

J. H. GOODFELLOW.

AUTOMATIC STORE SERVICE APPARATUS.

No. 297,987.

Patented May 6, 1884.

Fig. 1.

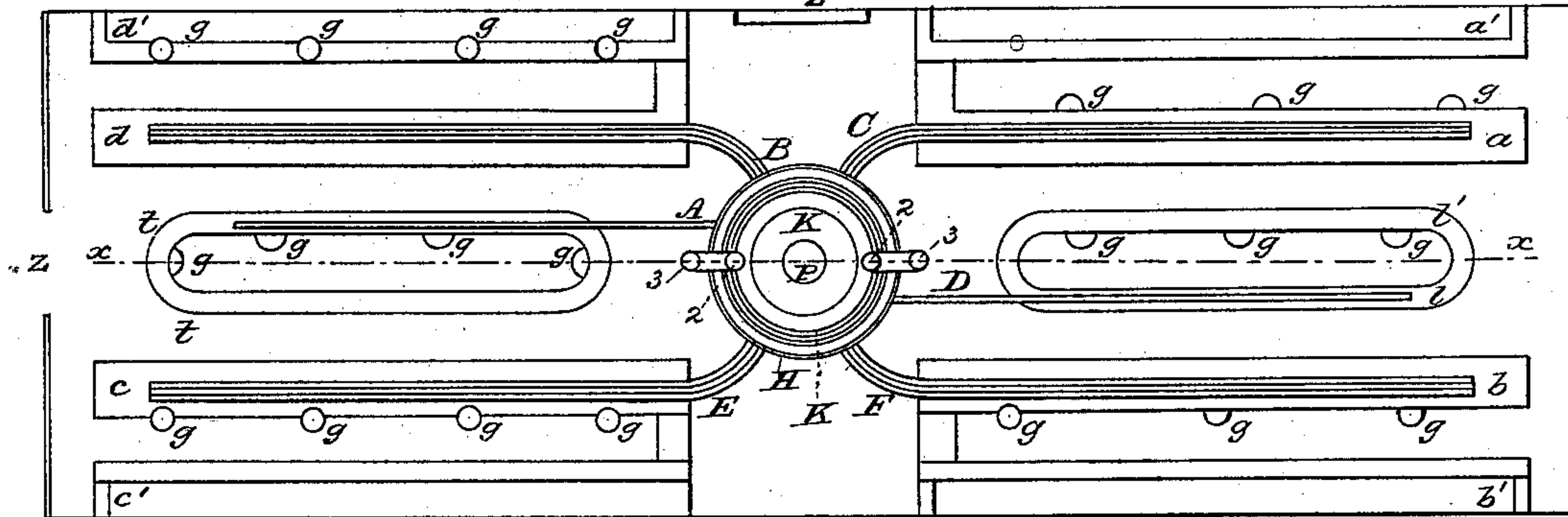


Fig. 2.

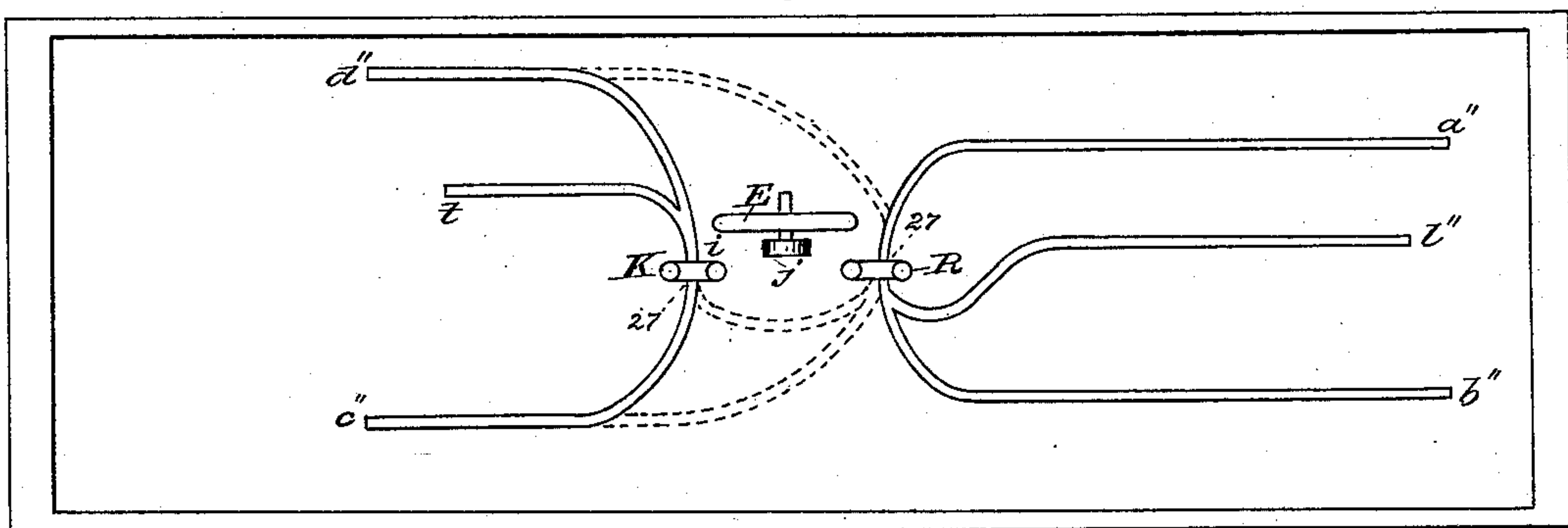
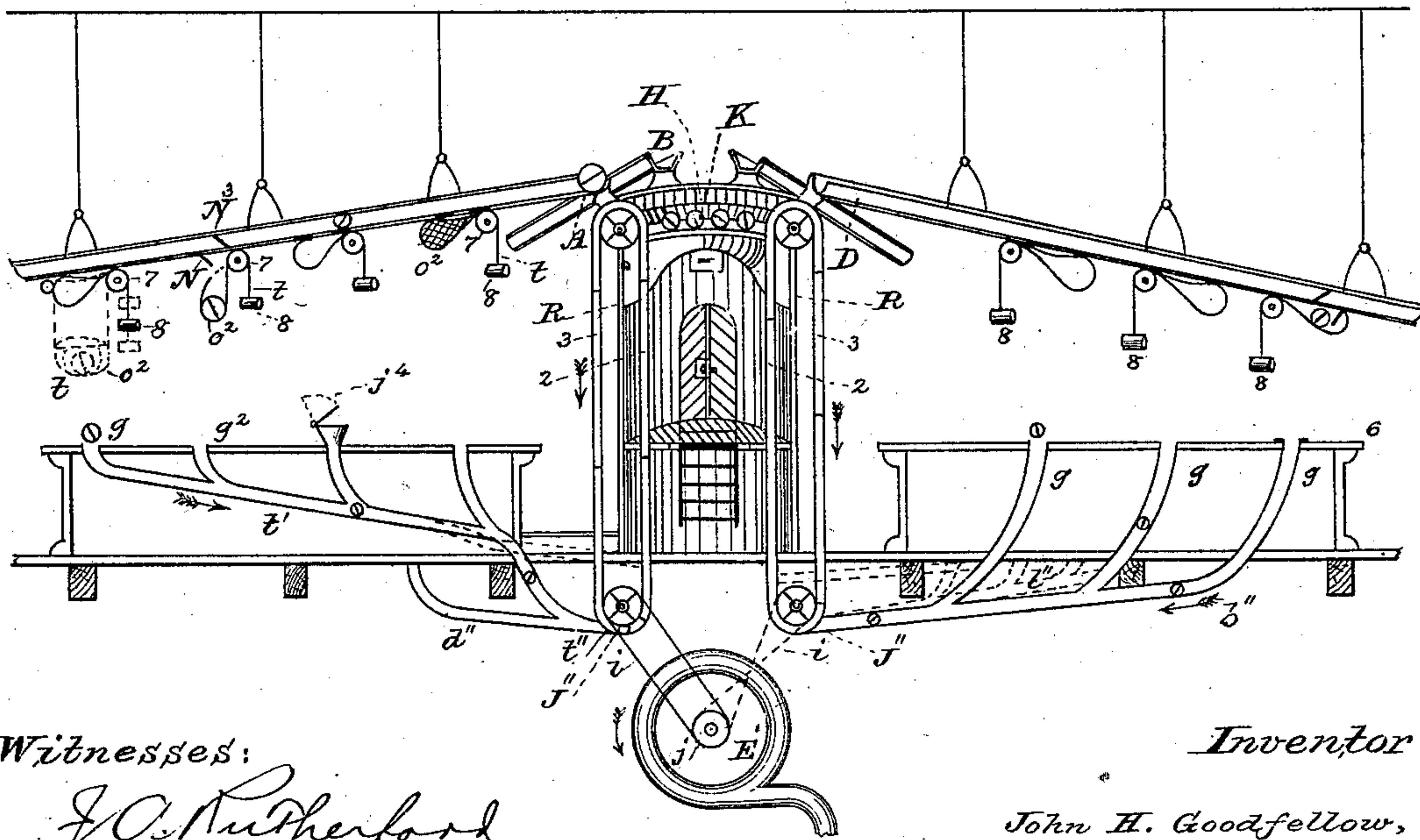


Fig. 3.



Witnesses:

J. A. Rutherford
George W. Red.

Inventor:

John H. Goodfellow,

By James L. Norris.
Attorney

(No Model.)

3 Sheets—Sheet 2.

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Fig. 4.

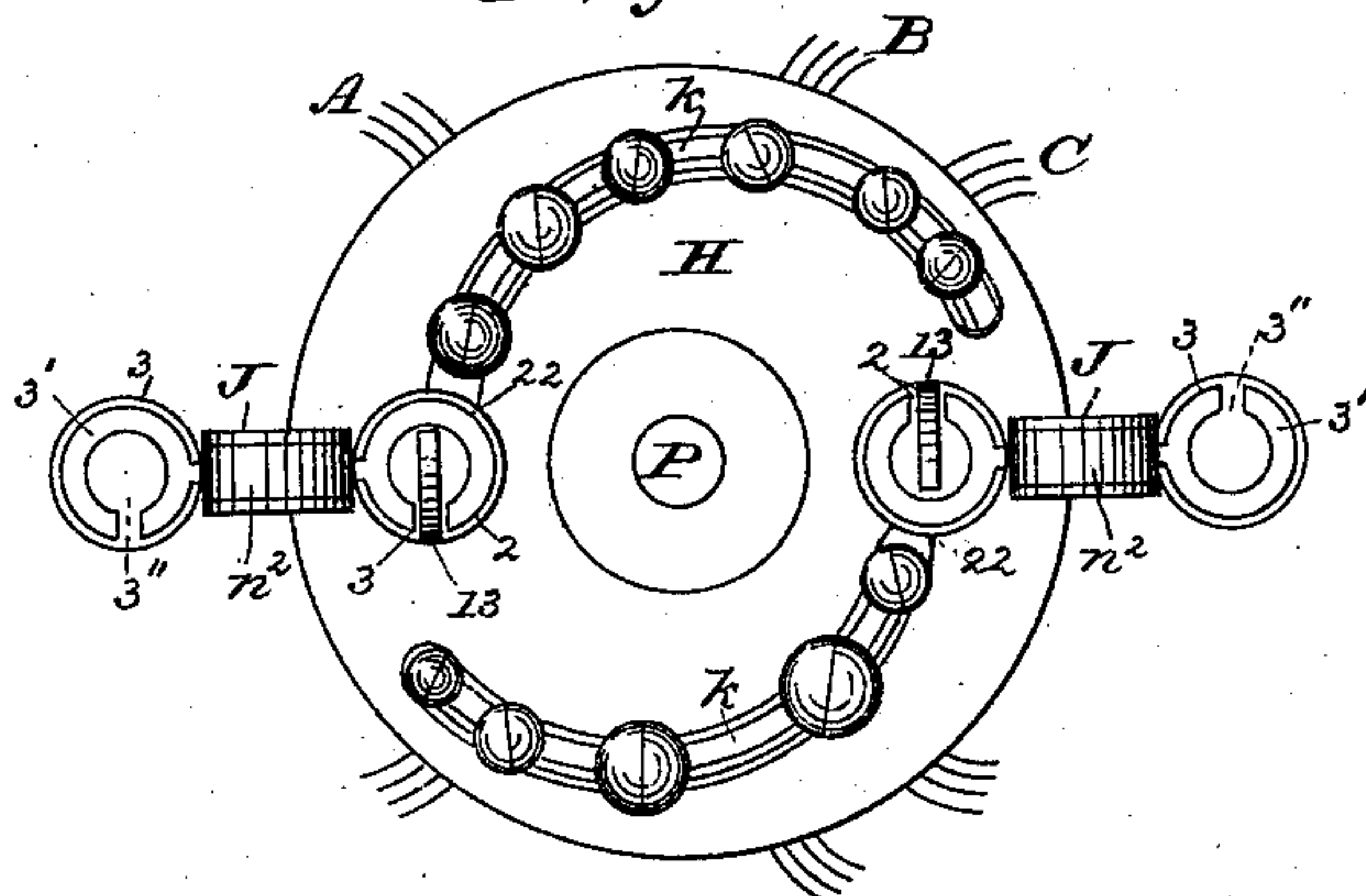


Fig. 5.

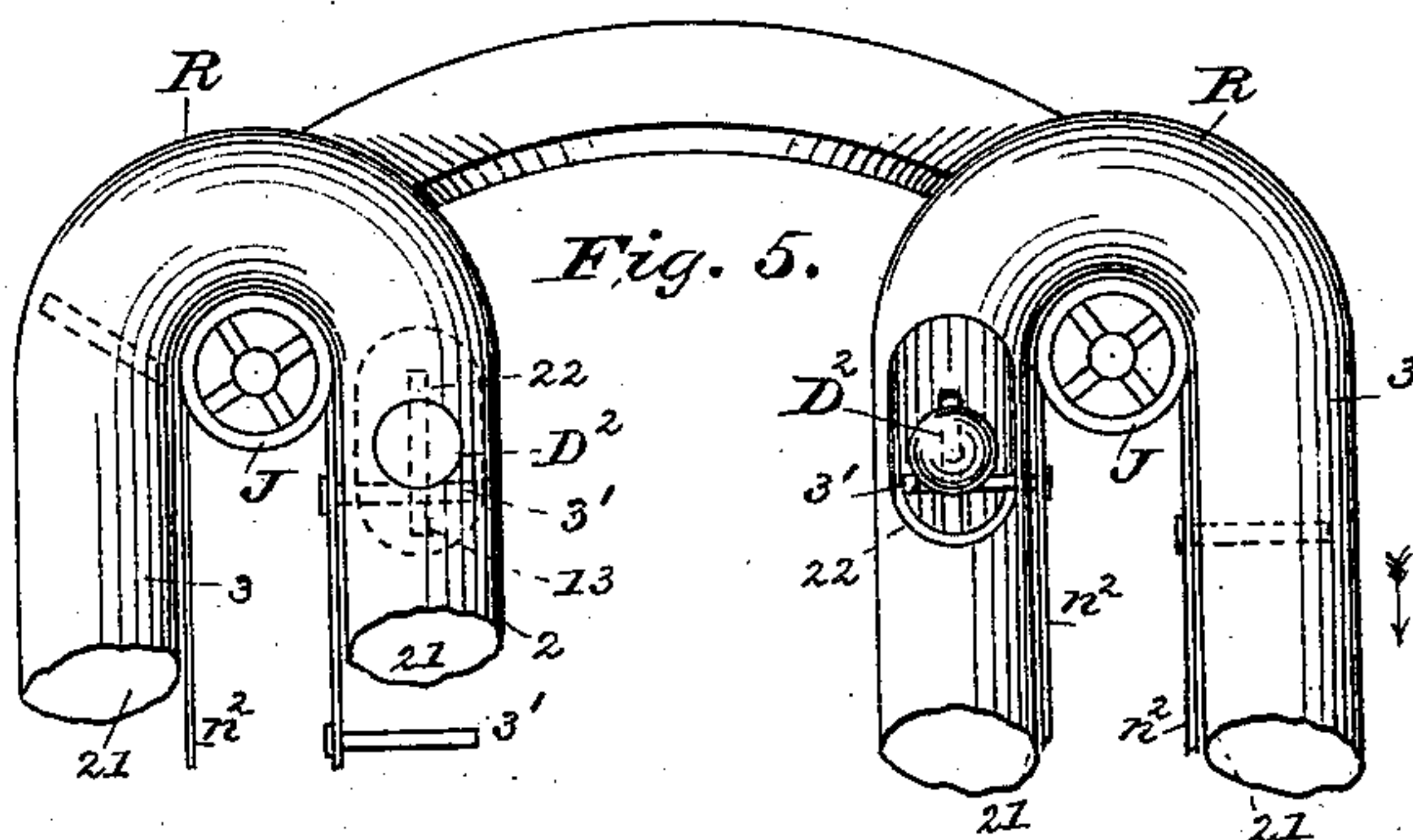


Fig. 6.

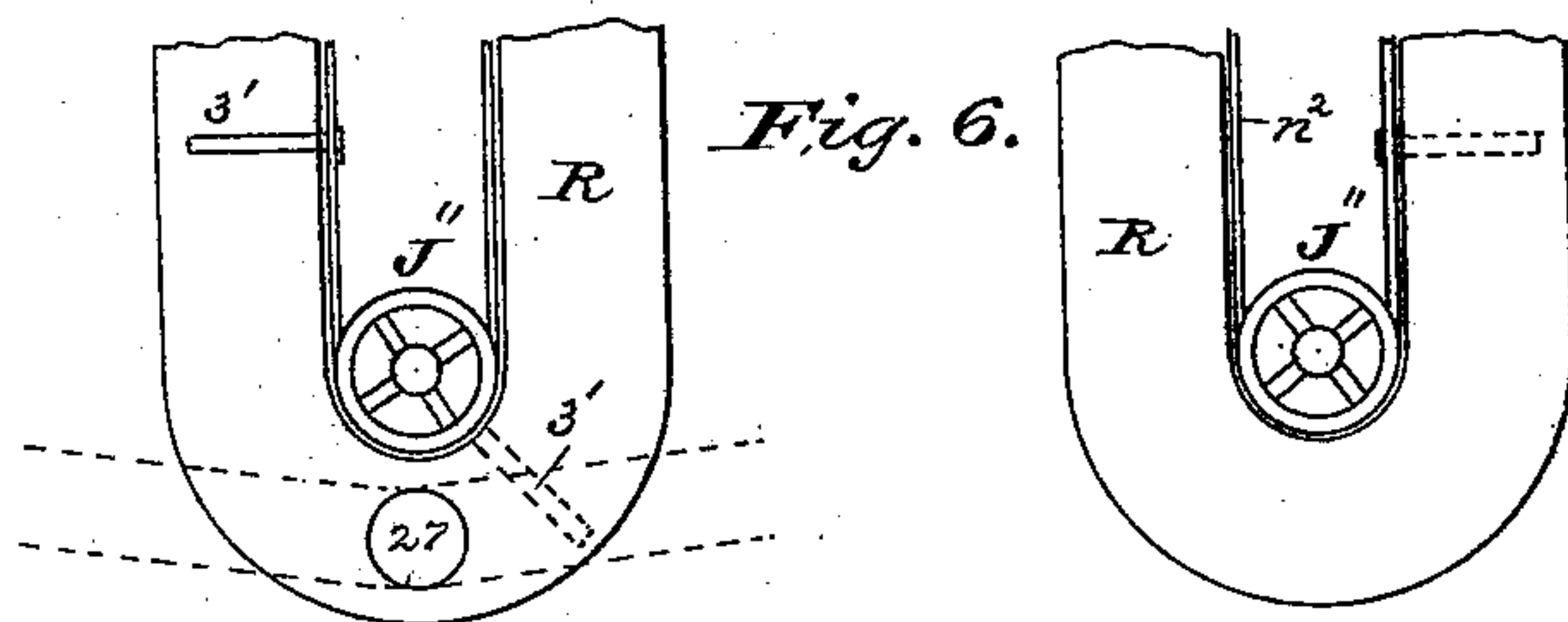


Fig. 8.

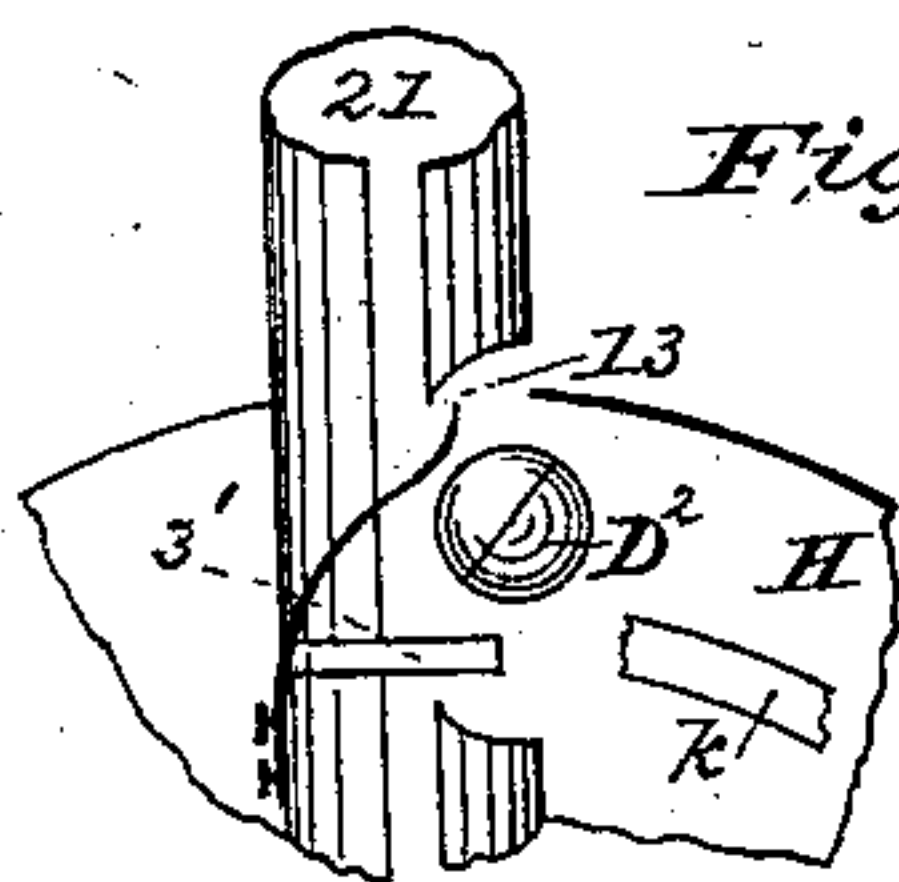
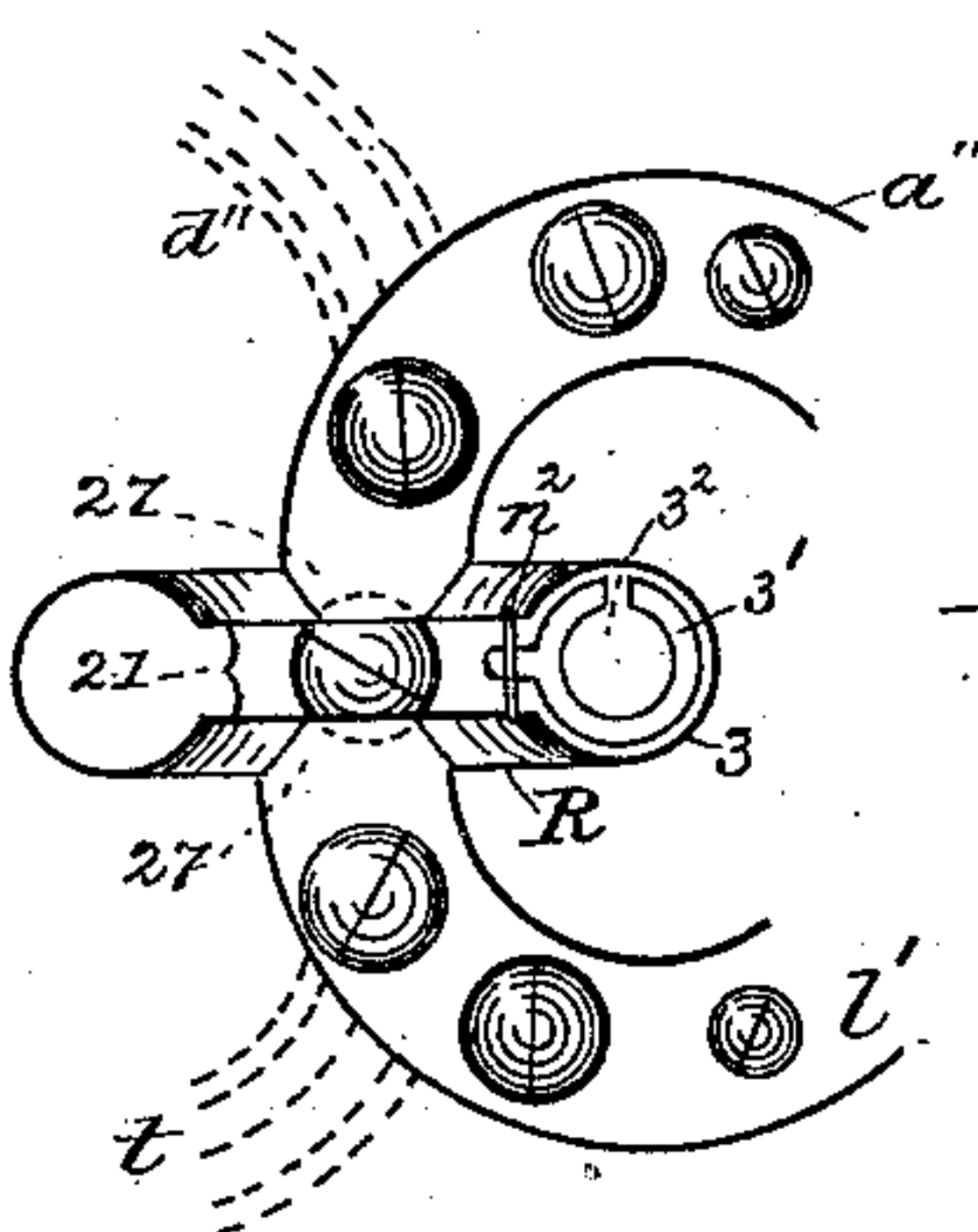


Fig. 7.



Witnesses:

J. A. Rutherford
George W. Reak

Inventor:

John H. Goodfellow,

By James L. Norris,
Attorney.

J. H. GOODFELLOW.

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Fig. 9.

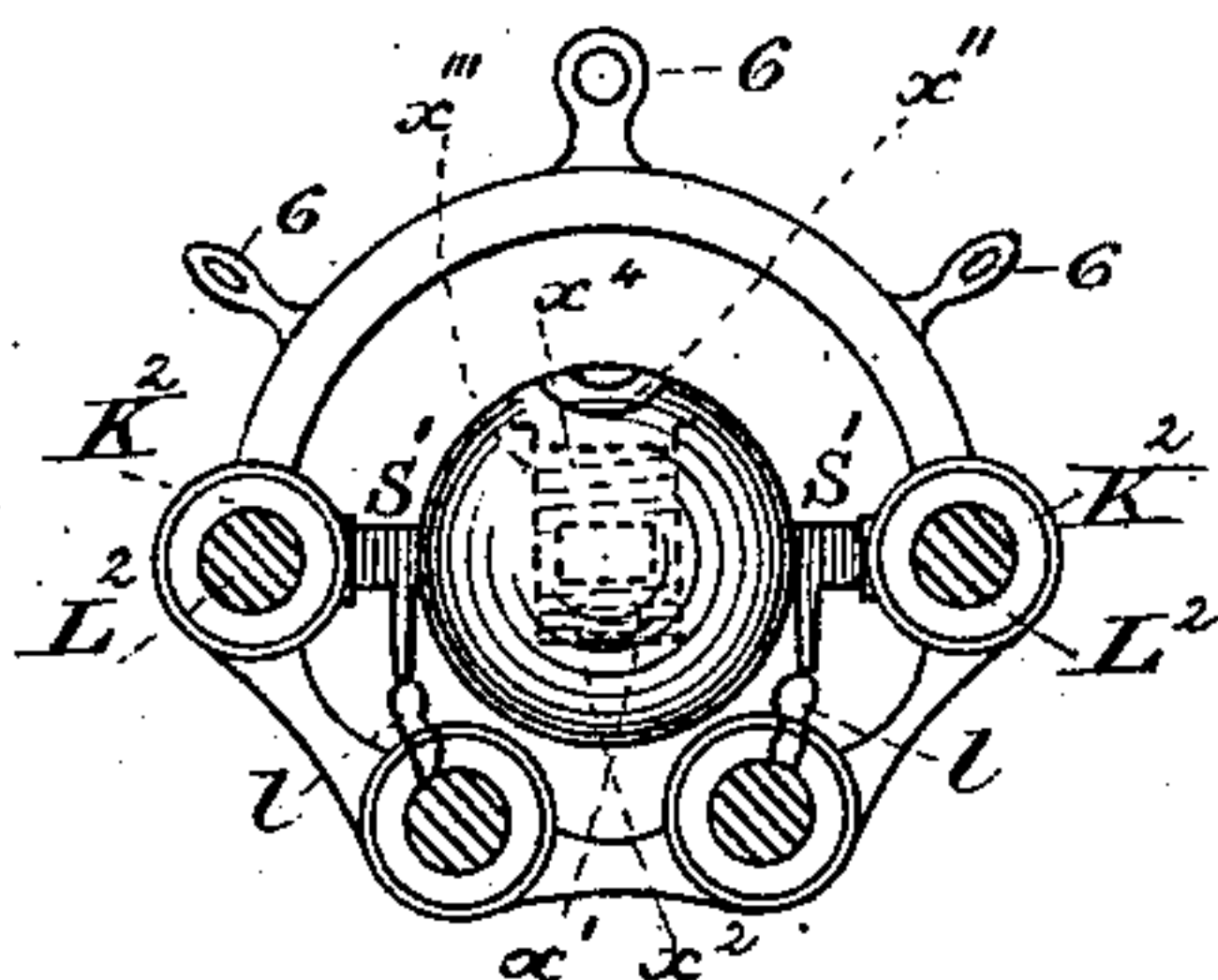


Fig. 10.

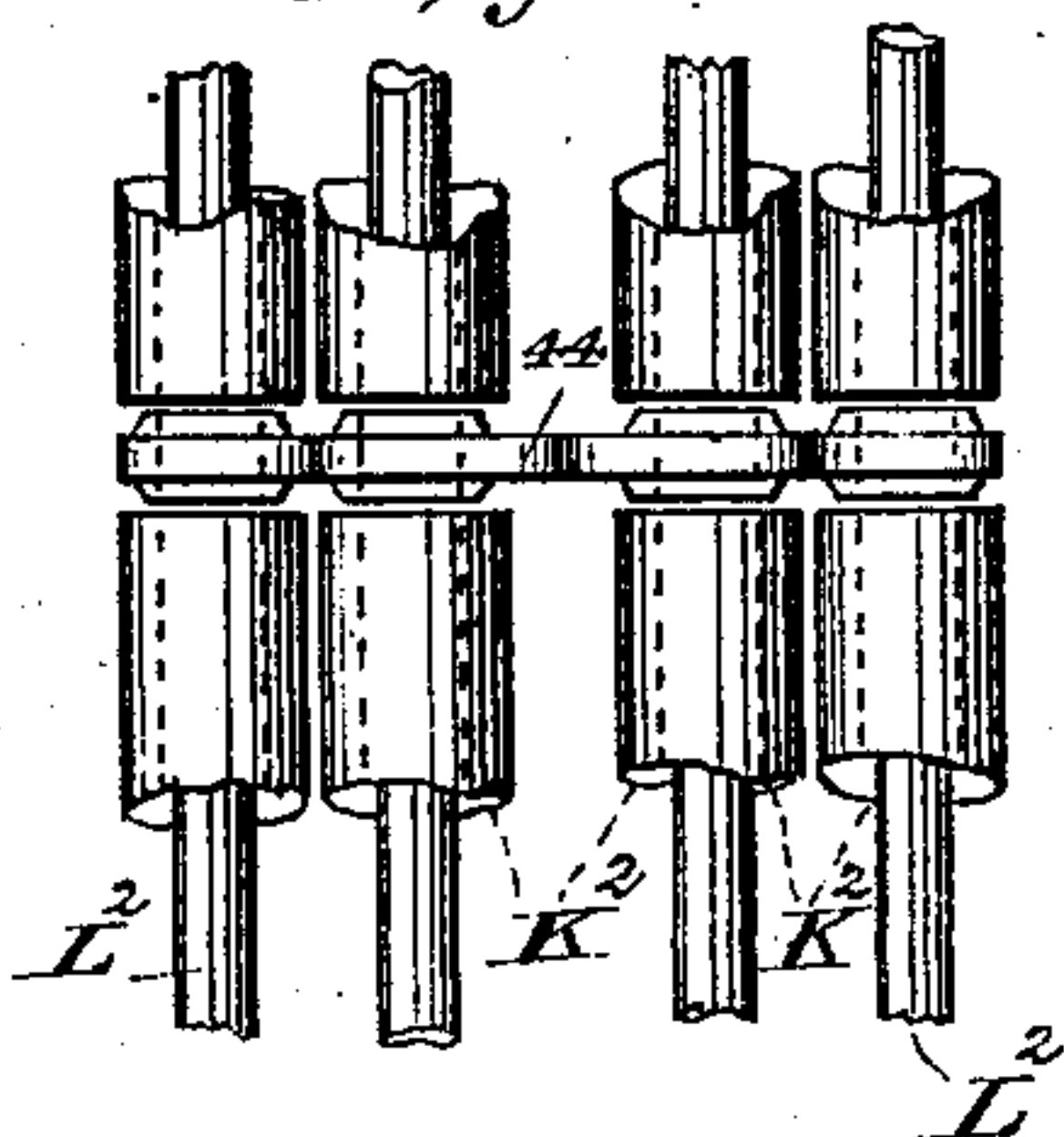


Fig. 11.

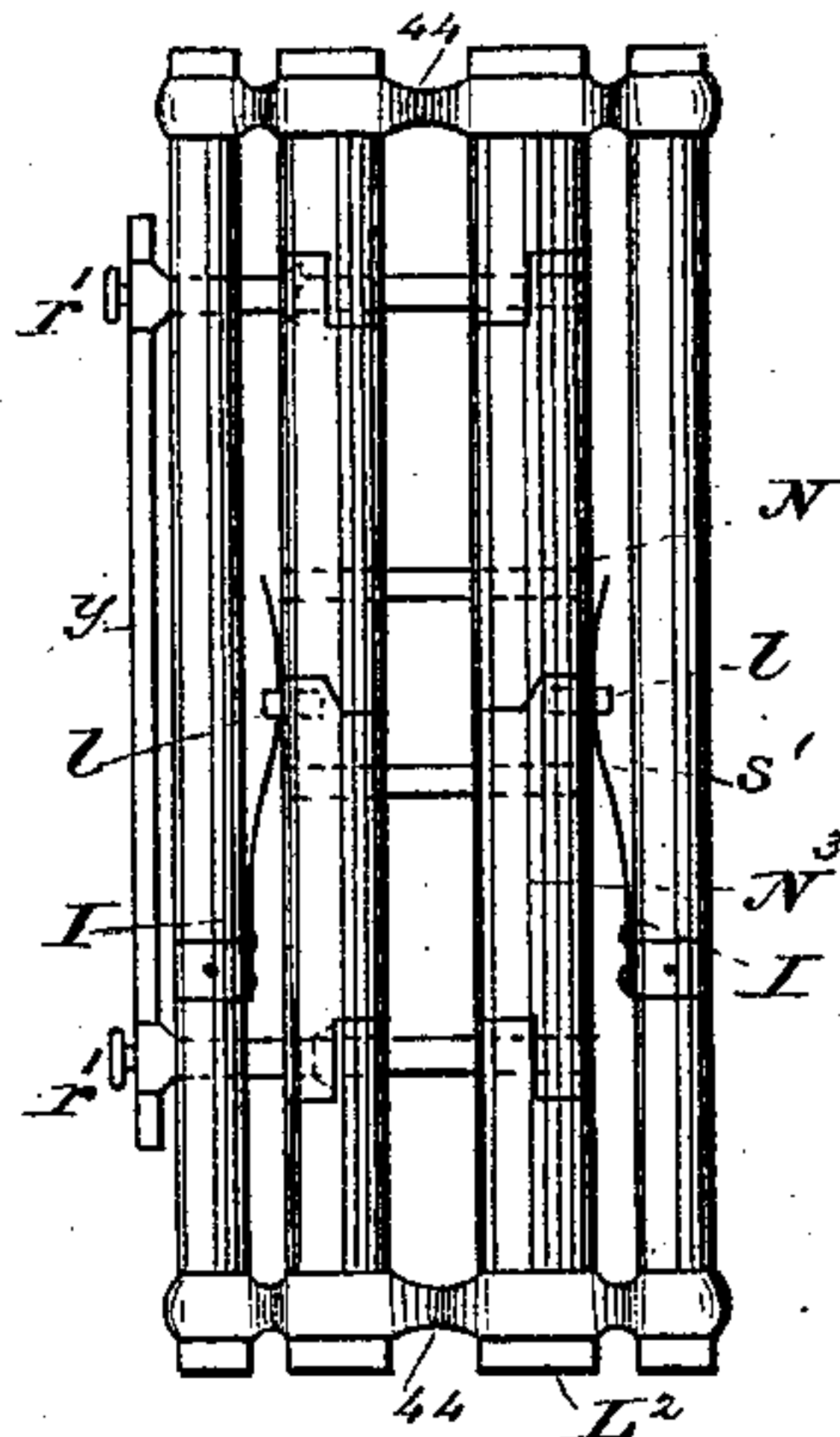


Fig. 13.

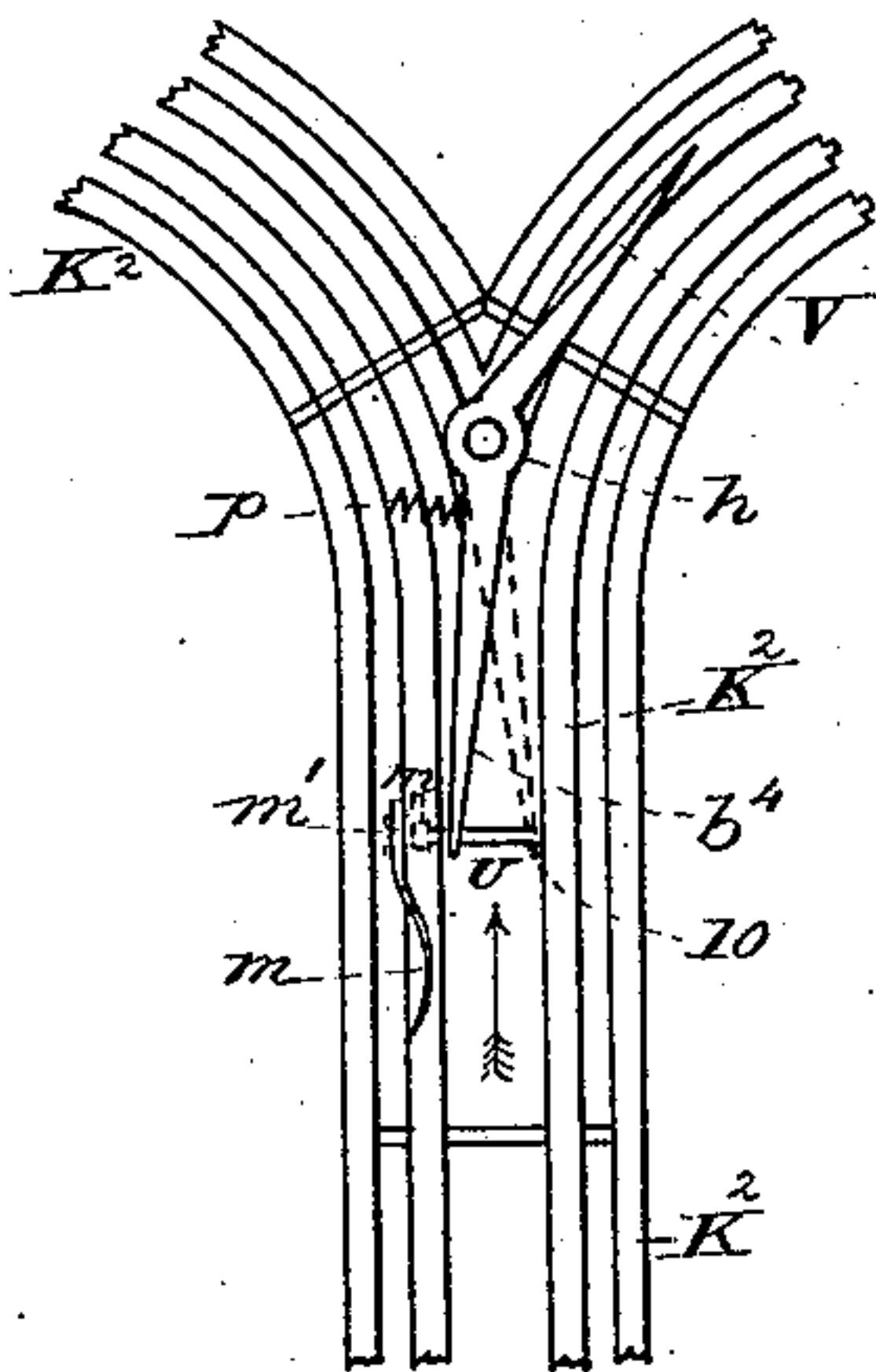


Fig. 12.

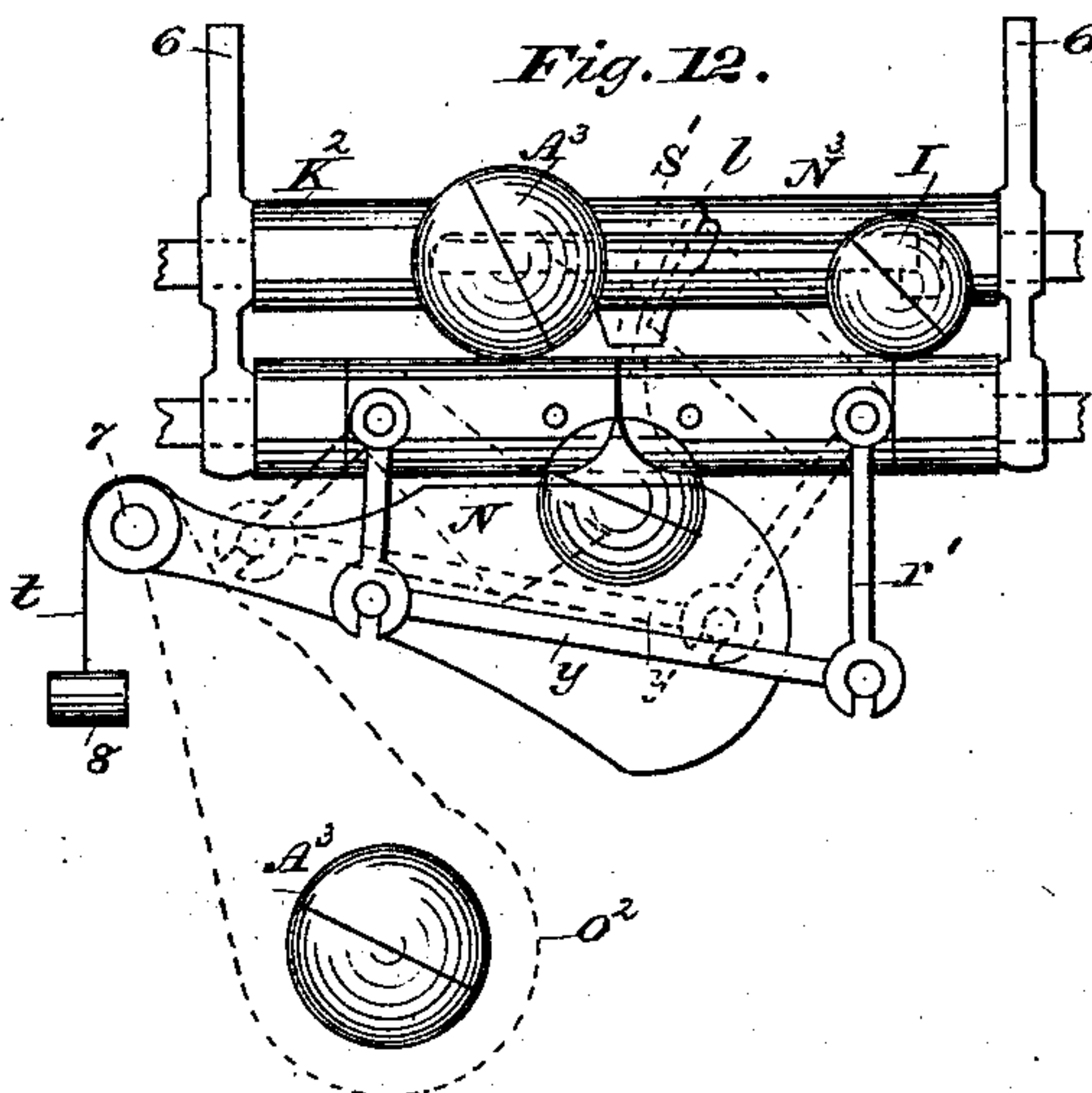


Fig. 14.

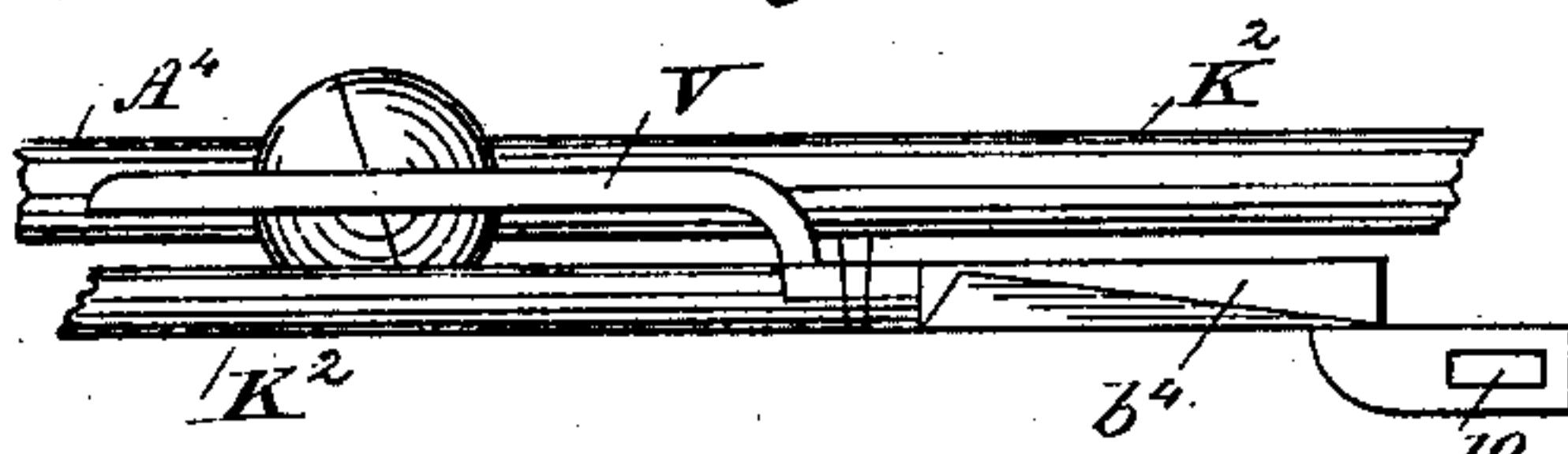
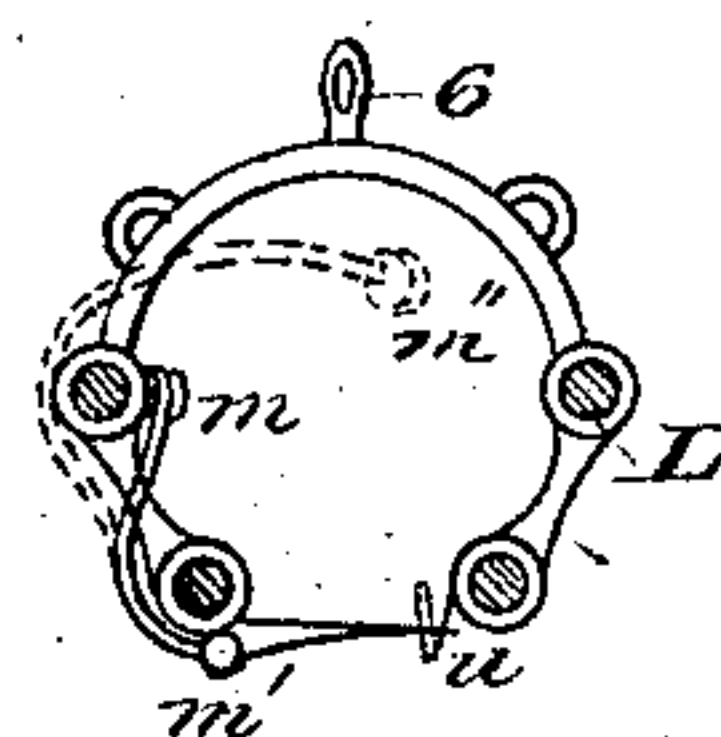


Fig. 15.



Witnesses:

J. A. Rutherford
George W. Rea.

Inventor:

John H. Goodfellow,
By James L. Norris,
Attorney.

UNITED STATES PATENT OFFICE.

JOHN H. GOODFELLOW, OF TROY, NEW YORK.

AUTOMATIC STORE-SERVICE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 297,987, dated May 6, 1884.

Application filed February 12, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. GOODFELLOW, of the city of Troy, in the county of Rensselaer and State of New York, have invented certain Improvements in Automatic Cash-Carrier Systems and Store-Service Apparatus, of which the following is a specification.

My invention relates to that class of store-service systems in which traveling hollow carriers move upon ways extending between the main desks and counters or stations occupied by salesmen; and my invention consists in means for rapidly sending the carriers to a converging station beneath the cashier's desk, and of means for depositing said carriers upon the latter.

It also consists of chutes at the clerk's stations communicating with a track, gutter, or tube beneath the floor, and an elevator adapted to deposit said carriers upon the cashier's desk, and an inclined distributing-track extending from the cashier's desk to the clerks' stations or counters, and in a general construction whereby the efficiency of the carriers is increased.

It also consists in the construction and arrangements of tracks adapted to carry rolling carriers, whereby they are noiseless and compact; also, of three branch switches, whereby the carriers are switched from or to the main track with ease and accuracy; and of means for dropping and catching and lowering the ball from the track to the clerk or station.

In the drawings, Figure 1 is a plan view of a store containing my improved system. Fig. 2 is a plan view illustrating the arrangement of the tracks at the converging station and the communication with the elevator. Fig. 3 is a side elevation, partly in section, of Figs. 1 and 2, taken at $x x$. Fig. 4, Sheet 2, is a plan view of cashier's desk and elevator. Fig. 5 is a side elevation of a part of Fig. 4, illustrating the means for elevating and ejecting the ball upon the desk. Figs. 6 and 7 are detail views of the lower end of elevators at the converging station. Fig. 8 is a detail side elevation of one of the discharge-mouths of the elevator, illustrating the means for ejecting the carrier. Fig. 9 is an end elevation of my improved track, showing ball and spring in position to operate the trap; and

Fig. 10 is a plan view of Fig. 9 at point of hangers. Fig. 11 is a plan view of a section of track at hangers, illustrating parts of my invention. Fig. 12 is a side elevation of Fig. 11, illustrating more fully other features of my invention; Fig. 13, plan view of a main track and branch, illustrating the operation of my improved switch; Fig. 14, side elevation of Fig. 13, and Fig. 15 end elevation of Fig. 14.

Heretofore it has been customary to use two inclined tracks leading directly from the cashier's desk to the clerks' counters, said tracks being suspended directly beneath each other, and oppositely inclined and arranged so as to converge at the cashier's end, the lower track being provided with various devices for distributing the carriers at their respective stations, and the upper or incoming track is provided with elevators, used at each station for raising the ball or carrier to the track, along which it may roll to the cashier's desk. All of these arrangements need to be very elaborate and expensive, and when used make much noise, and the upper track, with its numerous elevators, greatly obstructs the view of the store. Furthermore, the track, being made of wood, distorts from proper shape, and requires to be large in order to be of sufficient strength.

It has been customary to use the upper part of stores for display room, and when these double tracks are introduced it is necessary to abandon that advantage. Another disadvantage is that the raising of the elevators by the clerk takes his time, as he has not only to adjust the carrier in the elevator, but has to raise it and wait until it leaves the latter before lowering it, and at other times, when in a hurry, it is permitted to come down with a thud. All this is serious delay when customers are plenty in the store; and when the ball returns it is necessary to reach quite high for it; and in other cases the ball drops various distances to within easy reach; and in these there is more or less strain on the balls, as they often break, and are accompanied with much noise on their arrival at the desired point.

The object of my invention is to construct and arrange a cash-carrying system which has

not any of the aforesaid defects, and to render the dispatching of the carriers instantaneous upon their being loaded; also, to provide means whereby a much larger portion of the show-room of the store is retained for display of goods; and, furthermore, to greatly reduce the expense of their production, all of which and other features are hereinafter described, and pointed out in the claims.

It has been customary to provide stores with the necessary conveying systems and all of their various appliances suspended from the ceiling or side walls, and, in cases where tracks are inclined in opposite directions from the cashier's desk, spreading them apart as they extend toward the clerks' stations, and in many cases, where the distance is great, the outer ends of the track require to be spread apart considerably in order to give the track sufficient incline to send the carriers by gravity; and in such case, there being two tracks, the space would need to be divided between them, thereby reducing the incline and preventing the carriers from moving as fast as on a shorter line of greater incline.

Another disadvantage in former systems is the necessity that the aforesaid track should be provided with elevators at each station, and long chutes beneath the swinging traps, and wires and elevator supports, all of which serve to fill up the upper part of the store.

To obviate these objections my invention consists in providing but one main distributing-track from the cashier's desk along and over each series of clerks' stations or counters, and of the said stations being provided with means for conveying or directing the carriers beneath the floor to a suitable converging station or stations provided with means adapted to elevate or lower the carrier to or from the cashier's desk, thus removing the bulky construction which obstructs the view of the store, and which is the source of unpleasant noises, and also requires much time to be operated.

It has been customary to provide each salesman's station on the distributing-ways with a vertical tube or chute, into which the carriers are discharged by a vertically-swinging trap, when the distance through which the carriers fall into the drop-box is considerable, injury to the carriers often occurring, and unpleasant noises resulting from the force with which they fall. To avoid these objections my invention consists in providing means for catching the carriers close to and beneath the trap, and of means adapted to counterbalance the catching device or carrier with it, whereby the ball and basket may automatically descend upon the arrival of the former in the latter. The weight of this counter-balance may be varied—for instance, it may be of such weight that the weight of two or more balls shall be required to overcome its effect and cause the receptacle to swing or descend, in which case, when less than the requisite number is in the receptacle, it may be manually pulled or swung down.

The vertically-swinging trap used for discharging the carrier from the distributing-ways into various catching devices has been made in one piece, pivoted so as to tilt by the weight of the carrier, thereby depressing one end and raising the other, between which and the track a ball of smaller diameter may chance to roll and wedge or fall to the counter, which, if it chanced to wedge, would be liable to retard other carriers going to stations beyond, or dethrone them from the track. To avoid these difficulties, I propose to make my dropping device in two parts, pivoted to the main track at their outer ends, and furnished with means for connecting them together, whereby one part shall swing up behind the carrier upon its arrival upon the trap-section in such a manner that the carrier following will ride upon the raised portion, and by its weight reset the trap; and my invention also consists of the means for locking and unlocking said trap.

Elevated ways constructed of wood are liable to twist or warp by the effect of the hot air present near the ceilings of stores, or from other causes, so that their connecting parts and the ends of switches and tripping appliances fail to remain in perfect alignment with the stationary ends of the track. As a remedy for these objections, I construct my track, preferably, of iron or steel, over which is drawn molded or woven rubber tubing or similar yielding covering adapted to reduce the noise of carriers rolling thereupon, and with means for securing said track and ways in their proper relation to each other, all as hereinafter described, and illustrated on the accompanying drawings.

Figs. 1, 2, and 3 are views showing my improved system arranged in a store, of which H is a cashier's desk somewhat elevated.

A to F, inclusive, are inclined distributing-tracks, and *a b c d e f* are counters beneath the same. The said tracks may pass the stations of the several salesmen employed at such counters, so that a hollow carrier or ball placed upon the track A by the cashier may travel to any designated station along that track. Beneath the floor are placed suitable conveying tracks or gutters, *a'' b'' c'' d'' e'' f''*, which may converge at a central station provided with an elevator, R, as seen in Figs. 2, 3, 4, 6, and 7, Sheet 2. At the salesmen's stations are arranged suitable chutes or conveyers, *g g g g*, at proper distances apart, which, as seen at the counter *f*, Fig. 3, may pass beneath the counter and communicate with the track *f'*, which may extend the length thereof, and then, by suitable inclinations, pass through the floor and converge into the track *f''*, which leads to said central station, communicating with a suitable elevator. At the counter *b* the chutes *g* extend directly down through the floor in an inclined direction and connect with the track *b''*, which may also communicate with the elevators, of which I show two, (one of which, however, may be dispensed with in

small stores,) and all the tracks connected, as shown by dotted lines, Fig. 2.

The elevator R may be made of any suitable material and provided with a continuous slot, 21. (See Fig. 7.) A section of the lower part of the elevator, which is also provided with a suitable inlet, is shown at 27, (see Figs. 6 and 7,) with which the track communicates.

J J are pulleys arranged at the upper parts 10 between the sections 2 and 3, over which pulleys a suitable band, $n^2 n^2$, passes, and thence around the driving-wheels $J'' J''$. To this band are secured the conveying hoops or disks 3', which are arranged at proper distances apart, 15 and rigidly secured, so that they will remain at right angles thereupon while conveying the carriers. Said hoops are severed at 3'', and when so made the inner portion of the hoop provides a disk-like cup, whereby the carriers are held 20 thereupon centrally in the elevator tube. The space or slot 3'' provides means into which the deflector 13 may enter and pass through the disks. (Seen in Figs. 4, 5, and 8.) They are moved with the band in either direction. The object of this deflector is to eject the carriers 25 from the discharge-mouth 22 upon the disk into the grooves $k k$, which are inclined as they extend from the elevator around the disk, (see Fig. 4,) so that the balls may move there- 30 upon to the lower part of the groove k .

The elevator may be operated by any suitable and convenient power. I have shown a "Baxter water-motor." E', (see Figs. 2 and 3,) which may be a source of cheap and convenient power. As arranged, the pulleys $J'' J''$ 35 are adapted to receive the belts $i i$, which pass around the driving-wheel j of the motor, and from the arrangement of the belts and the indication of the arrows it will be seen that the disks 3' ascend the elevator-section 2 and return by the section 3. The operation of these parts is as follows: When a purchase has been 40 made by a customer, the money and checks are placed in the carrier by the clerk and dropped into one of the chutes—say at g^2 , Fig. 3—along which it rolls into the track f' , thence into track f' and into the opening 27, whereupon one of the disks 3' takes it up when at the mouth 22, it is deflected from the elevator 50 upon the desk, or within easy reach of the cashier, whereupon the proper change is made and the ball (recognized by a suitable mark—say A^3) is then placed upon the A track, along which it rolls to the proper station, and, because of the size of the ball, it is deposited 55 through the track in any suitable catching device, from which it is taken and the change returned.

It will be observed that the tracks beneath 60 the counter may be so arranged that they need not penetrate the ceiling beneath the floor, but may extend along the counter or beneath the shelving, and thence into a track between the ceiling and floor to a point near 65 or beneath the desk, or need not penetrate the floor, but may emerge from the lower ends of the counter adjacent to the floor, and thence

to the elevator. When thus laid, the gutters or tracks may be covered by any suitable means, that they may not be interfered with 70 in walking over them. It is optional where the chutes are located, whether they be arranged beneath the shelving, as shown at d' , Fig. 1, or pass down side of the counter, as shown at v , Figs. 1 and 3, or extend back be- 75 neath the counter toward the front thereof, and thence connect with the track or pipe section f , as shown in Fig. 3. If found preferable, in some cases I arrange the upper mouth of the chutes so as to project above the counter 80 or support in easy sight of the customers, that they may see the carrier leave the clerk's hand; and in some cases where I construct the chutes g and their connecting parts of a tubular or other form, in which all sides are closed, 85 and they extend through the floor, I provide the mouth of the chutes with a suitable cover, j^4 , which may be hinged or otherwise adapted to be removed when desired to use the chute. The inner parts of the chute and connecting 90 parts may be lined or provided with strips of leather or rubber or canvas upon those parts with which the carriers are liable to come in contact.

It is also observed that various constructions 95 of elevator may be used at the junction of the converging station or cashier's desk, to elevate the carriers and dispose of them within easy reach of the cashier, who may in turn place the carriers upon the elevator and lower them 100 to other tracks, onto which they may roll and return to their respective counters—say, for instance, to a point beneath the floor or basement-store; or they may be by the elevator extended up through the floor to a compart- 105 ment or store above the main floor, whereby one station of cashiers may manage several floors of store systems.

The elevators may be constructed of a platform, to hold the ball or carrier, with means 110 surrounding the same to keep them in their proper position thereupon. These may be one or more in number—say two, one on each end of a band or cord, which may be adapted to move over a pulley, whereby one elevator 115 may rise with a carrier and the other descend; and in some cases a rotating or revolving screw provided with suitable wings might serve as a conveyer; or they might be caused to roll up an incline by some other means to 120 propel them.

It is not absolutely necessary that the case 3 of the elevator should be round, or that it should be used, as the whole arrangement of the elevator might be placed within the cash- 125 ier's desk, which may form some part of the elevator-case, if need be. I find that an elevator constructed upon the rotary-band principle, provided with suitable cups, disks, or curved gutter-like wings to catch and lift the 130 carrier, is best adapted to a place where so much is to be done. The disk 3 for the elevator shown more plainly in Fig. 4 is the preferable form. It consists of a simple frame.

work having a central aperture, and presents the same form on both sides; hence it not only holds the carrier (especially if it be a ball) centrally, but is adapted to act in either direction, holding and retaining equally well a ball-carrier to be elevated or one to be lowered. The deflector 13 may be in the above case reversed, or other suitable means used—such as an incline seat for the ball—whereby at a proper opening the carrier would roll from its support to a track. If the disk-like device 3' were used, I would arrange the discharge-opening opposite the disk shown by dotted lines, Fig. 6. Opposite said opening may be arranged a track or gutter, onto which the ball may roll; and by switching devices on said track the carriers or balls may be automatically sorted to the various tracks or ways. The inlet-opening 27 to the elevator from the converging track may be located in any convenient place, whereby the wings 3' may receive their load.

It will also be observed that by reversing the motion of the elevator and placing the mouth 22 on the opposite side thereof, and leaving the deflector 13 where it is, with the said mouth just above, the carriers would be raised up over the wheel J, and in their descent on the opposite side would come in contact with the deflector and roll from the mouth onto the disk into said groove or receptacle. The grooves *k*, Fig. 4, may extend around the disk H, as shown, or, in cases where only one elevator is used, may extend all around, or terminate into any suitable receptacle to hold them. The advantage of this groove is that the balls do not get mixed—that is to say, it enables the cashier to wait on them in the relation in which they arrive; but in the case shown the cashier (if there be only one) may readily turn upon the stool *p* and wait upon either side alternately.

In Figs. 9, 10, and 11, Sheet 2, is illustrated my improved track, which may be used in one or more rods or wires, L^2 , of iron or steel, although hard wood might be used. The former, however, is preferable. Over these wires or rods is drawn rubber tubing or other flexible material—such as terra-cotta or braided fabric similar to telephone-wire or horse-whips—the object of which is to reduce the noise of carriers rolling thereupon. I find that rubber tubing is preferable, because it is very elastic and is adapted to be suitably ornamented. K^2 is the said track-covering.

In Fig. 9 I show four tracks supported by the hangers 44. The two lower tracks are those which the carrier may roll upon, and the outer and upper ones are guide-rails, which sometimes may become tracks, as will hereinafter appear. To mount this track as shown in the several figures, the rods L^2 are passed through holes of sufficient size in the hanger 44, and the tubing is drawn snugly over the wire or rod. To wax the latter greatly facilitates the sliding on of the tube. After the various rods are thus inserted the tubes are sev-

ered at proper lengths and the next hanger placed in position, forming the section shown in Figs. 11 and 12. The hanger 44 is provided, also, with loops 6 6 6, from which hanging wires may pass to the ceiling in one or more places and in different planes from each other. It will here be observed that were the bridge connection between the two inner rails removed the track would be adapted for a double side-wheel carrier, one pair of wheels riding upon either track. The hangers may be provided with small set-screws, to hold the rails intact at their junction with the rods. It will also be observed that only three rails may be used in this construction of the track, with the two upper ones located as shown in Fig. 9, and the third rail about as far from the upper ones as shown in the drawings, but centrally located. The operation of such an arranged track is as follows: A ball of a certain diameter may roll to its station by being placed on the rail between the center and right-hand rail, along which it might roll and fall through at a point at which the outer rail has an abrupt curve in it, at which point any ordinary catching device may be arranged to receive it as it falls through; and a ball of the same size now placed on the track between the center and left-hand rail would also roll farther on to its station, while a ball of still larger diameter, large enough to escape either track, would roll along and upon the center, and, being supported by the sides, would pass still farther on. It is obvious in what style of system this kind of track is used, as it is adapted to hollow rolling carriers, as well as those moving on wheels. As shown in the drawings, the track is constructed and arranged to accommodate various other appliances.

In connecting the terminating ends together they may be slightly reduced in diameter and a thimble of light tubing slipped over them to form the joint, and which is readily adjusted, as well as kept in position, by the covering. As thus arranged, a strong and durable as well as noiseless track for carrier systems is obtained. This covering may be made by splitting lengthwise a tube, or by taking a piece of rubber or flexible material of a suitable width and cementing it to the rods or wires—a method of procedure necessary in making repairs. The thickness of this covering should about equal the inner projecting portion of the hangers where they support the rods or wires, so that the covering may compensate for these inner projections, form a smooth, flush track or way, and avoid any jar or jumping of the balls or carriers at such points.

In Fig. 11 is shown a plan view of my improved vertically-moving switch as used upon the distributing-ways, which consists of the two sections N and N^3 , which are pivoted at their outer ends to the main lower rails or terminating supports of the main rails by any suitable means, and are preferably interlocked together, as shown. These two sections are

provided with arms $r' r$, which project outwardly and downwardly from the main track, and are connected together by the link Y. On the section N^3 are outwardly-projecting lips ll , which engage with the springs $S' S$, which are secured to the outer rails, as seen in Figs. 9, 11, and 12. As thus constructed and arranged, the traps $N N^3$, being connected by the link, are about balanced, and are held in a horizontal position by the spring-latch $S' S$ on both sides. When a ball is of sufficient width to open the springs sufficient to escape the nibs ll , the weight of the carrier drops down the section N and moves the section N^3 up, as shown in view Fig. 12, whereupon it drops into the wire basket o^2 , which I have shown pivoted at 7, and a counter-weight attached to counterbalance the basket and ball, if need be; but as I have shown it here it is intended to swing down as the ball arrives within easy reach of the clerk. The length of the "reach" between the pivot-joint 7 and basket may be determined by the stroke required.

It will be observed that the basket o^2 might have its counterbalancing-weight made ridged and stand in a plane nearly level with the track, or might be adapted to lower automatically by the ball dropping into it, and the cords tt pass over suitable pulleys from their present location and their free ends made secure to the upper edges of the basket, which would be returned to the rail upon removing the ball. The forward end of the basket or pocket is closed back upon itself, so that when swung down into a vertical position the carrier or ball is securely held and prevented from rolling or tipping out. When a ball follows one which has gone through a trap and left it open, as in the case just described, the weight of such ball, when brought in contact, closes that trap and passes on to the proper one. Nevertheless, this trap might be closed by counter-weight or spring, although these tend to retard the working of such traps.

The switching devices upon the distributing track or way, as proposed by my invention, are illustrated in Figs. 13, 14, and 15. K^2 is a portion of a return track or way, which is intersected by a branch track, A^4 , as shown. b^4 is a switch-tongue as ordinarily constructed, which is pivoted on a pin, h , at the intersection of the two adjacent rails of the main and branch tracks. The end of the tongue b^4 is held normally in position, so as to keep the main track continuous, by means of the slot 10 on the end of the tongue being held in such position by the lifting-latch u , which may intercept its return, and by means of a coiled spring located at p , which is adapted to open the switch or branch track in position to pass a carrier onto the branch. At m' the latch u is pivoted, and may be extended therefrom up between the rail, as seen in Fig. 15, or bent out and over the top rail, as shown by dotted lines at m'' . To the opposite end of the switch-tongue, near its pivot h , I attach to said tongue a yielding guard-lever, V , which extends up-

ward therefrom and out over the branch track to the height of about the middle of the ball, as shown at m , Fig. 14. The operation of this part is as follows: When it is desired to switch a ball to the branch track, the proper ball lifts or presses sideward the yielding guard-lever m or m'' , which lifts the latch or detent u in the slot 10, and by the spring p the switch-tongue is quickly moved in the position shown in Fig. 13, in which position it remains until the carrier has passed the pivot h , when the ball is crowded between the yielding guard V and the track sides A^4 , whereupon the switch-tongue is returned and locked by the gravity-latch u . It will thus be seen that a carrier may not leave the switch until it has been reset for the next carrier passing over the main track. The object of making the guards V or m or m'' yielding is that in the case of the horizontal switch it enables the guard a to be set to the smaller ball passing through, and which would move the tongue b^4 to lock, while the larger ones would do the same; but after that was done the guard V would yield and permit the ball to pass through. In the case of the guard m or m'' , their yielding enables them to be made all alike, while they may be quickly adjusted to any-sized ball used on the line. In mounting this on the rail where it is necessary to locate a switch, the said device may be made of wire simply wound around the rail in a place where a small section of the tubing may be removed, the ends of which act as washers to keep the wire in position. As thus wound around the wire, the hinge m' is made, when the wire may be further bent into form to adapt it to a carrier, while its opposite end may be provided with or bent to form a latch adapted to enter the tongue b^4 at 10, as specified.

In Fig. 9 is shown my improved carrier T , in which x' is a cavity made in from the side, the opening of which is provided with a bung, x'' , adapted to be movably secured in said ball, and which may be provided with any suitable means for holding it in position to close the aperture. As thus constructed the ball is adapted to carry paper money. In some cases I provide these balls with a spring, x''' , on their inner side, adapted to force the bung x'' out when turned, or a suitable latching device, x^4 , which is removed.

When I desire to construct these carriers to convey hard money or coin, I provide at one end of the cavity x' a coil-spring, x^2 , onto which I attach a small weight, x^3 , of heavy metal. Said weight may be of sufficient diameter to nearly fill the space, and may be of any desirable shape. As thus constructed, the spring x^2 retains the weight x^3 about or near the center, and when hard money is placed therein the weight is displaced, and thereby the coin is counterbalanced and the bung x'' compresses the spring x''' , and by suitable locking devices, x^4 , is held in proper position until released by turning or movable latches common to the art, whereupon it is automatically opened by

said spring x''' . As thus made it is adapted to carry cash by gravity.

Having thus described my invention, what I claim is—

- 5 1. The combination of a way, gutter, or tube extending past a series of clerks' counters or stations and below the counter or shelving, or both, and a rolling cash holder or box adapted to operate substantially as and for the purpose specified.
- 10 2. In a cash-carrying system for stores, the combination of a way adapted to and extending from the cashier's desk H to and over a counter, and a way, trough, or tube extending from the said counter or station and below the line of said counter, and a rolling cash holder or box, substantially as described.
- 15 3. In cash-carrying system, a way adapted to the cashier's desk H and inclined downwardly from and extending over a store-counter, and a way, gutter, or tube extending from the said counters or stations and below the line of said counters, and a rolling cash-holder adapted to receive and carry cash on said ways, as and for the purpose specified.
- 20 4. The within-described system for store-service, consisting of the combination of a way or ways adapted to the cashier's desk and downwardly-inclined therefrom, and extending over a store-counter and along a series of stations, and a way, trough, or tube extending from the said counter and stations and below the upper line of said counter, said ways adapted to support and convey by gravity a hollow rolling carrier or ball to an elevator arranged and adapted to elevate said carrier for the cashier's manipulation, substantially as described.
- 25 5. The combination, in a cash-carrying system for store-services, of a way or ways adapted to the cashier's desk and inclined downwardly therefrom, and provided with distributing-stations arranged in said ways over the different salesmen's counters or stations, and a way, gutter, or tube extending from said stations or counters below the upper line thereof, adapted to receive, support, and convey by gravity cash-holders to an elevator passing the cashier's desk, for elevating or lowering the carriers thereat, substantially as described.
- 30 6. In a cash-carrying system, the combination of one or more chutes arranged below the top line of the counters or salesmen's stations and adapted to convey by gravity a rolling carrier therethrough, and one or more branch ways or tubes leading to the cashier's desk or to an elevator or side track, substantially as described.
- 35 7. In a cash-carrying system, a chute or chutes arranged below the top line of the counters or salesmen's stations, and leading thence to the cashier's desk or to an elevator thereat, adapted to convey thereto by gravity a rolling cash-carrier, substantially as described.
- 40 8. In a cash-carrying system, the combination of one or more counters or stations and one or more chutes adapted to direct rolling

carriers upon or into a way, tube, or gutter, arranged to converge at their lower ends and discharge said carriers into or upon an elevator, whereby they may be raised or lowered to a side track for the operation of the cashier, substantially as described. 70

9. In a cash-carrying system for stores, the combination and arrangement of an incline way or ways, gutter, or tube longitudinally beneath the counter or shelving, provided with means, substantially as described, for receiving a hollow rolling ball or carrier adapted to carry cash on said ways, and the lower end of said ways adapted to discharge said ball or carrier into or upon an elevator, substantially as and for the purpose set forth. 75 80

10. In a cash-carrying system, the combination of a way, tube, or gutter, one or more counters or stations, and one or more inclined chutes connecting the stations or counters with the way, whereby a quick impetus is given the hollow rolling ball or carrier used therewith, when introduced therein, toward the cashier's desk or an elevator or side track thereat. 85 90

11. A cash-carrying system consisting of the combination, with one or more salesmen's counters or stations, of one or more chutes, ways, troughs, or tubes leading therefrom, and serving as a means of communication therewith to the cashier's desk, whereby cash-carriers may be sent to the cashier's desk, an elevator thereat by which the cashier may receive or distribute the cash-carriers, and a return distributing-track, the elevator being intermediate of the converging and diverging system of ways, troughs, or tubes, substantially as described. 95 100

12. In a cash-carrying system having chutes the bodies of which are arranged below the line of the counter or shelving at the salesmen's stations or counters, the combination, with the chute, of a cover adapted to close said chute when not in use, substantially as described. 105

13. The inclined chute g , arranged at the salesmen's counters or stations, and adapted as a source of indirect communication with a way, trough, or tube to the cashier's desk, whereby hollow rolling cash-carriers are sent by the clerk along said ways, in combination with an inclined return distributing-track, as set forth. 110 115

14. The chute g , arranged with its mouth extending above the counter, and furnished with a cover, in combination with a way, b'' , substantially as described. 120

15. In a cash-carrying system, one or more chutes having their bodies arranged below the top line of the counters or salesmen's stations, but with mouths extending above the top line of the counters or stations, provided with suitable covers, substantially as described. 125

16. In a cash-carrying system, the combination, with the troughs, grooves, or ways, arranged and adapted to deliver the cash-carriers at the cashier's desk, of one or more grooves, troughs, or ways located at the cash- 130

ier's desk, and adapted to receive and hold the cash-carriers for the cashier's operations, substantially as set forth.

17. In a cash-carrying system, the combination of troughs, grooves, or ways arranged and adapted to carry from the counters or salesmen's stations the cash-carriers, one or more troughs, grooves, or ways located at the cashier's desk, adapted to receive and hold for his operations the cash-carriers, and an elevator for receiving the cash-carriers from the troughs, grooves, or ways leading from the counters or stations and delivering them into the troughs, grooves, or ways receiving and holding them at the cashier's desk, substantially as described.

18. In a cash-carrying system, the combination, with one or more troughs, grooves, or ways located at the cashier's desk, and adapted to receive and hold thereat the cash-carriers, of an elevator for delivering the cash-carriers thereupon, substantially as described.

19. The combination, with a cashier's desk, H, of a store, and a series of outgoing distributing-tracks, of an elevator adapted to lift the ball from a converging station or stations to the cashier's desk, for his manipulation, substantially as described.

20. The elevator R, consisting of a suitable band provided with platforms adapted to raise a spherical carrier from a position near or below the floor or compartment beneath to an incline leading to the cashier's desk or the neighborhood thereof, for his manipulation, substantially as described.

21. The elevator R, consisting of a suitable band furnished with disks 3' and slot 3'', adapted to raise or lower a spherical carrier to or from the cashier's desk and a converging station, and provided with means for ejecting the carrier in either direction automatically, substantially as described.

22. In combination with a cash-carrying system and a cashier's desk, an elevator consisting of the sections 2 and 3, band n^2 , supporting and driving wheels J and J'', and hoop or disks or equivalents adapted to carry a ball in either direction, substantially as described.

23. The combination, with an elevator, R, for raising and lowering carriers from one floor to another, provided with means, as described, for receiving automatically such carriers into or upon the elevator from the incoming tracks or converging stations, of means, as described, for ejecting said carriers upon a track adapted to serve clerks in various floors, and means, as described, as a motive power, substantially as described.

24. The combination of the water-motor E and elevator R and a cash-carrying system adapted to rolling carriers, substantially as described.

25. The combination of the disk 3', slot 3'', and mouth 22, deflector 13, and case 2, adapted to operate as and for the purpose specified, and band n^2 and wheel J.

26. In a horizontal switch on the way of a carrying system, the combination, with a piv-

oted switch-tongue, of a yielding switch-guard attached to or engaging with the switch-tongue, and extending beyond its pivot into the branch to be kept normally closed, and self adjusting to various sizes of carriers, adapted to close the switch tongue upon a carrier passing out of the switch, and means, as described, for holding said tongue in such a position adapted to be released by a carrier to be switched, and a tongue adapted to move said switch-tongue in advance of the carrier, substantially as described.

27. In a horizontal switch on the ways of a carrier system, the combination of a switch-tongue, a latch to retain said tongue against the main rail with the branch closed, and means for moving said tongue by the action of various-size carriers to which it is adapted to yield, and means, as described, for raising said latch by the action of said carriers, and means for moving said tongue to the opposite side of the rail upon being released, whereby a carrier resets the switch upon passing through, substantially as described.

28. In a horizontal switch on ways of a carrying system, the combination of a pivoted switch-tongue provided with a spring or latch normally retaining the tongue in position against the spring, to close a branch way, means, as described, operated on by the carrier, for causing the latch to release the tongue and open the normally-closed branch, and a yielding switch-guard attached to or engaging with the switch-tongue and extending into said branch or way, and adapted to yield to various-sized carriers and again close the switch-tongue after leaving the main way or track and entering the branch way or track, substantially as described.

29. In a horizontal switch on the ways of a carrier system, the combination, with the pivoted switch-tongue provided with the yielding switch-guard V, extending back over the branch, of a latch, U, and a yielding guard, m , made in one piece, and adapted to trip the end of the tongue at 10 by the sideward or upward pressure of the carrier, substantially as described.

30. In a cash-carrying system, the combination, with a track or way provided with two vertical moving sections pivoted to the main track at their outer ends, and provided with means, as described, whereby they are connected, of means, as described, for retaining said gates or switches in a horizontal position, adapted to be operated by the carriers, substantially as described.

31. In cash-carrying systems, the combination, with a track or way provided with two vertical moving sections pivoted at their outer ends, and provided with means, as described, for retaining them in a horizontal position adapted to be operated by a carrier intended to pass through the switch, of means, as described, for closing them again by a following carrier, as set forth.

32. In a carrying system, the combination,

with a track or way, means, as described, for discharging the carriers from such ways, and a receptacle for arresting the carriers as they drop from the trap, of means, as described, whereby the ball is lowered by counter-weight, substantially as described.

33. In a store system, the combination of a discharging device on the ways and a receptacle beneath the same for the carrier, adapted to automatically drop upon arrival of such carrier in said receptacle, substantially as described.

34. In a store system, the combination of a discharging device on the ways and a receptacle beneath, attached to a lever provided with a counter-weight which may be overbalanced by the arrival of said carrier in said receptacle, whereby said receptacle automatically returns to the track upon relieving the carrier, substantially as described.

35. In a store-service system, a three-rail track or way consisting of rails running parallel with each other and the outer ones higher than the center one, whereby a ball placed upon the track between the two right-hand rails will follow those rails, substantially as described.

36. In a cash-carrier system, the combination of inclined distributing-ways A and the devices forming the means for sending a carrier toward the cashier's desk H from and below the counter of a store, and hollow rolling balls T, adapted to receive and carry cash on said ways, as and for the purpose specified.

37. The combination, with the counter *f* and desk H and elevator R in a store, of the devices forming the means for connecting the same, substantially as described.

38. The combination of the box T and bung *x''*, provided with the devices forming the means for holding the bung in position, as and for the purpose set forth.

39. The combination of the box T, the bung *x''*, and spring *x'''* and a detent, *x⁴*, as and for the purpose set forth.

40. The combination of the box T, adapted to roll, the bung *x''*, the detent *x⁴*, spring *x²*, and counter-weight *x³*, as and for the purpose specified.

41. The combination of the box T, adapted to roll, the bung *x''*, the detent *x⁴*, spring *x'''*, counter-weight *x³*, and spring *x²*, adapted to hold and carry cash, substantially as described.

42. A rolling cash-carrier consisting of the combination of the box T, adapted to roll, and provided with a cover, and means, as described, for returning it to the box, and a weight and spring adapted to counterbalance coin, substantially as and for the purpose specified.

43. In a cash-carrying system, the combination, with a cashier's desk, of an independent groove or trough, *k*, adapted to receive and hold a series of rolling cash-carriers, and the devices forming the means for conveying said carriers thereto, substantially as described.

44. In a cash-carrying system, the combination, with the ways, troughs, or tubes forming the track for conveying the cash-carriers, and hangers for supporting or suspending the same, of wires or supports for the hangers arranged on either side of the center thereof alternately and at an angle thereto, whereby the ways are held steady and fixed throughout the length of the track, substantially as set forth.

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

JOHN H. GOODFELLOW.

Witnesses:

EDWARD P. AUGUR,
GEO. C. MILLER.