

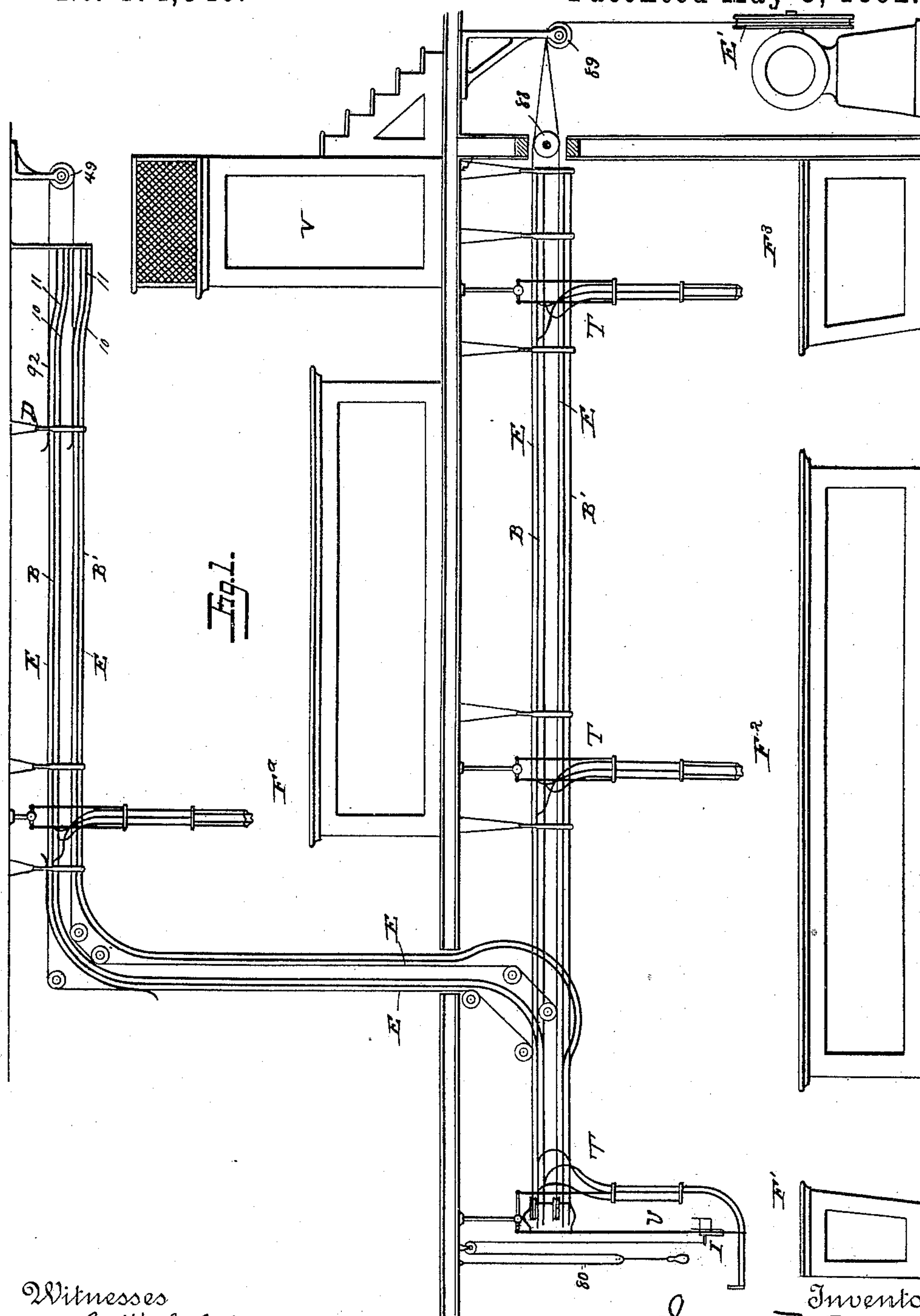
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10 Sheets—Sheet 1.

J. T. COWLEY.
STORE SERVICE APPARATUS.

No. 474,040.

Patented May 3, 1892.



Witnesses
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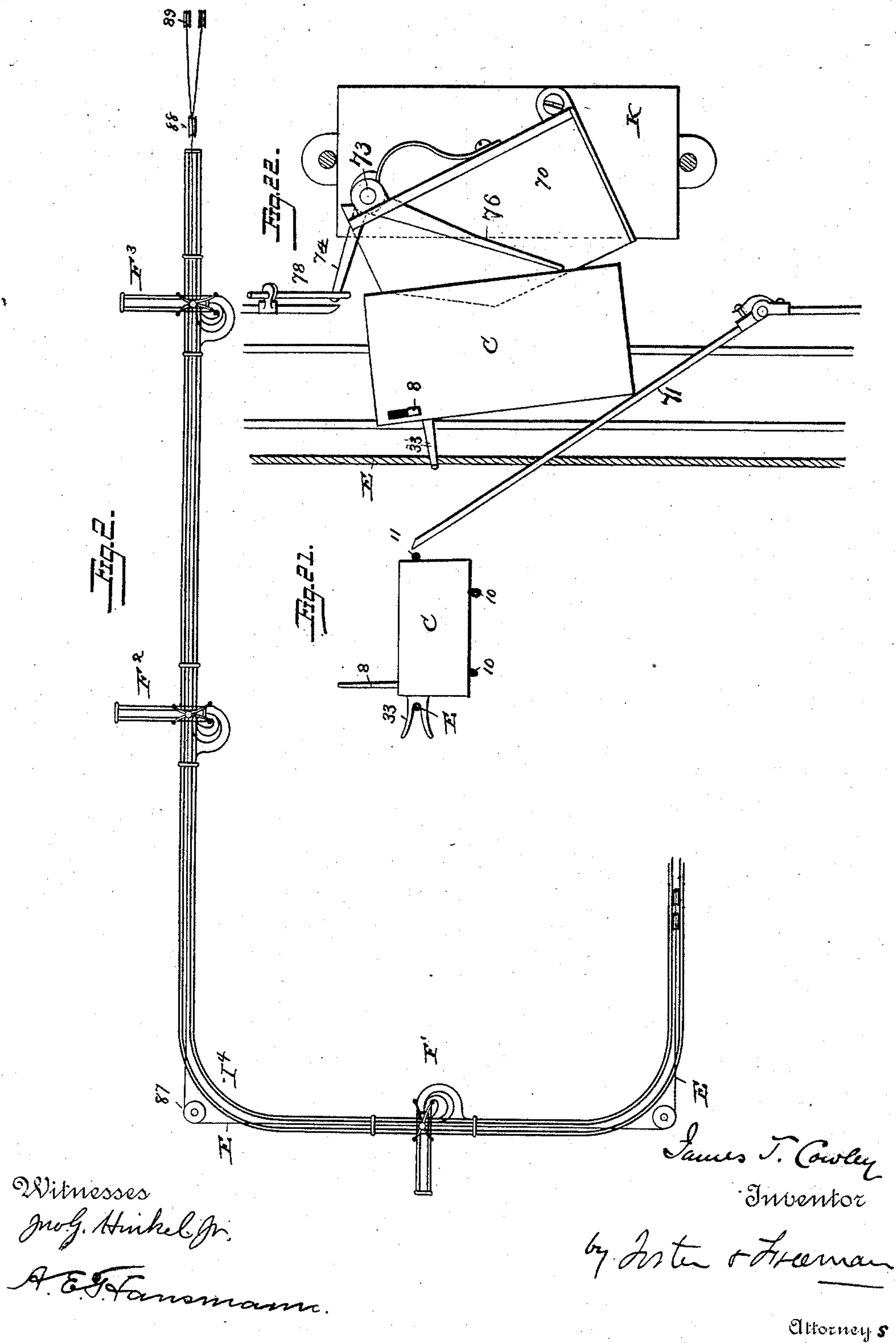
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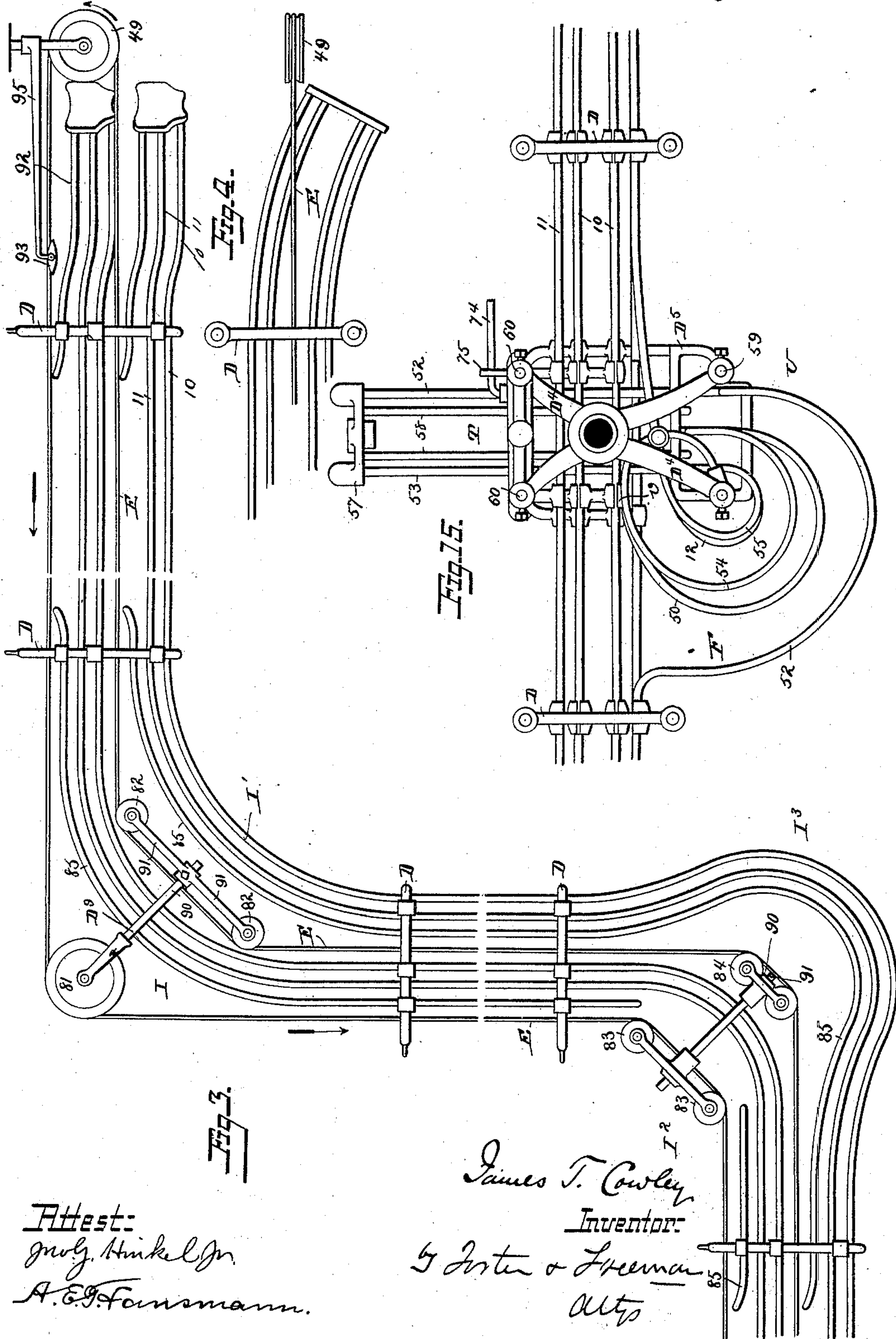
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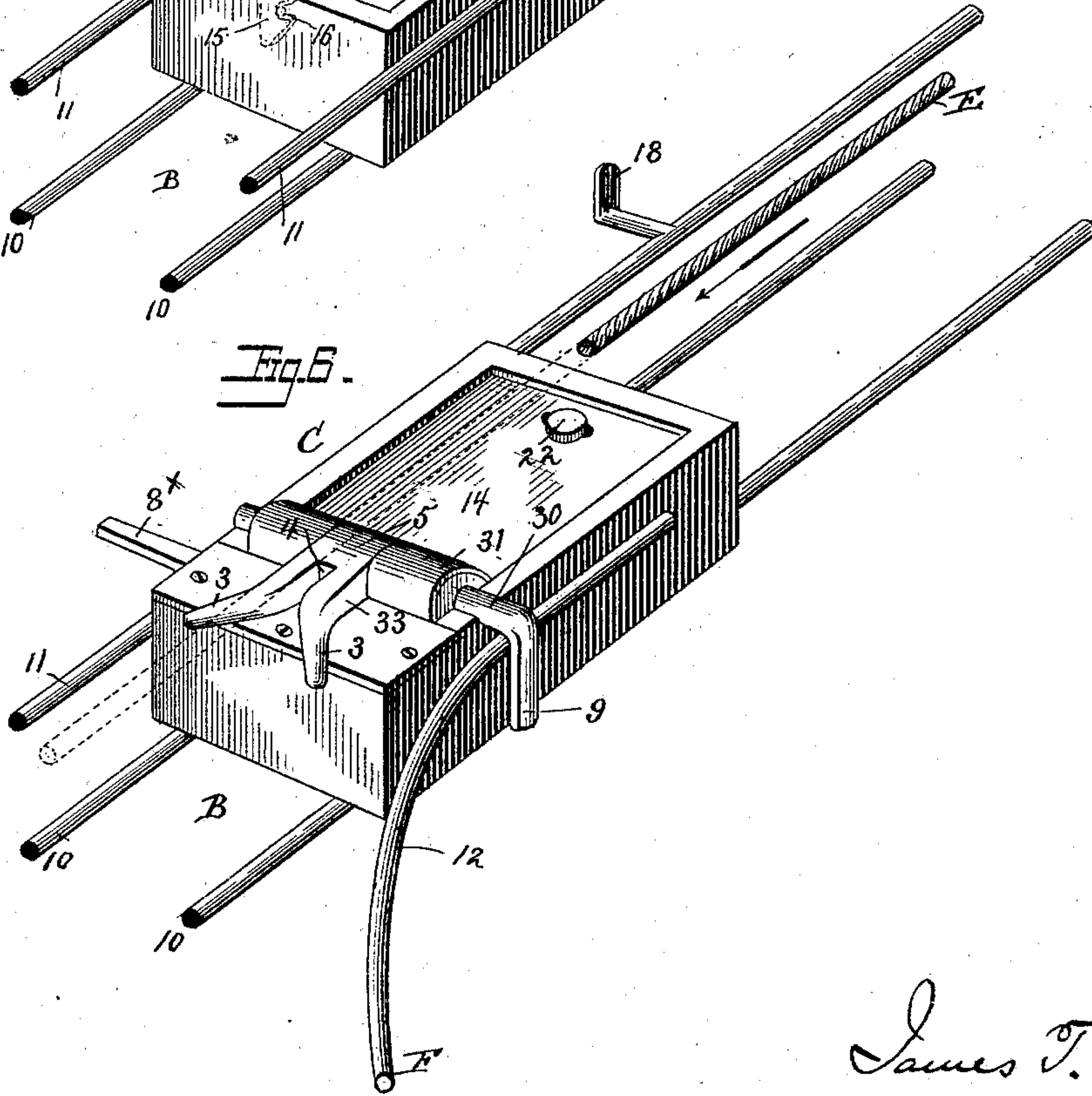
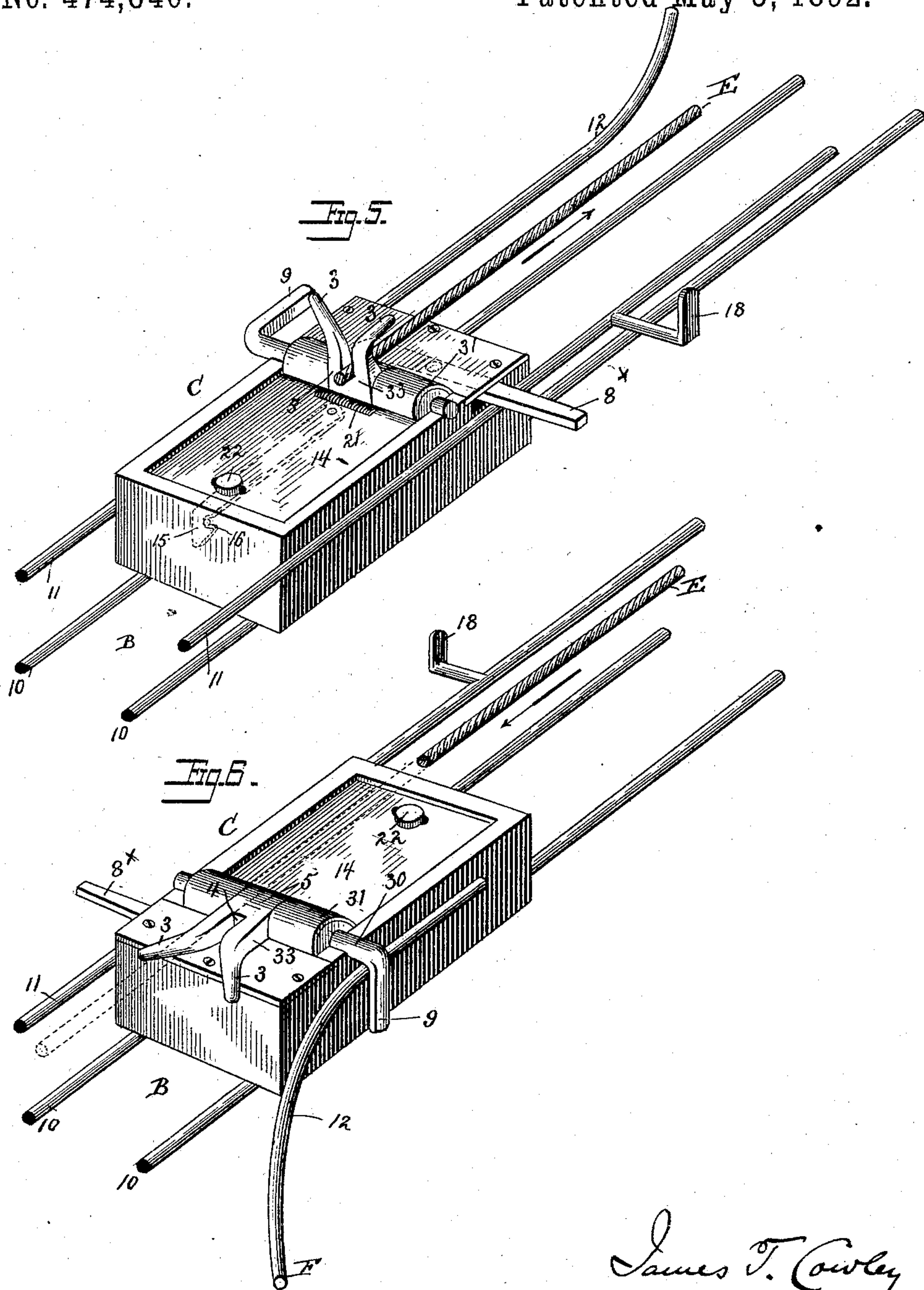
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J. T. COWLEY.
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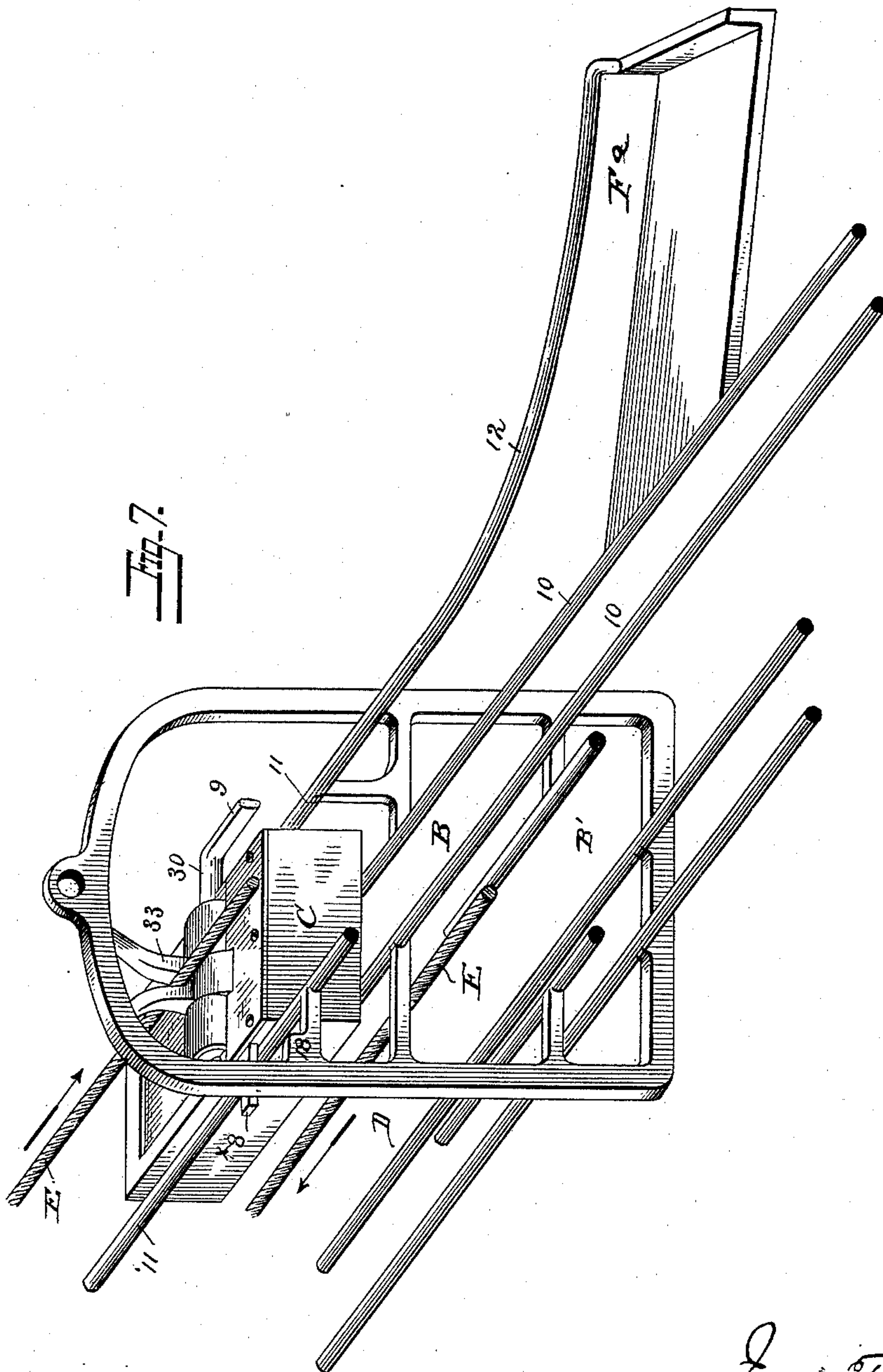
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J. T. COWLEY.
STORE SERVICE APPARATUS.

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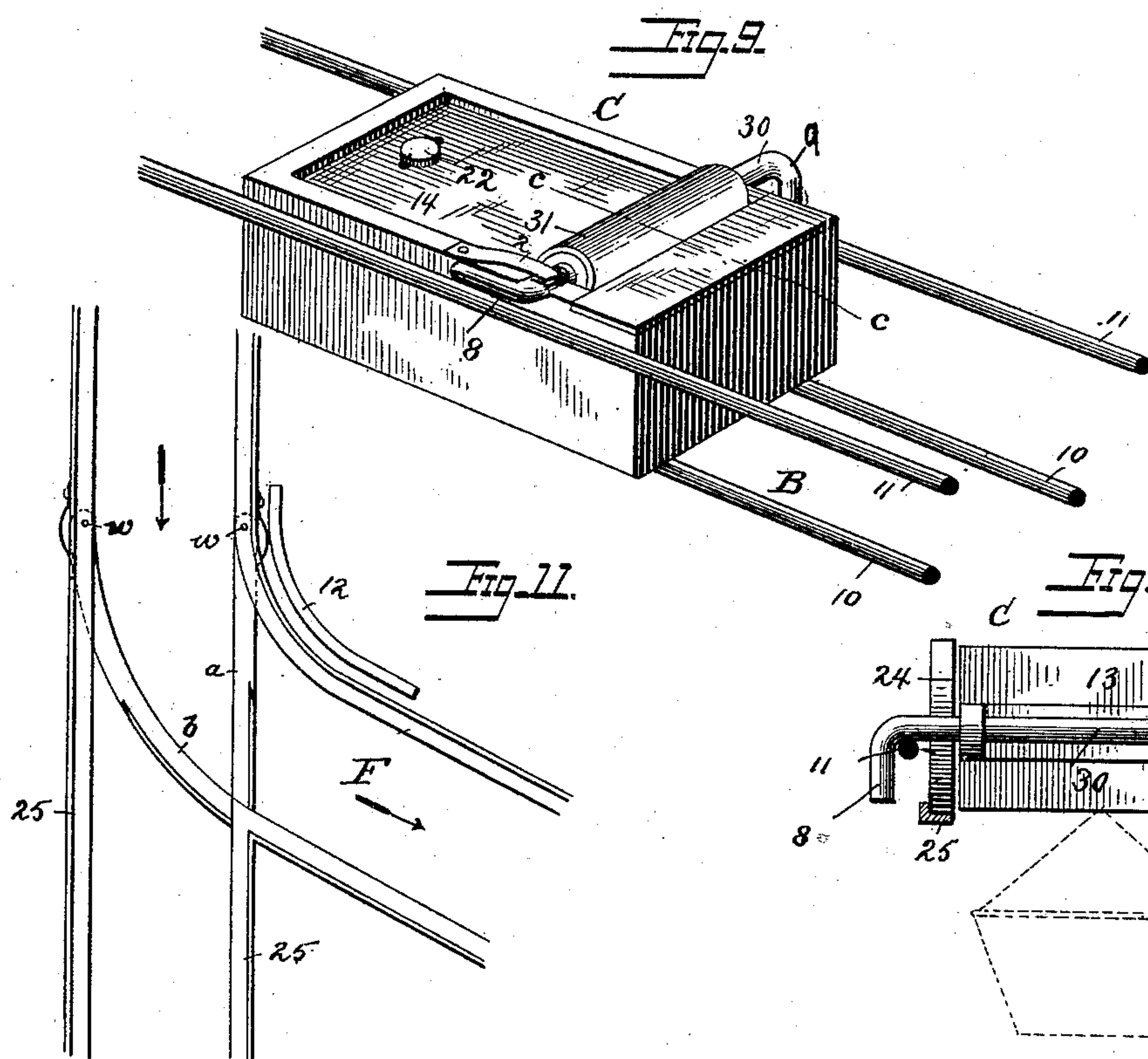
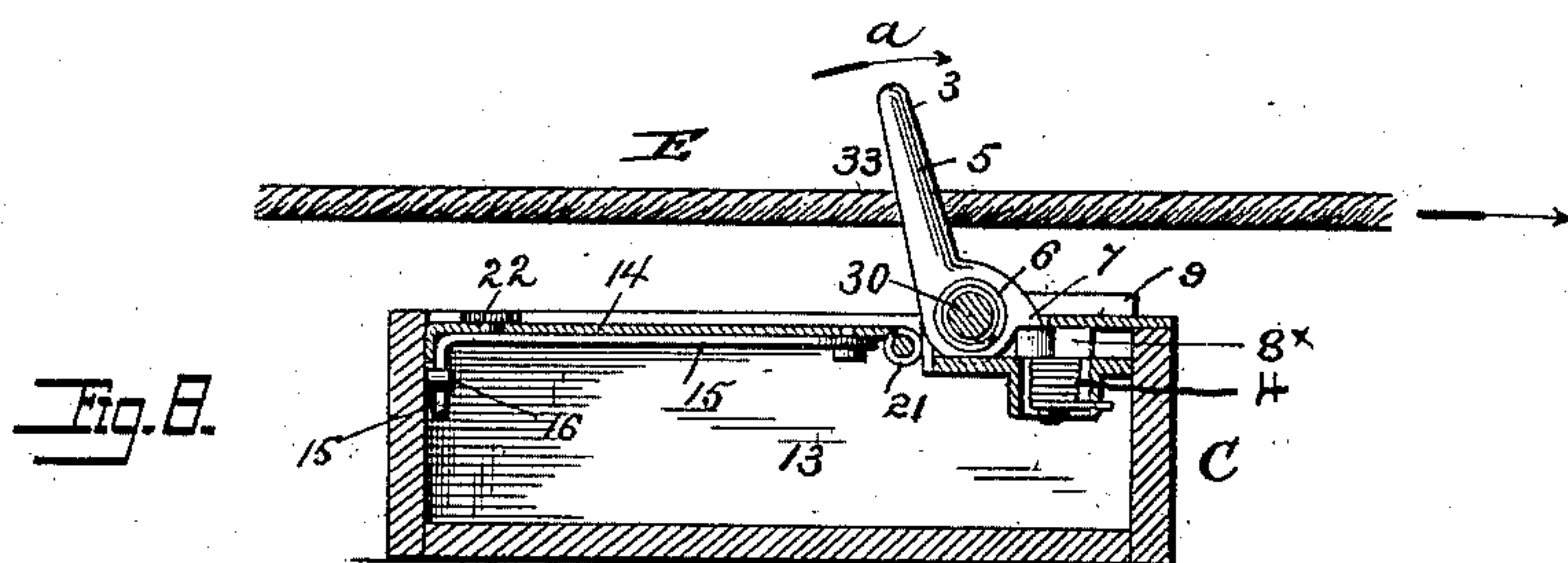
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Fig. 12.

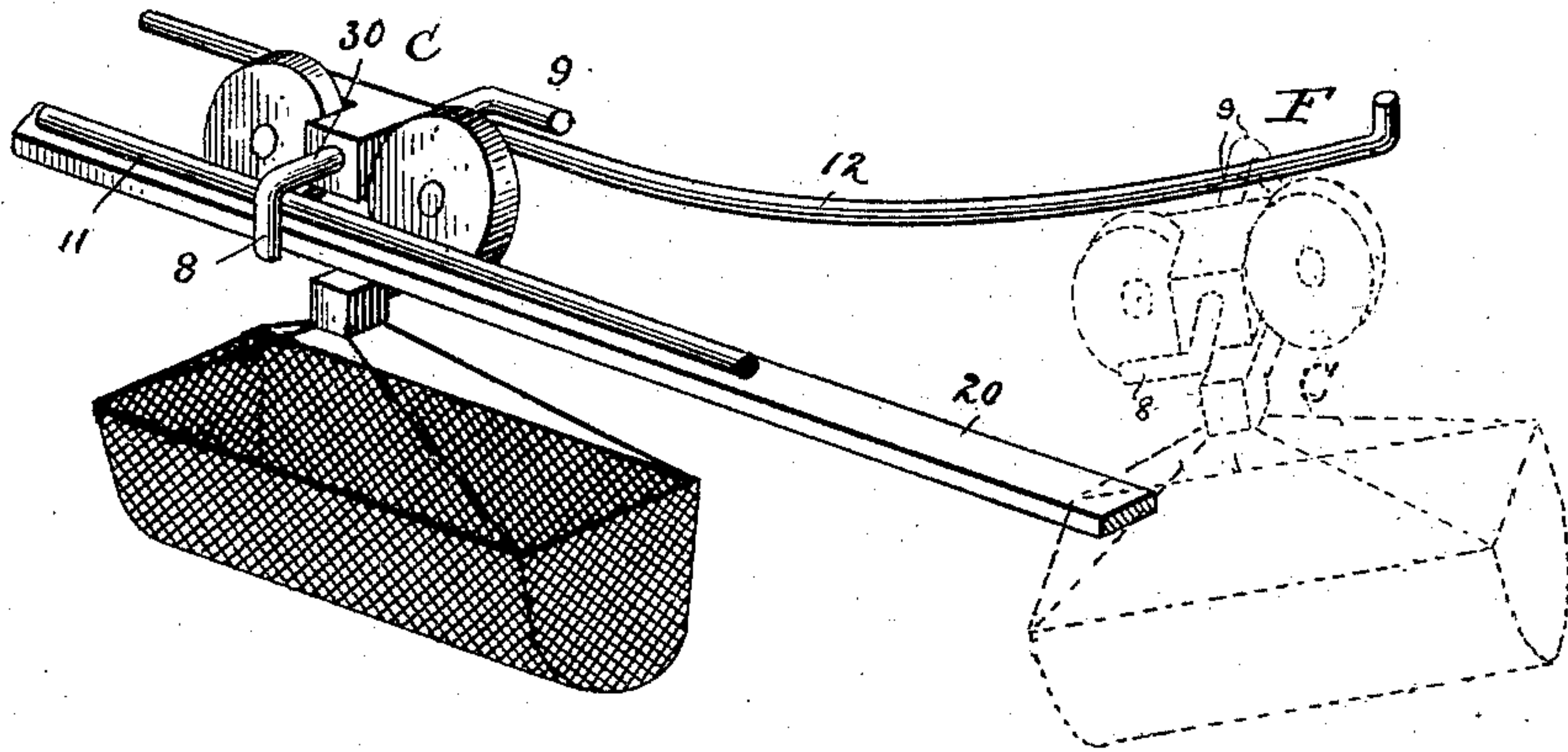


Fig. 15.

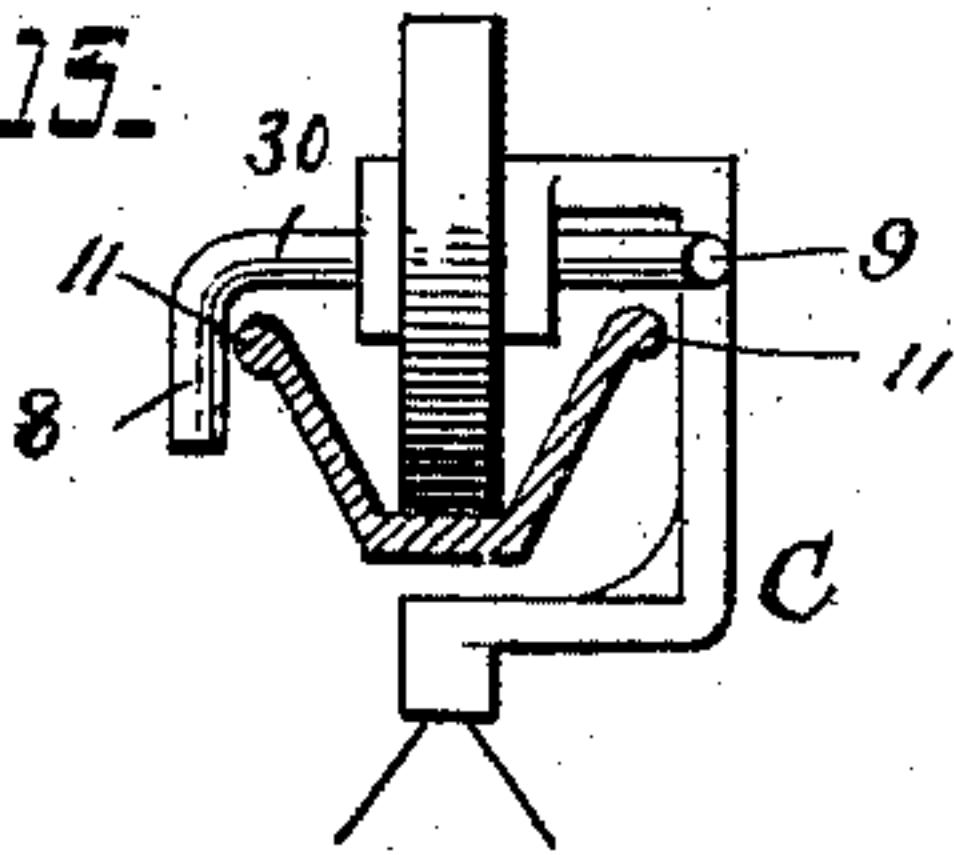


Fig. 14.

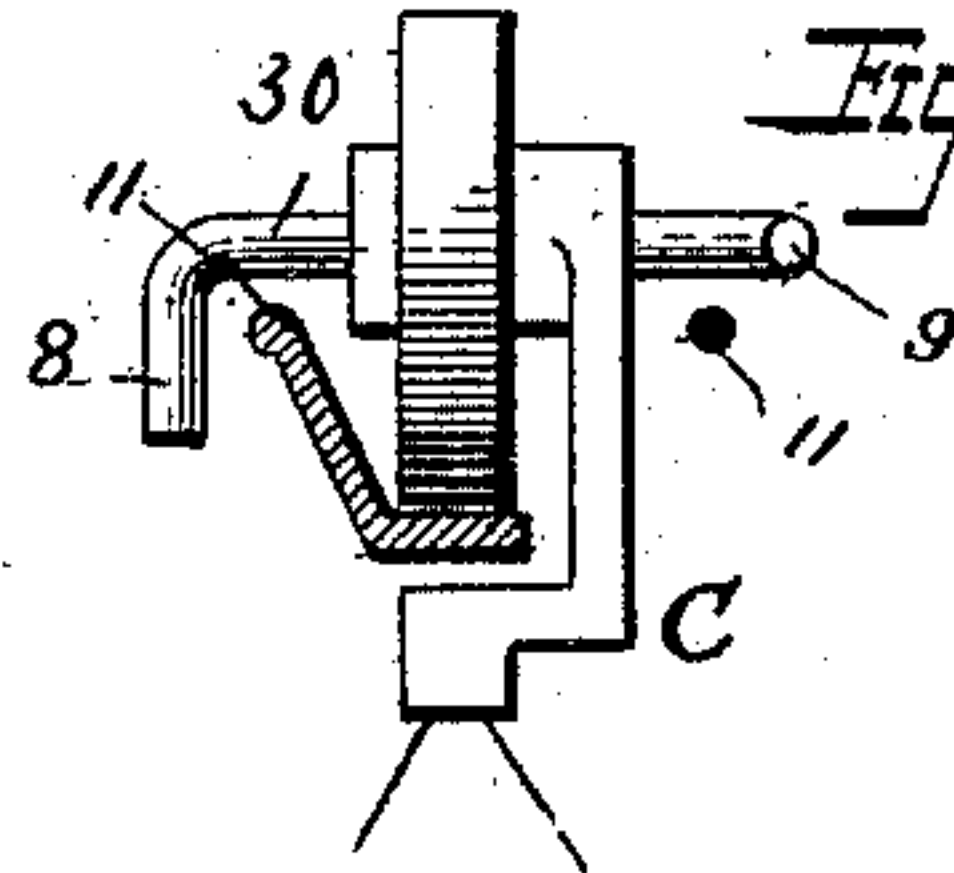


Fig. 23.

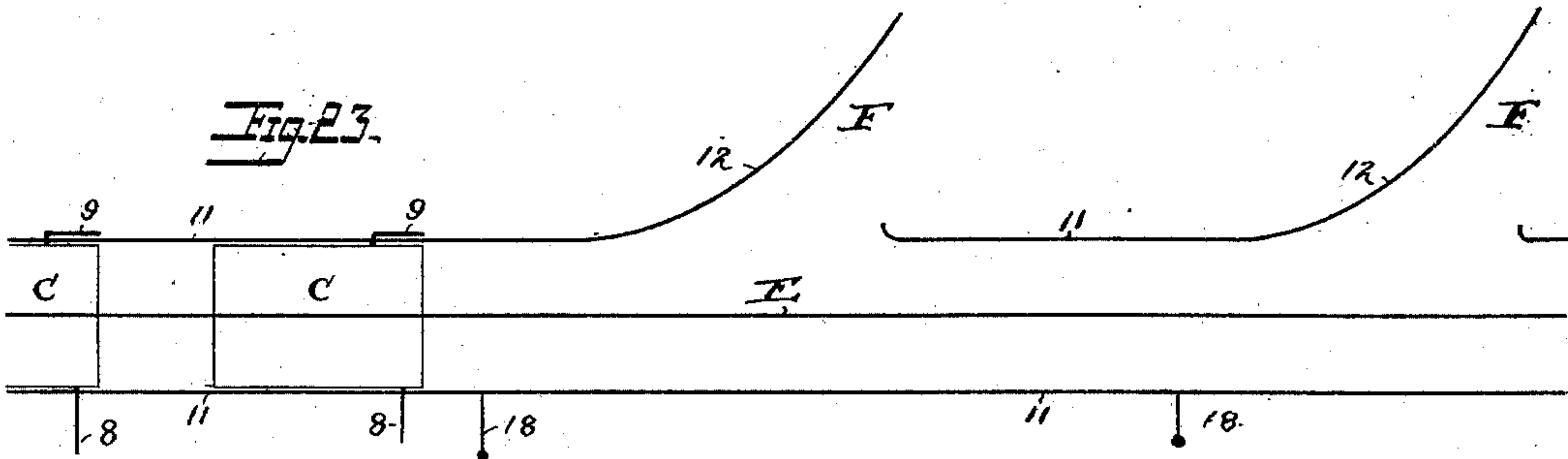
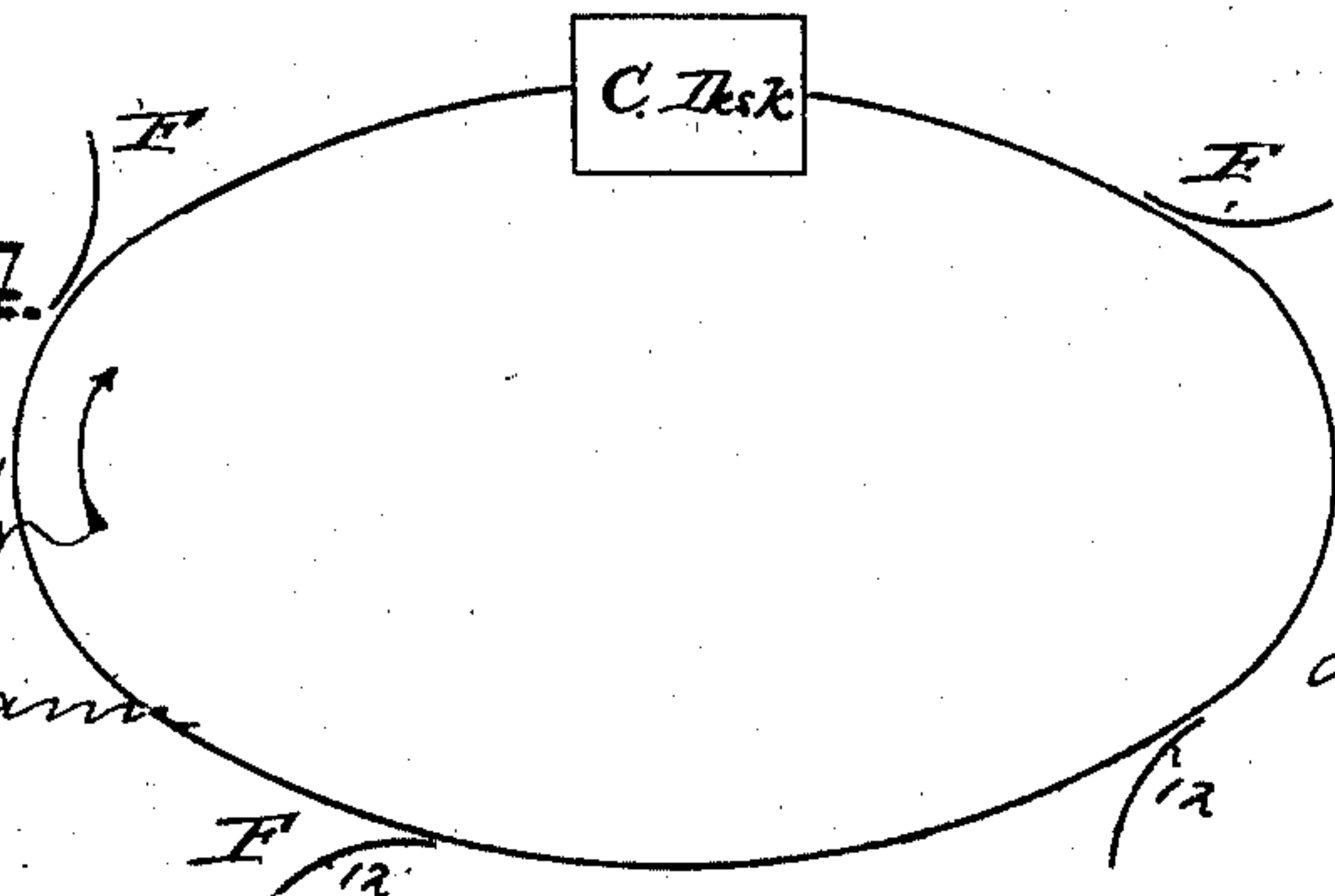


Fig. 24.

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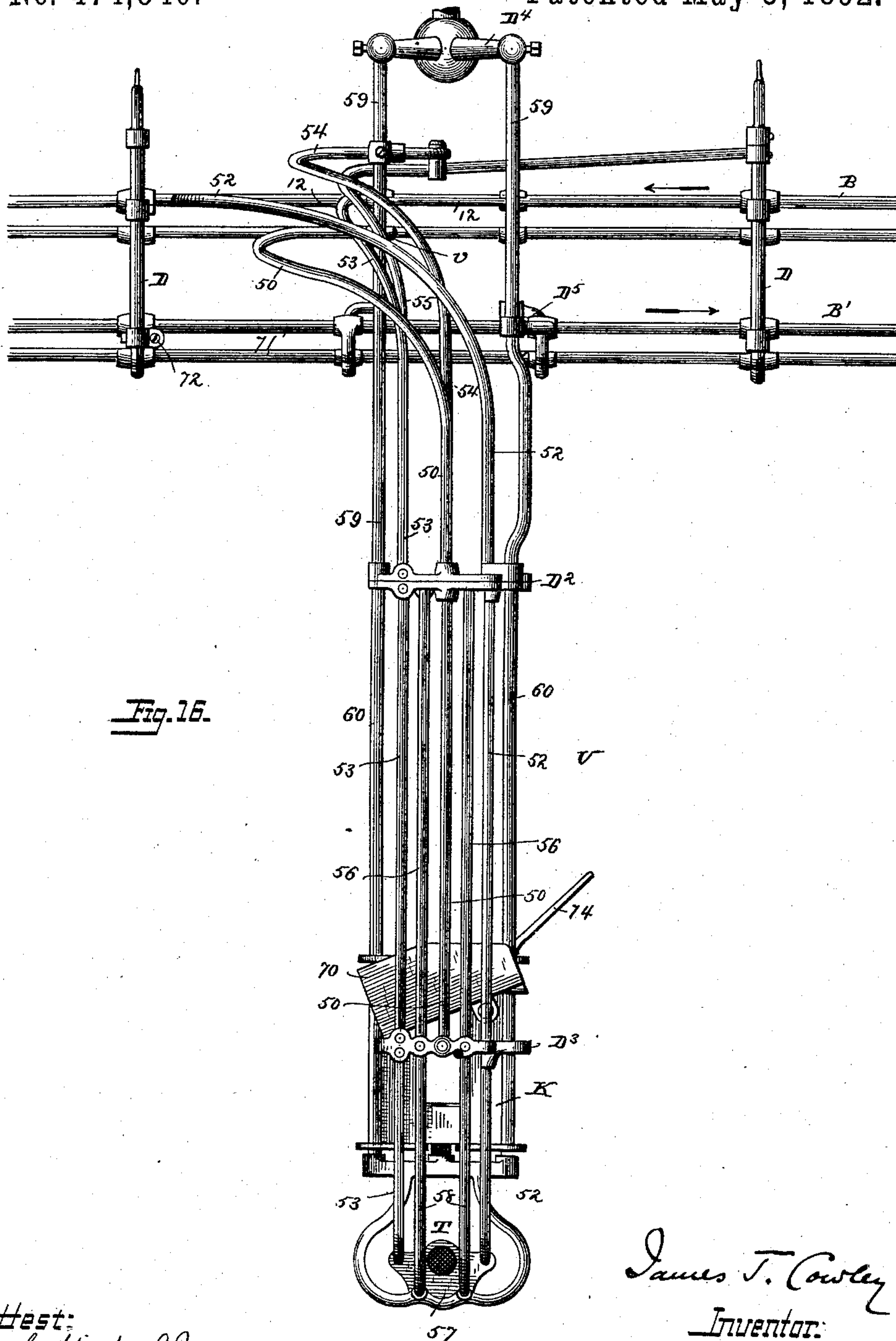
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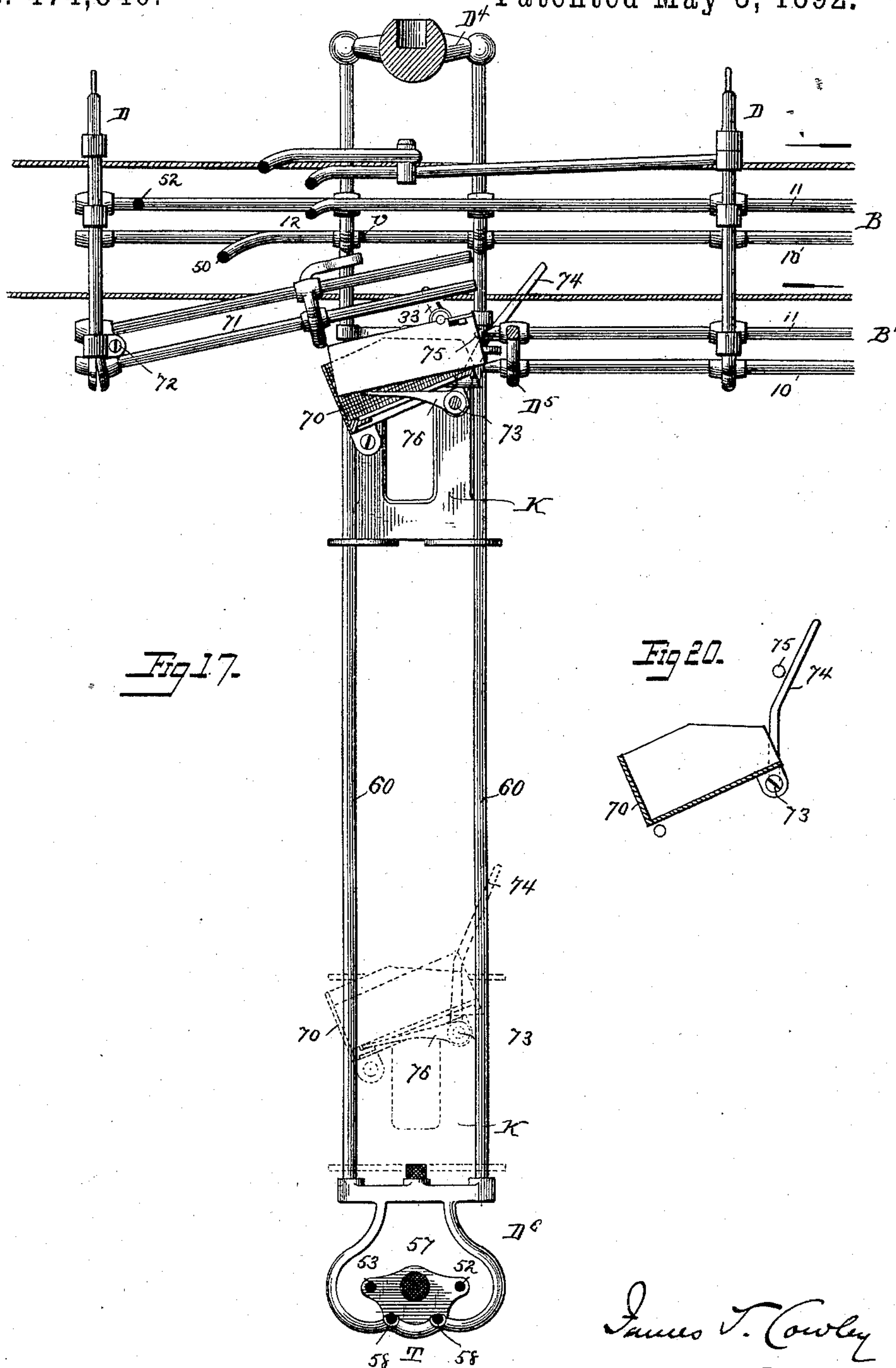
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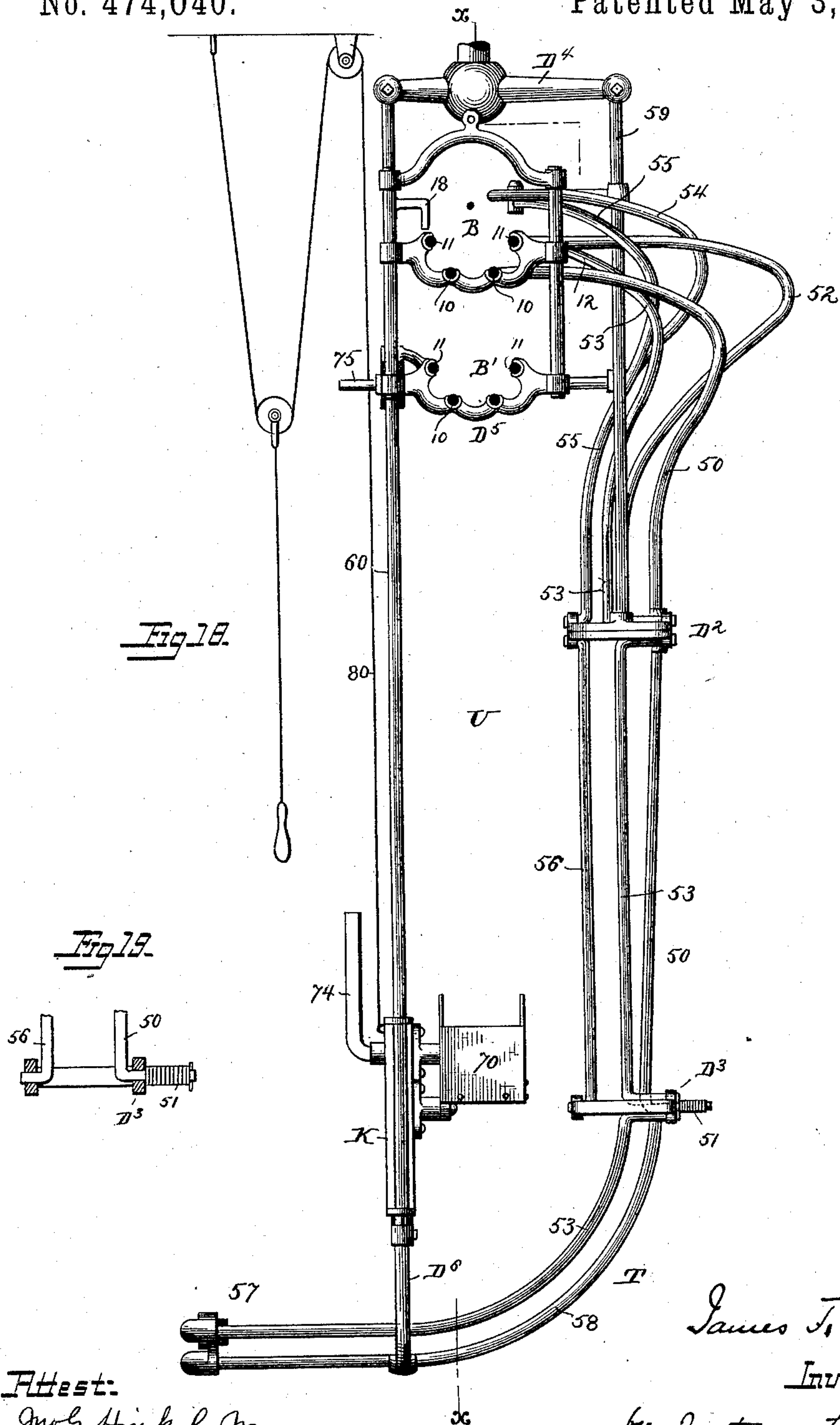
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UNITED STATES PATENT OFFICE.

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STORE-SERVICE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 474,040, dated May 3, 1892.

Application filed April 18, 1888. Serial No. 271,015. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. COWLEY, a citizen of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Store-Service Apparatus, of which the following is a specification.

This invention relates generally to store-service apparatus, and while certain features thereof are alike applicable to many kinds of such apparatus the present improvements particularly relate to that class of apparatus wherein a plurality of moving carriers, adapted either for cash or parcels, are automatically arrested at their respective destinations in such manner as not to obstruct the track or way upon which they travel; and the invention consists in certain novel devices and combinations of parts hereinafter fully set forth.

In the drawings, Figure 1 is a diagrammatic view in elevation of an apparatus embodying the present invention. Fig. 2 is a similar view in plan of a portion of that shown in Fig. 1. Fig. 3 is an elevation of portion of the forwarding and return tracks, showing particularly the arrangement of curves connecting the vertical with the horizontal portions of the tracks; and Fig. 4 is a plan view of the end of one of said tracks. Fig. 5 is a perspective view of a portion of the return-track and a carrier in position thereon. Fig. 6 is a similar view looking from the opposite side thereof. Fig. 7 is a similar view of the apparatus, illustrating the two tracks, a bracket for supporting them, and a carrier in position on one of the tracks. Fig. 8 is a longitudinal sectional elevation of the carrier shown in Figs. 5, 6, and 7. Fig. 9 is a perspective view of a carrier embodying a modified form thereof. Figs. 10 and 11 are respectively a cross-sectional and plan view of another modified form of the carrier and track. Fig. 12 is a perspective view, and Figs. 13 and 14 are cross-sectional elevations showing other forms of the carrier and track embodying the invention. Fig. 15 is a plan view of a portion of the return-track at one of the stations, showing particularly the speed-retarder and

delivering-elevator. Fig. 16 is a side elevation of the same. Fig. 17 is a vertical sectional elevation thereof, taken on the line xx of Fig. 18, looking in the same direction as in Fig. 16. Fig. 18 is an end elevation thereof. Fig. 19 is a sectional detail of the movable end of the branch rail 50. Fig. 20 is a modified form of the elevator-pocket shown in Figs. 16, 17, and 18. Figs. 21 and 22 are respectively sectional end and plan views of a modified form of the track and devices for returning the carrier thereto. Fig. 23 is another diagram illustrating a track and carriers thereon stripped of all details of construction, and Fig. 24 is a similar diagram hereinafter referred to.

The way is suitably constructed to support the carriers, which in the apparatus shown and herein described are propelled by a continuously-traveling cable. The said way may consist of parallel rods, as shown, or may be of any usual construction adapted for use in connection with the other features.

An arrangement of forwarding and return tracks $B'B$ of the way in a store is illustrated in the diagrammatic views, Figs. 1 and 2, showing parallel tracks leading from a cashier's desk V upon an upper floor past a station F^a downward to a lower floor and past stations F' F^2 F^3 , from which carriers are to be received by means of elevators U of suitable construction and to which they are to be delivered by means of the usual drop boxes or tubes, drop-baskets, or in the specially-constructed devices hereinafter fully set forth.

The cable E is suitably guided, as fully set forth hereinafter, to travel in a line with each track and passes round a driving-wheel E' , operated by a suitable motor, whereby the requisite movement is imparted.

As it will be desired to deflect the carriers from one way unto another at stations, means are provided for this purpose. Thus in Figs. 5 to 7 upon the return-way B , at or near each station, a switch 12 is arranged adjacent to the way and in position to control the further movement of the carrier, which is provided with a movable engaging piece or post which I term an "engaging-finger" 9, which is carried by a shaft 30, mounted thereon.

Where there are a number of stations and

a plurality of moving carriers, graduated contact-pieces of suitable construction are arranged along the track (in conjunction with the switches 12) at each station to actuate the
 5 movable engaging-fingers of the carriers to be switched from the track by said switches. In the preferred form, Figs. 1 to 7, inclusive, each track consists of one or more supporting-
 10 rods 10, along which the carriers will travel, and provided on one or both sides thereof with a side guard 11 to better confine the carriers to the track and prevent them from accidental dislodgment, the rods and guards forming the tracks B B' (which tracks are preferably located one above the other) being
 15 supported at suitable intervals by a bracket D of any desired form.

The switch 12 is shown in Figs. 5, 7, 12, 15, and 16 as forming a continuation of one of the
 20 side-guard rails 11; but it may obviously be independent thereof, as in Fig. 6, wherein only one side guard is illustrated. In either form the switch will preferably extend for a short distance parallel with the way and then be
 25 curved and extended away therefrom for any suitable distance and form a portion of a branch way or lead to a station F^a alongside of the way for receiving and arresting a carrier, as in Fig. 7, or to the drop of a station, as
 30 shown in Figs. 1 and 15 to 18, or form in itself the arresting and receiving device on which the carrier will be supported, as in Fig. 12.

The carriers C in their preferred form, Figs. 5 to 8, each consist of a rectangular case constituting a receptacle or compartment 13, having a hinged cover 14 held closed against the
 35 force of a spring 21 by a hooked end of a pivoted catch 15, carried upon the under side of the cover, which end engages with a stud or
 40 pin 16 in the interior of the compartment, and said catch may be moved to one side to engage or disengage said stud by a finger-piece 22, projecting through a slot in the cover. Of course many other forms of catch may be employed to secure the cover in place.
 45

The engaging-finger 9, with which each carrier is provided, is shown as forming part of the shaft 30, that is mounted in a bearing 31, so as to be capable of rocking therein, the
 50 said finger 9 extending at one end of the shaft at right angles thereto. In one form the shaft 30 is provided with squared portions engaged by a flat spring 2, Fig. 9; so as to hold the finger 9 in its adjusted positions against accidental movement, and at the opposite end forms a contacting-finger 8, which is at an angle
 55 to that of finger 9 at the opposite end, so that the latter in the normal position of the shaft extends parallel with the way and out of position to engage a switch 12. The finger 8, however, in said normal position of the engaging-arm lies in the path occupied by one of the contact-pieces 18, arranged along the track and preferably in advance of the switch,
 60 so that when the said finger 8 is struck by its proper contact-piece and moved the engaging

finger will be correspondingly moved to a position to engage a switch 12, and thus automatically place the carrier within the control of said switch in its further movement. In
 70 some cases, Figs. 5 to 8, the contact-finger, as shown at 8^x, is independent of the shaft 30 and is pivoted to the carrier, so that its inner end may engage with a shoulder 7, carried by
 75 said shaft to hold the latter in its normal position against the force of a spring 6, and said finger 8^x may be held to duty by a spring 4. The projecting end of the finger 8^x extends in a position to strike one of the contact-pieces 18, to be thereby moved to release its
 80 inner end from the shoulder 7 and permit the shaft and its engaging-finger 9 to be moved by said spring 6 to a position for the finger 9 to engage the switch 12, as in Fig. 6. The contact-finger may, however, be integral with
 85 the shaft 30, as before described, and shown in Figs. 9, 10, and 12, to 14.

When the carrier is to be moved along the way by a power continuously exerted, as by the endless cable E, means must be provided
 90 for connecting the carrier with the cable and for automatically detaching it therefrom when the carrier is to be stopped or switched from the way. In the present instance there is a catch in the form of a fork 33, preferably carried by the shaft 30 and having flaring prongs
 95 3 3, which catch is arranged to straddle the cable, so that the latter becomes wedged in the notch between the prongs and draws the carrier along with it. The catch is so arranged on the shaft 30 that in the normal position of the latter the catch will be in position to engage the cable; but as the shaft 30 is rocked to move its finger 9 into engagement with the switch 12 by the operation of the
 100 finger 8 and a contact-piece 18 the catch will be simultaneously moved away from the cable and detached therefrom.

In the preferred construction, Figs. 5 to 8, the catch (supposing the cable E to be traveling in the direction of the arrow) will be inclined slightly rearward, so that the tendency of the cable will be to draw down toward the bottom of the notch, while the catch, when it is moved to free or disconnect the carrier
 115 from the cable being suddenly moved in the same direction with that of the cable, will gain slightly thereon and partially free itself therefrom, and by reason of its circular movement will become entirely free from the cable in assuming the horizontal position seen in Fig. 6.
 120

In the construction shown in Figs. 9 to 14 the finger 8 acts as a safety device, loosely engaging, when in its normal position, the side
 125 guard 11, so that as the carrier passes a station along the way to which it is not to be directed it will prevent the carrier from becoming accidentally derailed; but when the shaft 30 is moved so that its finger 9 may
 130 engage the switch the finger 8 will be also moved to free itself from the side guard 11,

and hence it will not oppose the movement of the carrier when under the control of the switch.

In adapting a plurality of carriers to travel over the same way to their respective stations it is obvious that the contact-pieces 18 may be graduated in height or position with respect to the fingers 8 or 8^x on the carriers, or the fingers may be graduated in length with respect to the contact-pieces, or both the contact-pieces and the fingers 8 or 8^x may be graduated in size or position, as illustrated in the diagram Fig. 23, in a manner which will be well understood.

The forwarding-track B', leading from the salesman's counters to the central desk, is provided with propelling means similar to the other track, and is also provided with stations with means for permitting the carriers to be readily placed upon the track to pass to the central desk, and instead of employing a second track for forwarding the carriers to the central desk the track may lead from said desk around past all of the counters and return to said desk, as illustrated in Fig. 24. Of course in this case the contact-fingers and contact-pieces must be so arranged that the carrier after being placed on the way at any station to be sent to the central desk will not be directed from the way between its station and said desk.

It is obvious that different forms of carriers may be employed without departing from the essential features of the invention, and that different forms of ways may be used, along which the carriers may travel. Thus in Fig. 10 is shown a carrier C, consisting of a rectangular receptacle 13, mounted between supporting-wheels 24, which travel upon a track consisting of a pair of flanged rails 25 with a guard 11. These tracks at a station or branch way, as shown in Fig. 11, connect with branch tracks, a portion of the flange on one of the rails being removed to permit the wheels to pass onto said branch tracks when the engaging-finger 9 is moved to engage with a switch 12. If the receptacle be a pendent one, as shown in dotted lines, Fig. 10, the portion *a* of the main track and the portion *b* of the branch track will each be hinged at *w* and capable of swinging to one side, the former to permit carriers to pass a station and the latter to permit a carrier to pass onto the branch track.

In Fig. 12 the track consists of a single rail 20, provided with side guards 11, one of which extends into and forms a switch 12 of the station F. The carrier in this instance is provided with a pair of plain wheels mounted to travel on said rail 20, and the carrier-frame between the wheels is provided with the shaft having an engaging-finger 9 and a finger 8 for embracing the switch 12 and the side guard 11, respectively. In Figs. 13 and 14 a similar carrier is illustrated in part, with a rail formed with the side guard 11 integral therewith, forming in the first instance a

trough or U-shaped rail and in the other an L-shaped rail.

Of course it is obvious that the movable engaging-finger 9 may be employed independently of the catch 33, in which case other means, as gravity, for imparting a propulsive movement to the carriers may be used.

It should be understood that by the term "catch" I mean any means that will engage temporarily with the cable, so as to cause the carrier to be propelled thereby until it is necessary to detach it.

When the carriers are propelled at a rapid rate, it becomes necessary, to avoid shocks, to gradually reduce the speed as the carrier reaches the salesman's position. When a propelling-cable is used, the speed of the carrier cannot be diminished so long as it is connected with the cable, nor can it be diminished so long as it is in line with other rapidly-traveling carriers. I therefore provide means whereby the carrier can travel upon the track at normal speed until just above the salesman's station and to then gradually but positively diminish its speed, so that it will arrive at the station at a comparatively slow speed. This I effect by means of a track in the form of a gradually-diminishing spiral connected with the main track and with a drop-track leading to the salesman's station. One construction of such a speed-retarder is best illustrated in Figs. 15 to 18, in which a branch rail 50 extends from a point *v* adjacent to one of the track-rails 10, and is curved round and downward vertically through two frames D² D³, the lower end being bent out at right angles before passing laterally through the frame D³, and a spring 51 tends to force the end of this rail in the direction of the arrow, Fig. 18. This constitutes the track-rail, on which the carrier travels first on a wide curve, which is gradually contracted, and then downward, pressing out the movable end of the rail, as in Fig. 19, against the force of the spring, which gradually retards the descent of the carrier.

To keep the carrier on the rail, the guard-rail at one side is curved outward and downward in the form of two guards 52 53, and two additional guard-rails 54 55 are also extended from one side of the track above the rail 10, first curved outward and then downward. The rails 52 53 are continued downward below the frame D² to form side guards, as shown in Fig. 16, the track-rail 50 extending to the frame D² as a front guard, the rail 55 constituting an additional side guard terminating at the frame D², while two additional guard-rails 56 56 extend between the frames D² D³ to constitute with the others the vertical portion of the retarding-track.

If desired, the carriers may drop from the open end of the vertical track portion into a suitable receptacle; but I prefer to add a deflector-track T, whereby the carriers are gradually conducted from a vertical to a horizontal curve, at the end of which is a stop 57,

preferably supplied with an elastic buffer. As shown, the deflecting-track consists of four curved rails, two of which are continuations of the rails 52 53 and two others 58 58 are attached at the upper ends to the frame D³. By this combination of rails, which may be differently arranged, I form a retarding-track having a gradually-diminishing spiral at the upper end and extending then vertically; but it will be evident that said track may be in the form of a tube or otherwise made.

The structure may be strengthened by hanger-bars 59 59 60 60, braced by frames or spiders D⁴ D⁵, the rails 60 60 being connected to a yoke D⁶, supporting the deflecting-track T and constituting the guides of an elevator when one is used.

I have found that a receiving-track having a spiral and a straight portion, as above described, will receive carriers traveling at a high speed and gradually reduce such speed without shock or noise.

Heretofore when motor-cables have been employed it has been customary to place the carriers upon the track and in engagement with the cables by hand. This is not practicable where the track is elevated above the reach of the operator. I therefore use an elevator constructed to support the carrier and conduct it to a position to engage with the cable and then pass onto the track.

In the construction shown the elevator-carriage K is guided to slide vertically on the rods 60 60, and is provided with an inclined pocket 70, adapted to support the carrier in an inclined position. A section 71 of the lower track immediately above the pocket 70 is movable, so as to be deflected or turned out of the line of said track as the carrier is brought in line with the same. The movable section may be supported to be moved out of line in any of the ways usual in store-service apparatus. As shown, it is pivoted at one end 72 in position for the free end to be struck by the top of the carrier itself, so that if no carrier is in the carriage the track-section will not be lifted. As the motor-cable maintains its position in line with the path of the carrier, the catch of the latter will engage with the cable as soon as the carrier is in position to move onto the track.

While the movement of the elevator-carriage alone might be depended upon to conduct the carrier into position to engage the cable, I prefer to bring the carrier to about a horizontal position before it begins its travel on the track. Thus the pocket may be secured to a rock-shaft 73, Fig. 20, provided with an arm 74, arranged to strike a stop 75 adjacent to the track to raise the pocket to a horizontal position as the carriage reaches its upper position. I prefer, however, to have a stationary pocket with a lifting-finger 76 at the bottom thereof secured to the rock-shaft 73, this finger being lifted to raise the carrier in the pocket to a horizontal position and into engagement with the cable. The carrier is

thus brought to a horizontal position before beginning to move onto the track and starts without shock or jolting.

I have referred to the driving-cable as being placed above the track centrally therewith; but it may, if desired, be placed at one side of the track, as shown in Fig. 21, in which case it will act also as a substitute for one of the guard-rails, and the catch will extend from the side of the carrier and the finger 8 will project upward. In this case the elevator is constructed as already described, except that the pocket is placed at an angle on a horizontal platform and is thrown out laterally, the longer section consisting of part of the guard-rail instead of part of the lower rail, as shown in Fig. 22. The pocket 70 is fixed on the platform of the elevator-carriage K and an arm 74 on the shaft 73 contacts with an inclined rod 78, supported from the track, so that the finger 76 is swung inward as the elevator-carriage reaches its upper position. It will be seen that the pocket of the carriage is brought in such position that the carrier will move instantly therefrom onto the track the moment it engages with the cable, so that it is only necessary to elevate the carriage and deflect the hinged track-section for a moment in order to transfer the carrier, thus permitting the transfer to be effected with little danger of collision with other carriers moving on the track.

The lifting of the elevator-carriage K is effected by the usual elevating-rope 80, Figs. 1 and 18, or in any other suitable manner.

When the ways extend past counters on different lines at angles to each other, they must be provided with curves, as also in case it is necessary to convey the carriers from one level to another.

As the retention of the carriers with the cable throughout a tortuous course would be attended with considerable difficulties, I depend upon the momentum of the carriers to carry them round curves vertically and horizontally and at such points deflect the cable out of the lines of the tracks. Thus in Fig. 3 the arrangement of curves connecting the horizontal and vertical parts of the tracks is shown. The portion of the cable co-operating with the outer curve I is supported by a guide-pulley 81, so arranged that the cable will be in proper position as respects each straight portion of the track, but will be wholly outside of the curve. If the carriers are provided with catches or grippers for positively pinching the cable—such, for instance, as are shown in Letters Patent No. 314,339—the catch releasing and engaging devices are arranged to operate on said catches just before and after passing the curve; but the construction of catches hereinabove described renders this unnecessary, as it engages frictionally with the cable and permits the cable to leave and enter the catch without any movement of the latter of the necessary use of catch-operating appliances. The inner curve I' has a longer

radius than the curve I, leaving space between the two curves for the insertion of one, two, or more guide-wheels 82 82, two being shown, which deflect the inner portion of the cable from adjacent to the line of the track at the curve. The curve I² of the outer or upper track when the vertical part of the latter joins the lower horizontal track portion, Fig. 3, is a regular curve, while the curve I³ of the other track is swelled outward to increase the space between the two, the said curve I³ having its center beyond that of the curve I², the cable being guided by guide-wheels 83 84. With each curved and vertical portion of the track are combined two parallel guide-rails 85, so arranged as to prevent the carriers from leaving the track at such curved and vertical portions.

Where the curve connects two parts of the track at an angle to each other upon the same vertical plane as does the curve I⁴, Fig. 2, the cable is deflected to one side by a guide-wheel 87. At the end of the track the cable passes round guide-pulleys 88 89 to the driving-wheel of an engine, by which the requisite traveling motion is imparted.

By the arrangement of cable and curves above described the carriers are conducted in positive connection with the cable to the beginning of each curve, then are automatically disconnected from the cable, either by reason of deflecting the track from the cable, as before described, or by means of a contact-piece of sufficient extent to engage all the contact-fingers of the carriers to move the cable-catch from engagement with the cable and pass the curve by momentum, and then automatically connect with the cable again to be positively driven until another curve is reached.

In most instances I prefer to set the adjacent guide-pulleys 82 84 so that the carriers shall descend the vertical part of the track without connection with the cable. Thus the carriers will travel more rapidly during its descent than if connected to the cable. To permit the carriers to be controlled in their descent or thrown out of connection with the cable I support the pulleys 82 84 on adjustable supports, so that the cable can be set near or away from the track. Thus the wheels are supported by brackets 90, secured adjustably on arms 91, extending from the adjacent yoke D⁹, that supports the track and guard-rods.

At the cashier's desk the cable passes round a guide-pulley 49 and the upper track is deflected downward, and guard-rails 92 are arranged to guide the carrier as it is placed by hand upon the track and passed up the incline until the catch engages with the cable. The receiving end of the lower track is also deflected downward and also laterally, as shown in Fig. 4, so as to carry the incoming carriers away from the cable to a position to be readily taken from the track by the cashier.

As the cable when moving rapidly is apt sometimes to acquire a rapid vibration result-

ing in a humming noise, or sometimes becoming so extended as to move at points out of the line of carriers, I provide bearings 93 (see Fig. 3) at intervals, which will contact with the cable and limit its vibration. As shown, said bearings are elongated blocks centrally suspended loosely from the ends of supporting-arms 95, said arms being somewhat elastic, to yield and break up the vibration of the cable.

What I claim is—

1. In a store-service apparatus, the combination, with a way, a traveling cable, a contact-piece 18, and a switch 12, of a carrier provided with a movable finger adapted to engage with the switch and with a catch for the cable, and a finger adapted to make contact with the contact-piece to disconnect the catch from the cable adjacent to the point where the carrier is to leave the way and also connected to move the switch-engaging finger, substantially as described.

2. The combination of a way, cable, switches in the form of rails adjacent to the way in position to deflect carriers therefrom and to support the same after they are deflected, contacting pieces adjacent to the switch-rails, and carriers each provided with a cable-catch, with a contacting finger to strike the contacting piece to disconnect the catch from the cable, and with a finger for engaging the switch-rail, substantially as described.

3. The combination, with the tracks, contact-pieces, cable, and carriers, of switch-rails arranged adjacent to the way in position to deflect the carriers and to support the same after they leave the way and out of the line of the way, each carrier provided with means for clutching the cable, a finger for engaging the switches, and a finger for engaging the contact-pieces, substantially as described.

4. The combination of the main track, a propelling-cord movable parallel thereto, a switch inclined to the line of the main track and constructed to support the carrier in position adjacent to the main track, a carrier supported and guided on the main track and provided with an engaging-finger distinct from the portions of the carrier that engage the main track for engaging the switch, a cable-engaging catch attached to the carrier, and a contact-piece to release the catch from the cable adjacent to the junction, substantially as described.

5. In a store-service apparatus, the combination of the main track, propelling-cable, switch-rails inclined to the line of the main track, carriers supported and guided on the main track and each provided with an engaging-finger distinct and separate from those parts of the carrier that support it on the main track, said engaging-finger adapted to engage the switches and to support the carriers thereon, a cable-engaging catch attached to each carrier, and contacting pieces arranged and operating to release the catches of the

several carriers from the cable when the carriers are to be disconnected therefrom, substantially as set forth.

6. In a store-service apparatus, the combination, with a way and a carrier adapted to travel thereon, of a fixed switch located adjacent to and independent of the way, a movable engaging-finger carried by the carrier and held normally out of the path of said switch, and a contact-piece for moving said finger into engagement with said switch, substantially as described.

7. In a store-service apparatus, the combination, with a way and a carrier adapted to travel thereon, of a fixed switch located adjacent to the way, a movable shaft mounted on the carrier and having an engaging-finger held normally out of the path of said switch, and a contact-piece for moving said shaft to place its finger in position to engage with said switch, substantially as described.

8. In a store-service apparatus having a way and a series of stations and switches, a series of carriers, each provided with a movable engaging-finger held normally out of the path of said switches, and graduated contact-pieces for moving their respective engaging-fingers into engagement with the respective switches, substantially as described.

9. In a store-service apparatus having a way and a series of stations and switches, a series of carriers, each provided with a movable shaft having an engaging-finger normally out of position to engage with the switches, and graduated contact-pieces to change the positions of the said fingers as the carriers reach their respective stations, substantially as described.

10. In a store-service apparatus, the combination, with a way and a carrier adapted to travel thereon, of a switch diverging from the way, a movable engaging-finger mounted upon the carrier, a contact-finger upon the carrier, and a contact-piece arranged at the side of the way in the path of said contact-finger for moving said engaging-finger into position to engage with the switch, substantially as described.

11. In a store-service apparatus, the combination, with a way and a carrier adapted to travel thereon, of a switch located adjacent to the way, a movable shaft having an engaging-finger mounted on the carrier, a contact-finger on the carrier holding the shaft, whereby its engaging-finger is normally held out of the path of said switch, and a contact-piece arranged at the side of the way in position to strike said contact-finger to move the engaging-finger to engage with the switch, substantially as described.

12. In a store-service apparatus, the combination, with a way and a carrier adapted to travel thereon, of a switch located adjacent to the way, an engaging-finger, a shaft mounted in bearings on the carrier, a contact-finger pivotally mounted on the carrier and normally holding said shaft and engaging-finger

in one position, and a contact-piece arranged in the path of the contact-finger, whereby to free the shaft and its engaging-finger and cause the latter to assume a position to engage with said switch, substantially as described.

13. In a store-service apparatus, the combination, with a way, a carrier, and a traveling cable for moving said carrier along the way, of a switch adjacent to the way, a movable engaging-finger mounted on the carrier, a cable-catch carried with said engaging-finger and normally held in position to grip the cable, while the finger is out of the path of said switch, and a contact-piece adjacent to the way for moving the cable-catch and the engaging-finger to free the car from the cable and to place said finger in position to engage the switch, substantially as described.

14. In a store-service apparatus, the combination, with a way, a carrier, and a traveling cable for moving said carrier along the way, of a switch adjacent to the way, a movable engaging-finger, and a cable-catch mounted on the carrier, said finger normally held out of the path of said switch, and the catch in position to grip the cable, a contact-finger also carried by the carrier, and a contact-piece arranged at the side of the way in the path of said finger to strike the latter, whereby to cause the engaging-finger and the catch to be moved, the one to engage with the switch and the other to disconnect the carrier from the cable, substantially as described.

15. In a store-service apparatus, the combination of a way, a carrier, and a cable for moving said carrier along the way, a cable-catch pivotally mounted transversely on the car and held normally in position to grip the cable, a contact-finger also mounted on the carrier, and a contact-piece in the path of said finger to strike the same and move the catch from engagement with the cable and out of the horizontal plane thereof, substantially as described.

16. In a store-service apparatus, the combination, with a way, a carrier, and a cable for moving said carrier along the way, of a pivoted cable-catch mounted in bearings on the carrier, a spring bearing upon said catch, a finger normally holding the catch in position to grip the cable against the action of the spring tending to move the catch from engagement with the cable, and a contact-piece located in the path of said finger to operate the same and cause the catch to be released from the cable, substantially as described.

17. In a store-service apparatus, the combination, with a carrier and a cable adapted to propel the same, of a pivoted cable-catch mounted on the carrier, a contact-finger, and a stop holding said catch in position to grip the cable, and a contact-piece for moving the finger to permit the cable-catch to assume a position out of the path of the cable, substantially as described.

18. In a store-service apparatus, the combi-

nation, with a carrier and a cable adapted to propel the same, of a pivoted catch mounted on the carrier, a spring, a stop on said catch, and a pivoted finger engaging the catch to hold it in position to grip the cable against the force of said spring, and a contact-piece for moving the contact-finger to permit the catch to move to be released from the cable, substantially as described.

19. The combination of a carrier, a shaft pivotally mounted thereon and having an engaging-finger, as 9, a cable-catch carried by said shaft, a spring connected to said shaft to rock the same, a stop on the shaft, and a movable finger for holding the shaft and catch in normal position, substantially as described.

20. The combination of a carrier, a horizontal shaft mounted in bearings transverse of the carrier and having an engaging-finger 9, a cable-catch having a notch therein, and a stop carried by the shaft, a spring connected with said shaft to rock the same, and a finger engaging with the stop for holding said shaft in its normal position, substantially as described.

21. The combination, with the rails or supports of a store-service way, of side guards 11, one of which is curved outward at the station to constitute a switch, substantially as described.

22. The combination, with the rail and switch of a store-service apparatus, of a guard-rail 11 at opposite sides of the way, and a carrier provided with a movable contact-finger and an engaging-finger, substantially as described.

23. The receiving-track, the upper portion of which is substantially horizontal and connects with a horizontal main track, and is thence continued in the form of a contracting spiral to a straight vertical portion leading downward toward the counter, substantially as described.

24. The combination, with the tracks and a motor-cable of a store-service apparatus, of switches diverging from the tracks, graduated contact-pieces and carriers provided each with a cable, a contact-finger, and a switch-engaging finger, said cable-catch and engaging-finger being connected to move together, substantially as described, whereby the engaging-

finger moves into position to engage a switch when the catch moves from engagement with the cable, substantially as described.

25. The combination of a track provided with an opening closed by a movable section, a carrier provided with a cable-catch and a motor-cable, and an elevator arranged to conduct the carrier through the opening in the track into position for the catch to engage the cable, substantially as described.

26. The combination of the track, a cable, an elevator, a carrier provided with a cable-catch, and an ejector-arm for moving the carrier into position for its catch to engage the cable, substantially as described.

27. The combination of the track, a cable, an elevator having a pocket to receive the carrier, a carrier provided with a cable-catch, and an ejector for moving the carrier into position for its catch to engage the cable as the elevator reaches its upper position, substantially as described.

28. The combination, with the elevator, of a pocket to receive the carrier, an ejector-finger, an arm 74, and a stop arranged to contact with the arm 74 as the elevator is raised, substantially as described.

29. The combination, with the horizontal, curved, and vertical track portions, and with the cable arranged to carry the carriers toward the descending track, of guide-pulleys arranged to hold the cable out of the path of the carriers at the descending track, so that the carriers move downward by gravity alone, substantially as described.

30. The combination, with a straight track, of a spiral track having its upper end connected therewith, a drop connected to the lower end of the said spiral track, upper and lower frames D^2 D^3 for the said drop-track, a rail suspended loosely from the upper frame and bent at its lower end to enter a socket in the lower frame, and a spring 51, connected to said rail to throw it inward, as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES T. COWLEY.

Witnesses:

M. B. LAWRENCE,
C. COREY.