowding and blockading in attempting to pass through restricted passageways. In practice, we propose to employ banks of passageway controlling devices embodying our invention so as to offer the greatest possible convenience and accommodation to the necessities and requirements of heavy passenger traffic.

It is to be understood that many changes in the details of construction and arrangement will readily occur to persons skilled in the art and still fall within the spirit and scope of our invention. We do not desire therefore to be limited or restricted to the exact details shown and described.

But having now set forth the objects and nature of our invention, and a construction of apparatus embodying the same, what we claim as new and useful and of our own invention and desire to secure by Letters Patent is,—

1. In a passageway controlling mechanism, and in combination with means to form a restricted passage, barrier arms therefor, lock devices for said arms, and releasing means for said lock devices, of coin controlled devices for controlling said releasing means, including a coin or token receiving receptacle having a raceway adapted to receive and guide coins or token of substantially uniform size, a releasable coin or token stop and a cooperating yieldable coin or token stop member arranged to be alternately projected into the raceway, and means for actuating said stops said means being energized by the operation of said barrier arms.

2. In a passageway controlling mechanism, and in combination with means to form a restricted passage, barrier arms therefor, lock devices for said arms, and releasing means for said lock devices, of coin or token controlled devices for controlling said releasing means, including a coin or token receiving receptacle having a raceway adapted to receive and guide coins or tokens of substantially uniform size, a rock lever, a coin or token stop carried thereby, an auxiliary coin or token stop yieldingly mounted on said lever, and means to rock said lever to alternately extend said stops into the raceway.

In testimony whereof we have hereunto set out hands on this 8th day of January, A. D., 1926.

FRANK HEDLEY.
JAMES S. DOYLE.