No. 740,274. PATENTED SEPT. 29, 1903.

V. R. HEFTLER & C. B. WEEKS.

TICKET PRINTING, ISSUING, AND RECORDING MACHINE.

APPLICATION FILED JUNE 25, 1902.

NO MODEL. 11 SHEETS—SHEET 1.

Fig. 1.

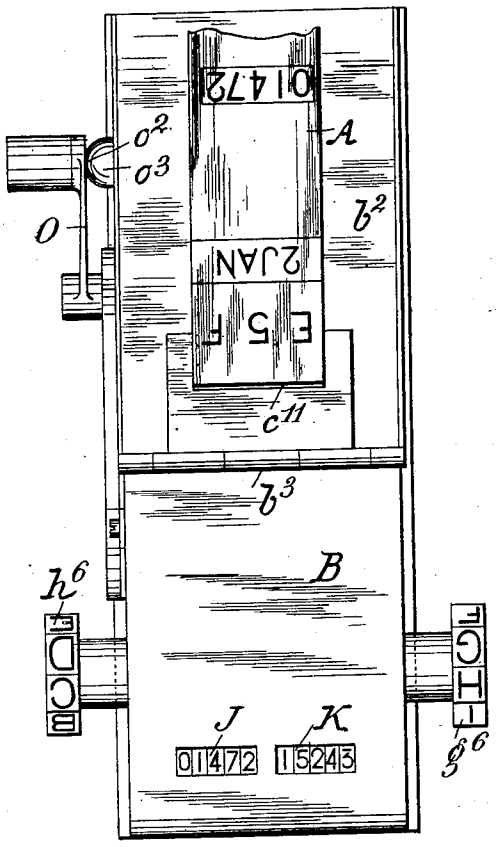
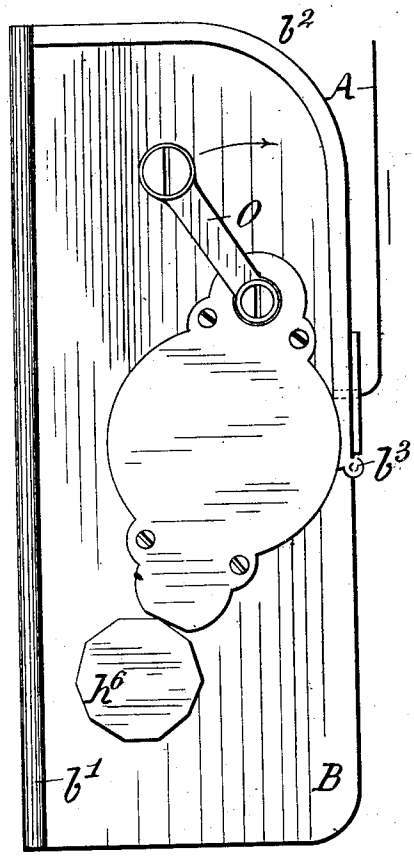


Fig. 2.



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Fig. 3

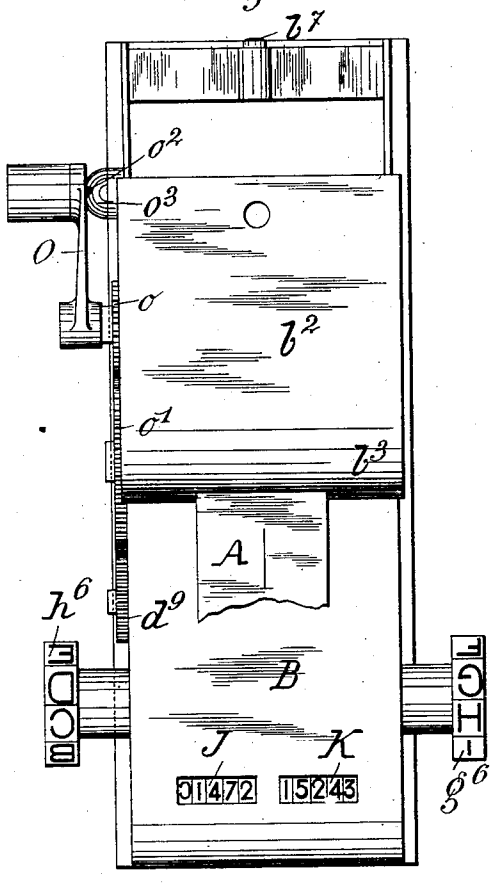
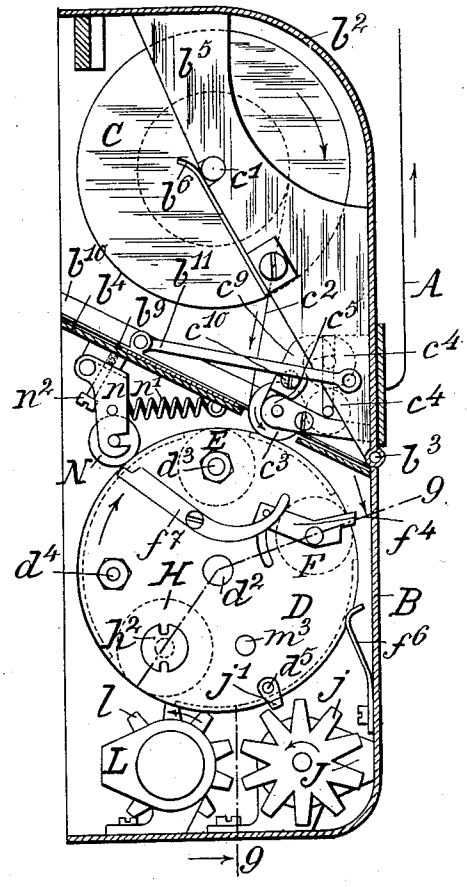


Fig. 6



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Fig. 4

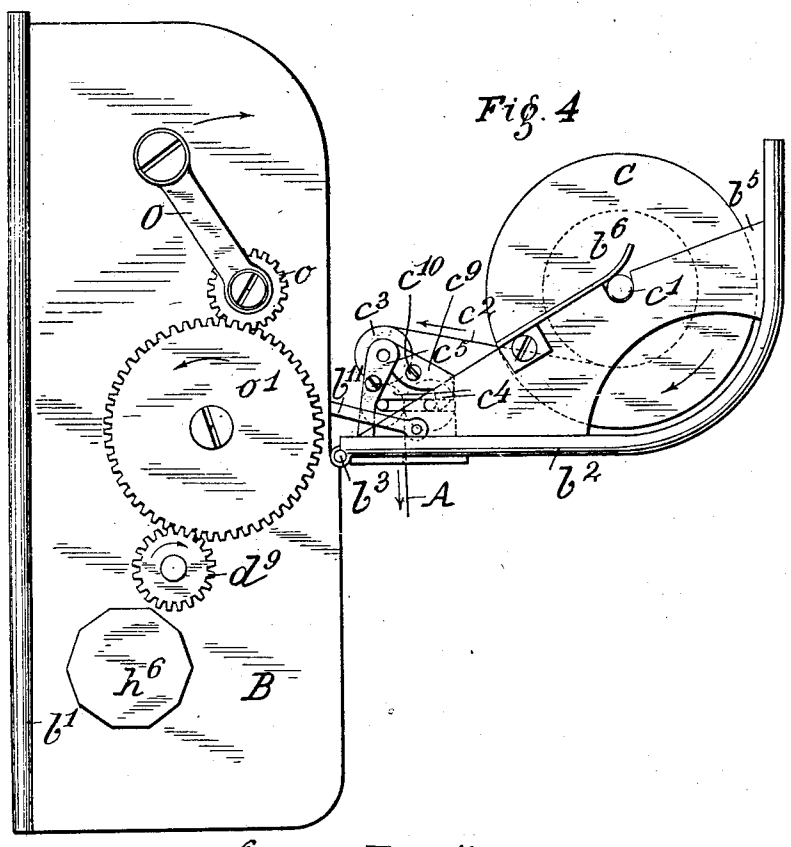
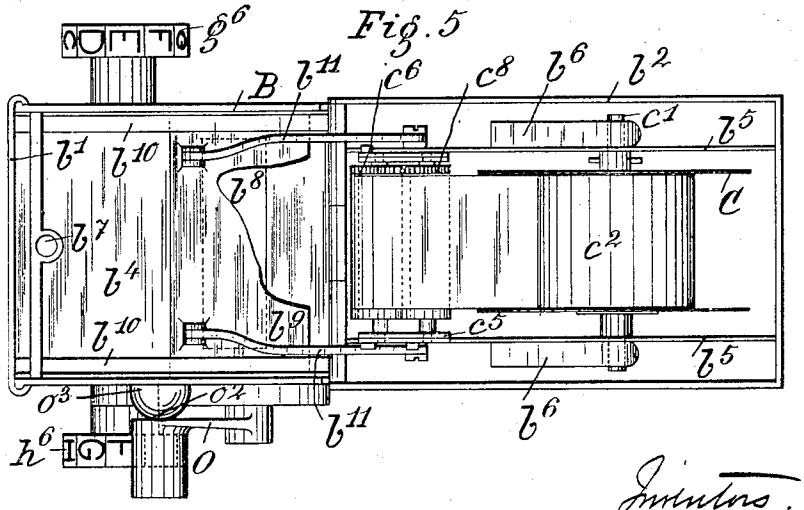


Fig. 5



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Fig. 7

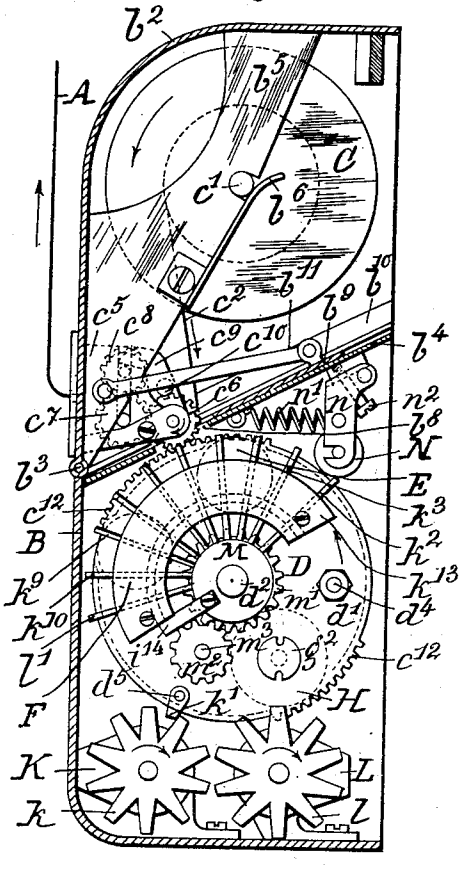
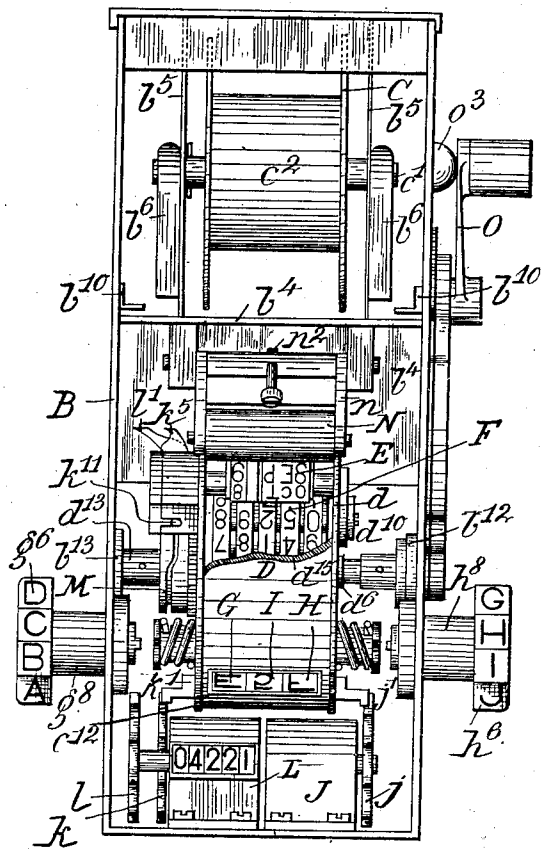


Fig. 8



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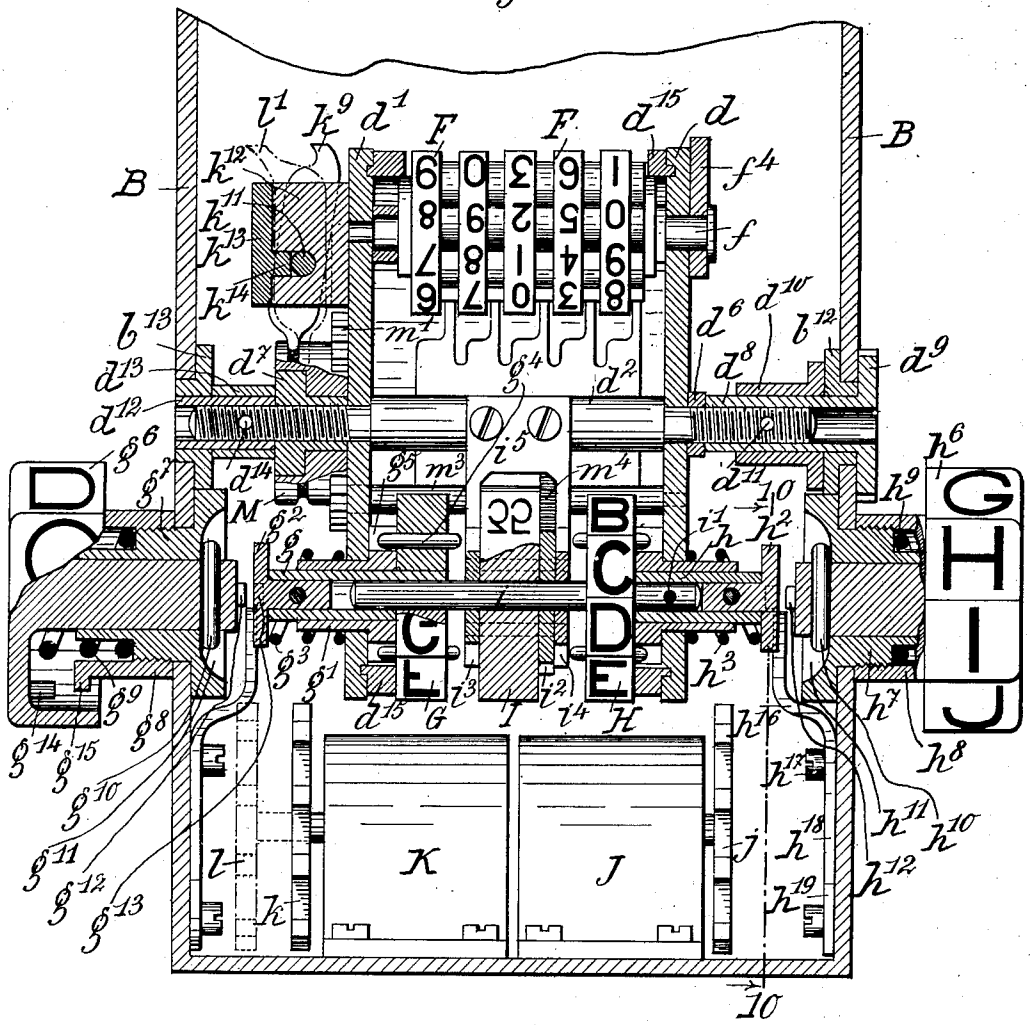
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Fig. 9



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Fig. 16.

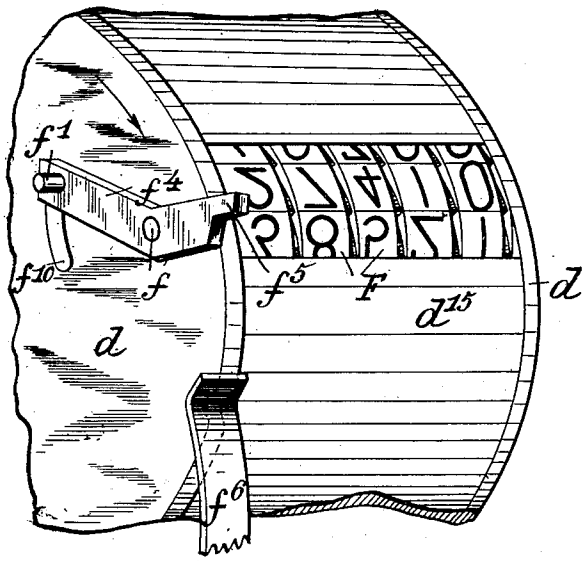
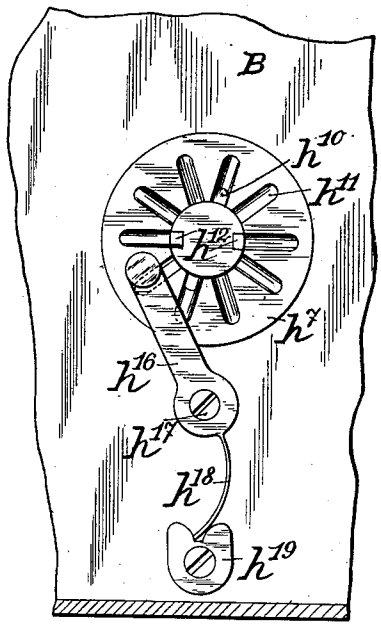


Fig. 10



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NO MODEL. 11 SHEETS—SHEET 7.

Fig. 11

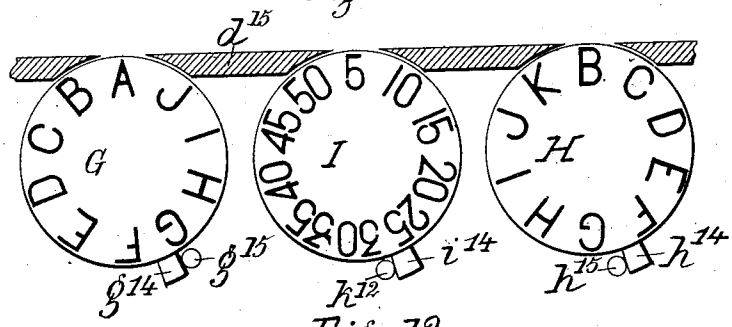


Fig. 12

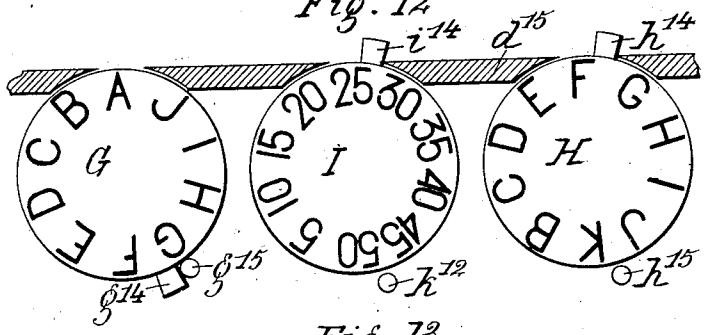
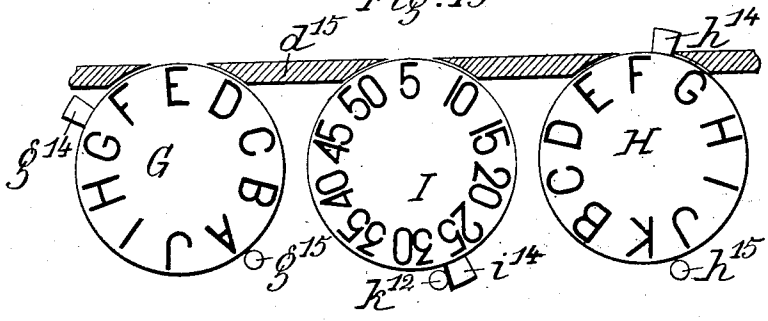


Fig. 13



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Fig. 14.

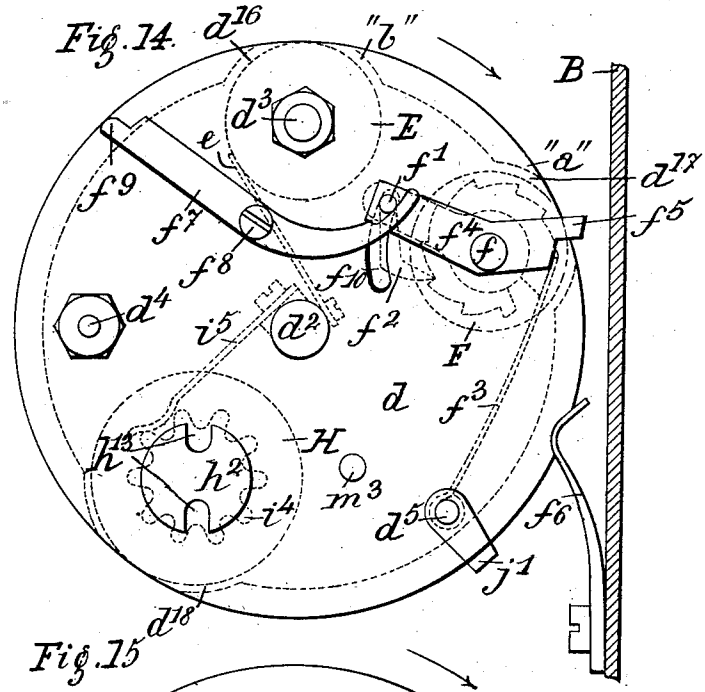
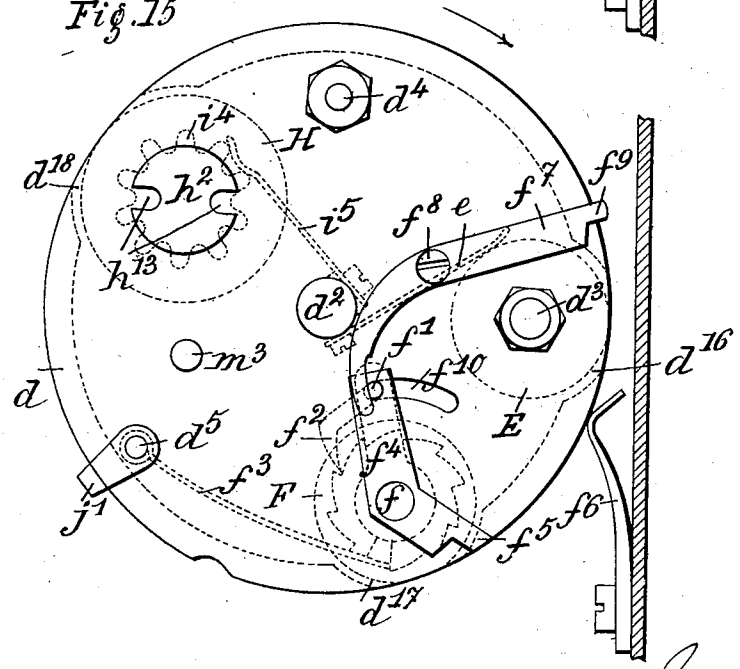


Fig. 15.



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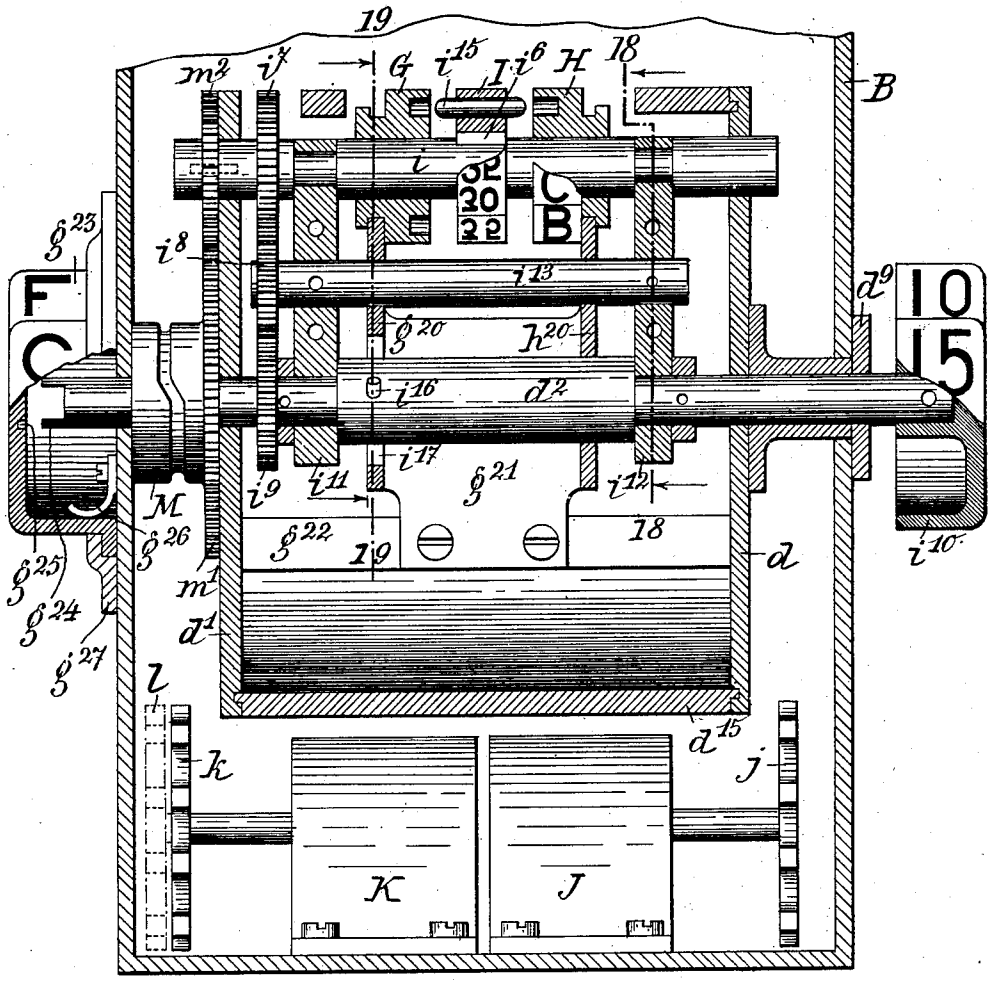
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Fig. 17.



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NO MODEL. 11 SHEETS—SHEET 10.

Fig. 18.

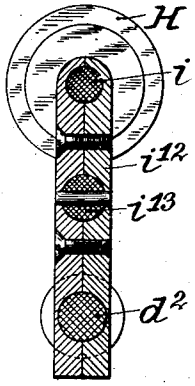


Fig. 19.

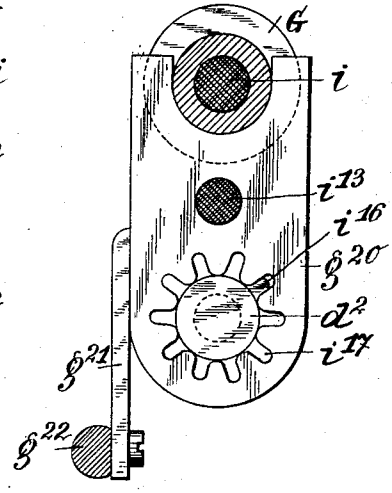


Fig. 22

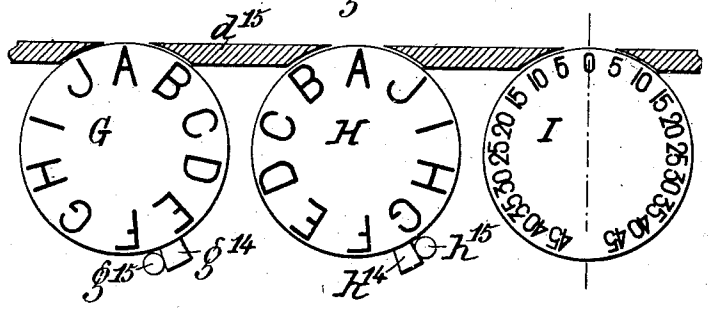
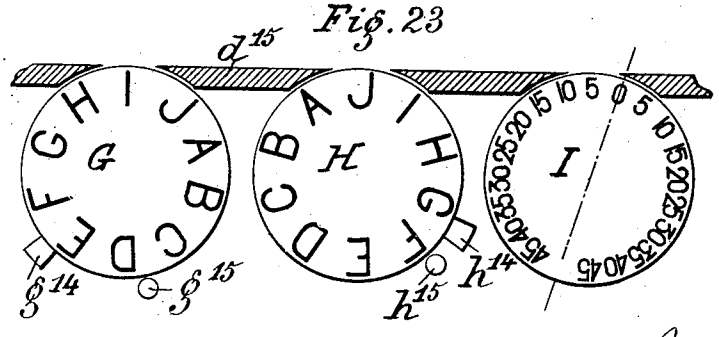


Fig. 23



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NO MODEL. 11 SHEETS—SHEET 11.

Fig. 20

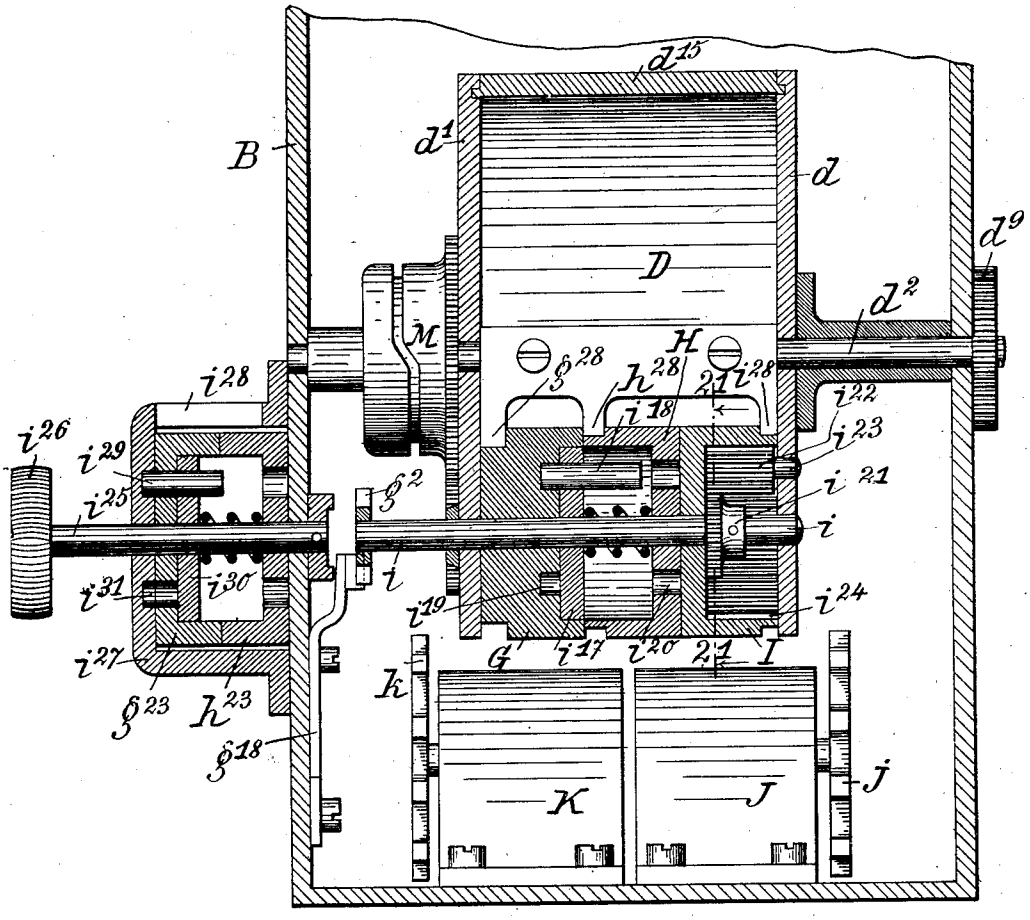
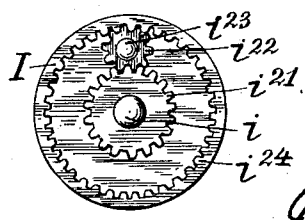


Fig. 21



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 740,274. Patented September 29, 1903.

UNITED STATES PATENT OFFICE.

VICTOR RAPHAEL HEFTLER AND CHESTER BENTON WEEKS, OF PARIS, FRANCE; SAID HEFTLER ASSIGNOR TO SAID WEEKS.

TICKET PRINTING, ISSUING, AND RECORDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 740,274, dated September 29, 1903.

Application filed June 25, 1902. Serial No. 113,189. (No model.)

To all whom it may concern:

Be it known that we, VICTOR RAPHAEL HEFTLER, civil engineer, a citizen of the Republic of France, residing at 28 Rue Racine, (postal address,) and CHESTER BENTON WEEKS, manufacturer, a citizen of the United States, residing at 2 Rue de Rocroy, Paris, France, (postal address,) have invented a certain new and useful Improvement in Ticket Printing, Issuing, and Recording Machines, (for which application for Letters Patent has been made in England, provisional, in the name of VICTOR RAPHAEL HEFTLER, with the knowledge and consent of C. B. WEEKS, under date of December 2, 1901, No. 24,466, and in France in the name of CHESTER BENTON WEEKS, with the knowledge and consent of V. R. HEFTLER, under date of June 2, 1902;) and we do hereby declare that the following is a full, clear, and exact specification of the same.

This invention relates to machines for printing, issuing, and recording tickets and the like for journeys on road-cars, railways, steamboats, or other conveyances, for admission to theaters and other places of entertainment and for inclosures or inclosed places generally, for printing and issuing tradesmen's bills for goods purchased, whether in shops, restaurants, or elsewhere, and for various other services where tickets or similar checks are employed.

In the present specification the invention is described as applied to printing and issuing tickets for use on road-cars, and in the machine herein to be described a record is secured in respect to the number of tickets issued by the conductor and also of the sums received by him. By means of this machine the conductor issues a ticket which besides containing a rotation-number, the date, and, say, the name of the road car company also indicates the station or point at which the ticket is issued, the station or point to which the passenger is entitled to travel, and the price corresponding to distance separating the two points. Furthermore, the machine contains registers on which are recorded the number of tickets issued by the conductor and the total amount of the various sums received by him. Again, the machine is so devised that in addition to fulfilling the above-mentioned conditions it also indicates, and this separately, the number of tickets issued only for distances comprised between two consecutive stations. This latter information is or may be useful in studying or investigating the requirements or statistic conditions of traffic.

Broadly speaking, the machine, which, as other machines of the class to which it belongs, is a portable one, comprises a drum in which are fitted a set of wheels indicating the two stations and the price, which wheels are operated from the outside by the conductor, such wheels presenting their printing-face at the periphery of the drum. In the same drum are likewise fitted another set of wheels for printing the date and another set of wheels which are mechanically operated at each revolution of the drum for printing the rotation-number on the ticket to be issued, and, finally, the periphery of the drum is provided with permanent type or characters for printing, say, the name of the road car company.

The machine also comprises a paper web, a printing mechanism, and an external operating device by which motion is imparted to the drum, the required action of the various registers being derived from such rotary motion of the drum.

In the accompanying drawings, Figure 1 is a front elevation of the machine. Fig. 2 is a side view of Fig. 1. Fig. 3 is a front elevation similar to Fig. 1 with the hinged lid swung down. Fig. 4 is a side view of Fig. 3. In Figs. 3 and 4 the cover-plate which incloses the operating-gears has been removed. Fig. 5 is a plan of Fig. 4. Fig. 6 is a side view similar to Fig. 2, the box being in section for showing the internal mechanism. Fig. 7 is a side view similar to Fig. 6, showing the opposite side of the said mechanism. Fig. 8 is a rear view of Fig. 1, the inclosing slide-plate being removed for showing the internal mechanism. Fig. 9, on a larger scale, is a section on the broken line 9 9 of Fig. 6. Fig. 10 is a detail of a part of Fig. 9 in section on the line 10 10. Fig. 11 is a diagram showing the type or characters borne by the two station-wheels and the price-wheel. Fig.

12 is the same diagram with the wheels set for a given travel. Fig. 13 is the same diagram with the wheels set for another travel. Fig. 14, on a larger scale, is the face of the drum shown in Fig. 6. Fig. 15 is the same view as Fig. 13 after the drum has revolved a quarter of a turn. Fig. 16 is a detail of Fig. 14. Fig. 17 is a modified construction of machine shown in section. Fig. 18 is a detail of Fig. 17 in section on the line 18 18. Fig. 19 is a detail of Fig. 17 in section on the line 19 19. Fig. 20 is a second modified construction of machine shown in section. Fig. 21 is a detail of Fig. 20 in section on the line 21 21. Figs. 22 and 23 are diagrams showing the type or characters borne by the two station-wheels and the price-wheel of the modified construction shown in Fig. 20.

The ticket, which is shown at A, Fig. 1, as having just been printed and issued from the machine, bears a consecutive or rotation number, which in this instance is No. 01472. It also has a blank space for the name of the road car company and for any other or additional matter desirable. It also bears the date, which in this instance is January 2. It also bears the name of the station at which the ticket is issued and the name of the station to which the passenger is entitled to travel, which in this instance are the letters, say, "E" and "F," respectively, and, finally, it also bears the price charged—say five cents—for traveling from station "E" to station "F." It is, however, understood that the letters of the alphabet have been arbitrarily chosen for designating the stations and that such stations could as well be otherwise designated or even be designated in full.

B is the box which contains the mechanism and is closed at the rear by a slide-plate b', capable of being fastened by a key-lock or otherwise. (Not shown.) It comprises a lid b^2, hinged at b^3, and is divided by a partition b^4 into two compartments, in the lower one of which is located that part of the mechanism to which the conductor shall not be able to gain access, while the other compartment contains the paper-spool C, which needs to be exchanged for a fresh one when exhausted, the conductor being able to effect the substitution without it being possible for him to tamper with the registers or with the rest of the machine generally. In the top compartment are formed two cross-pieces b^5 b^5, acting as supports for the axis c' of the spool C, which is held in position by springs b^6 b^6, whereby the spool may be readily removed and replaced. The lid b^2 is held in the closed position by a catch or other locking device b^7, Figs. 3 and 5, of any suitable kind. The web c^2 after leaving the spool passes over a printing-roller c^3 (see Figs. 4 and 6) and between guide-rollers c^4 c^4. The axis of the rollers c^3 c^4 c^4 are suitably journaled in a frame c^5 and carry pinions c^6 c^7 c^8, all geared together, as shown in Fig. 7. The guide-rollers c^4 c^4 are firmly pressed against each other in order to positively feed the web by an adjustable pusher c^9, which when adjusted for a proper pressure is set by a screw c^{10}. The web c^2 after leaving the guide-rollers c^4 c^4 is conducted outside the machine through a slot c^{11}, Fig. 1. The pinion c^6 meshes into a mutilated set of teeth c^{12}, formed on the periphery of the hereinafter-described cheek d' of the drum D. The printing-roller c^3 and its pinion c^6 extends from the upper to the lower compartment of the box through a slot b^8, formed in the partition b^4. (See Figs. 5 and 7.) Over the partition b^4 is arranged a sliding door b^9, which is guided between two angle-irons b^{10} b^{10}, fast on the box B, the said door uncovering the slot b^8 when the machine is closed, as in Figs. 6 and 7, and covering the same when the lid b^2 is swung down, as in Figs. 4 and 5. The said sliding door b^9 is connected to the lid b^2 by pivoted connecting-rods b^{11} b^{11}.

D is the drum formed of two cheeks d d', Fig. 9, fitted on an axis d^2 and held together by cross-ties d^3 d^4 d^5. (See Figs. 6, 14, and 15.) The two ends of the axis d^2 are threaded, and nuts d^6 d^7 serve to fasten the drum and cheeks together. The right-hand end is screwed into a sleeve d^8, fitted in a bearing b^{12}, fastened to the box B and integral with a gear d^9, to be hereinafter referred to. On the sleeve d^8 is slipped a bushing d^{10}, the parts d^8, d^{10}, and d^2 being made fast with each other by a pin d^{11}. The left-hand end of the axis d^2, provided with the nut d^7, is screwed into a sleeve d^{12}, fitted in a bearing b^{13} and carrying a bushing d^{13}, the parts being held together by a pin d^{14}, as in the former case. The object of the bushings d^{10} d^{13} is to lock the drum D against lateral movement. The periphery of the drum is formed of a cylinder d^{15}, (see Figs. 8 and 9,) which is held in place against the cheeks d d' by engaging grooves formed in the latter. The periphery of the cylinder d^{15} is engraved to correspond with the permanent characters for printing, say, the name of the road car company. Such characters may, however, be formed on an independent electrotype set and fastened on the said cylinder. In the instance under consideration such permanent characters extend from the point, say, a to the point, say, b of the drum-cylinder d^{15}. (See Fig. 14.) In the said cylinder are formed openings through which project the type-wheels for printing the variable matter, so that both the permanent and variable characters are on the same cylindrical surface, d^{16} being the opening for the date-wheels E, Figs. 6, 7, 8, 14, and 15, d^{17} the openings for the wheels F, Figs. 6, 7, 8, 9, 14, and 15, which print the rotation-number, and d^{18} the opening both for the wheels G and H, which print the stations, and the wheel I, which prints the price.

The date-wheels E are three in number, one for the month and the two others for the day of the month. (See Fig. 8.) They are mounted on the cross-tie d^3, acting as an axis,

and are held in printing position, as usual, by a flat spring e, Figs. 14 and 15, fastened to the drum-shaft d^2. The date-wheels E are set once for all by an attendant every morning previous to handing the machine to the conductor. Access to such wheels may be gained by removing the slide-plate b'.

The wheels F—say five in number—each bear a set of ciphers from "0" to "9" and form together a printing-register for printing the rotation-number of each ticket issued. They are mounted on an axis f. This register is of any approved well-known form and need not be described here in detail, suffice it to say that one unit is registered every time the pivot f' for the pawl f^2 rocks to the extent of one-tenth of a revolution around the axis f of the registering-wheels F. Each of the said wheels is held in proper position for printing by a usual flat spring f^3, fastened to the cross-tie d^5. The said rocking motion is produced, as hereinafter described, at each revolution of the drum D. The pivot f', which passes through a curved slot f^{10} in the cheek d, engages a hole at the end of a lever-arm f^4, mounted on the axis f, which extends through the cheek d, Figs. 9, 14, 15, and 16, and the arm f^4 is provided with a tang f^5, which as the drum revolves comes in contact with a stationary spring f^6, fastened to the box B, so as to cause the pivot f' to rock, as hereinbefore stated, from the position shown in Fig. 14 to that shown in Fig. 15. A counter-arm f^7, pivoted at f^8 and provided with a tang f^9, will as the latter meets the spring f^6, Fig. 15, be rocked to its original position (shown in Fig. 14) and at the same time return the pivot f' to the position shown in the latter figure.

The wheel G, (see Fig. 9,) which prints one of the stations, is fast upon a hollow shaft g, fitted in a bushing g', secured to the cheek d'. Into the external end of the hollow shaft is pinned a connecting-head g^2. The hollow shaft g is capable of sliding within its bushing g', a spiral spring g^3 tending to hold the said shaft in the normal position. (Shown in Fig. 9.) The wheel G is provided with one or more pins g^4, which project from both sides, the external side of the pins engaging one or the other of peripheral notches g^5, formed in the head of the bushing g'. In a line with the axis of the bushing g' when the drum D is in the position shown in Fig. 9 is arranged an operating-knob g^6, fitted in a bushing g^7, fastened to the box B by a nut g^8, a spiral spring g^9 tending to hold the knob in the normal position. (Shown in the said figure.) A pin g^{10}, passing through the inner end of the knob g^6, acts to lock the said knob in one or the other of its ten different positions by engaging one of the radial grooves g^{11}, formed in the bushing g^7. The internal end of the knob g^6 has two projecting pins g^{12}, which may enter corresponding recesses g^{13}, formed in the connecting-head g^2. By pressing inwardly upon the knob g^6 the conductor causes the pins g^{12} to engage the recesses g^{13}, and thus rigidly connects the knob with the station-wheel G. Both knob g^6 and station-wheel have engraved upon them like letters or characters representing names of stations.

On the opposite side of the machine and in a line with each other are arranged another station-wheel H, knob h^6, and corresponding intermediate parts designated by the same letters of reference.

The price-wheel I is loose on a shaft i, which is rigidly connected by a pin i' to the hollow shaft h, while its other end is free to slide within the hollow shaft g, so that the parts g, h, and i together form a telescopic shaft. Integral with the price-wheel I are a gear i^2, to be hereinafter referred to, and two notched disks $i^3 i^4$. (See Figs. 9, 14, 15.) The notches, ten in number, are arranged so that one of them will always be opposite one of the pins g^4 or h^4. A flat spring i^5 holds the price-wheel in position.

In order to operate one of the station-wheels—say G—the knob g^6 is pressed in opposition to its spring g^9, so as to connect it with the connecting-head g^2, and by pressing in farther the pin g^{10} disengages from its groove, and at the same time the pins g^4 are disengaged from their notches g^5 and engage at their other end the notches in the disk i^3, whereby the station-wheel G is connected with the price-wheel I and both are capable of being revolved together by an equal amount under the action of the knob g^6. The other knob h^6 similarly operates the corresponding station-wheel H and price-wheel I; but it is to be observed that both station-wheels G and H cannot be operated simultaneously in view of the fact that if, for instance, it is the knob g^6 which has been operated the end of the head g^2 abuts against the free end of the shaft i, while if it is the knob h^6 which has been operated the free end of the shaft abuts against the head.

One of the important features of this machine is that by connecting any station-wheel with the price-wheel the latter will print the correct price. Let us explain how, in reference to the diagram shown in Figs. 11, 12, and 13, which have been made under the assumption that the tramway-line is divided into ten sections, so that, including termini, the line comprises eleven stations, which for convenience we will designate by the letters "A" to "K," and that the unit of fare is five cents for one stage, so that for traveling to the whole extent of the line—viz., ten stages—the fare will be fifty cents. In assembling the parts the price-wheel I is so placed as to present the numeral "5" at the opening of the drum-cylinder d^{15}, Fig. 11, while the wheel G presents the letter "A" and the wheel H presents the letter "B," the knobs g^6 h^6 correspondingly presenting the same letters "A" and "B" to the conductor. Now if we suppose the conductor is called upon to issue a ticket from station "A" to station "B"

he will operate the machine with the wheels set as shown in diagram Fig. 11, and the ticket issued will be a five-cent ticket between "A" and "B." Again, if we suppose that he is called upon to issue a ticket, say, from "A" to "F," he will through the corresponding knob h^6 operate the station-wheel H until it presents the letter "F" in the opening of the drum-cylinder d^{15}, for which purpose the said wheel H is revolved to the extent of four divisions. At the same time the price-wheel I is carried along to the extent of four divisions, so as to present the numeral "25," which is the correct price. (See diagram Fig. 12.) If, furthermore, we suppose that he is called upon to issue a ticket, say, from "E" to "F," he leaves the station-wheel H unchanged and will operate the station-wheel G so as to cause it to present the letter "E," the price-wheel I being at the same time carried along and presenting the numeral "5." It will thus be seen that whatever be the station, provided the number of stages remain the same, it will always be the same face of the price-wheel which will print.

It is important that the combination herein shown of numerals and letters be not disturbed. For that purpose the rotary movement of each of the wheels G, H, and I is limited to nine-tenths of a revolution. This can be explained as follows, in reference, for instance, to the diagram shown in Fig. 11, wherein all the three wheels have reached their limit of rotation, being arrested by a pin and a stop, diagrammatically illustrated at g^{14} and g^{15}, Figs. 9 and 11, g^{15} being stationary and g^{14} being integral with the moving part. It is therefore seen that if it be desired to move the station-wheel G from "A" to "J" it is necessary by reason of the stop g^{15} to cause it to successively present the intermediate stations. For instance, if it were possible in the absence of a stop to move the wheel G from "A" to "J" directly the price-wheel I would be correspondingly actuated and made to present the numeral "10," which would be the wrong fare.

The stops for the station-wheels G and H are placed upon the corresponding knobs g^6 and h^6. On the nut g^8 is formed a projection g^{15}, and on the knob is formed a projection g^{14}. The stops for the price-wheel I are carried to another part of the machine, as hereinafter described. An inspection of Fig. 13 will show the object of the said stops.

It now remains to be shown by what means a record is secured in respect of the number of tickets issued, also in respect of the sums received, and also in respect of the number of tickets issued only for a distance comprised between two consecutive stations.

One important feature of this machine is that in addition to the two usual registers ordinarily provided in machines of the kind for recording the number of tickets issued and also the sums received it also records the number of tickets issued only for a distance comprised between two consecutive stations for the purpose hereinbefore referred to.

The three registers, which may be of any well-known description—such, for instance, as the Veeder register—are, first, the register J, Figs. 1, 3, 6, 8, and 9, which records the number of tickets issued; second, the register K, Figs. 1, 3, 7, and 9, which records as many units of price—say five cents—for each ticket as there are units of price in the price of the ticket; third, the register L, Figs. 6, 7, and 8, which records the number of tickets issued only for a distance comprised between two consecutive stations.

Each of the registers J, K, and L is provided with the usual star-wheel $j\,k\,l$, by which they are actuated. The actuation of the registers is derived from the drum D, as hereinafter explained.

The register J is operated by a tooth j', Figs. 6, 8, 14, and 15, fastened to the cross-tie d^5 outside the cheek d, so that the register will record one unit for each revolution of the drum—that is to say, for each ticket issued.

The registers K and L are operated by means of teeth in such a manner that the required number of teeth will be rendered operative, according to the price of the ticket, while the remaining teeth will pass clear of the star-wheels $k\,l$. The teeth which operate the register K are ten in number and are designated by k' and k^2 to k^{10}, Figs. 7 and 9, while the tooth which operates the register L is a single tooth l'. The tooth k' is a fixed tooth, which is fastened to the cheek d' of the drum D, (see Figs. 7 and 8,) all the teeth k^2 to k^{10} being alike and the tooth l' being different in shape. (See Figs. 7 and 9.) All the teeth k^2 to k^{10} and l' are radially mounted and are loose on a common axis formed of a wire k^{11}, bent so as to enter a circular groove formed in a support k^{12}, fastened to the cheek d', the axis k^{11} being held in place by a cap k^{13}, whose projections k^{14} bear against the said wire, and which is fastened to the support k^{12} by means of screws or otherwise. For the convenience of illustration two teeth only are shown in Fig. 8, and for the sake of facilitating comprehension the tooth l' has been shown in the same plane as the other, k^5. The inner end of the teeth k^2 to k^{10} and l' engages the groove of a cam M, Figs. 7 and 9, loosely fitted upon the nut d^7, the said cam being integral with a gear m', which by means of the gear m^2 on the axis m^3 and of the gear m^4 receives its movement from the price-wheel I by the gear i^2 integral therewith in such a manner that the price-wheel when actuated to the extent of one division—say from "10" to "15"—will cause the cam to be correspondingly turned by the amount of one tooth—say from k^2 to k^3. The shape of the cam-groove is such that the offset portion thereof corresponds to the space covered by nine teeth, and when the tail of any tooth is in the said offset portion the head of the tooth is swung out of the plane of the corresponding star-wheel. For instance, if the

price-wheel I is set at "5" the teeth k^2 to k^{10} will be swung out of the plane of the star-wheel k and the tooth l' will be swung into the plane of the star-wheel l, so that on the drum revolving the register K will be actuated to the extent of one unit by the stationary tooth k' and the register L, which we term the "statistic-register," will be actuated to the extent of one unit by the tooth l'; but if, for instance, a ticket is issued from "A" to "F" at twenty-five cents, which is the case supposed in the diagram shown in Fig. 12, the teeth k^2 k^3 k^4 k^5 will be brought into play and, in addition to the stationary tooth k', will successively actuate the star-wheel k, so as to record five units of five cents each, and all the remaining teeth k^6 to k^{10} and l' will be in their inoperative position.

The limiting-stop, hereinbefore referred to in connection with the price-wheel I, is designated by i^{14}, Fig. 7, and is fastened to the said cam M, the said stop being diagrammatically shown in Figs. 11, 12, 13, wherein the support is represented at k^{12}.

The inking mechanism comprises an inking-roller N, fitted in a pivoted frame n, fastened to the partition b^4 and elastically held in its operative position by a spring n', Figs. 6 and 7, its motion being limited by a screw-stop n^2.

We will now describe the manner in which the drum is revolved. The gear d^9, Fig. 9, receives motion from a crank O through intermediate gears o o'. (See Figs. 3 and 4.) The crank O, which to some extent is flexible, is provided with a point o^2, capable of engaging a recess formed in a projection o^8, so as to hold the crank in its position of rest. It will be readily understood that when the machine is in its position of rest—that is to say, when the parts are in the position shown in Fig. 9—the knobs g^6 h^6 if operated by the conductor will actuate the internal mechanism, but that when the drum is in any other position than that shown in the said figure it would be possible to operate the knobs and yet not actuate the mechanism. In such an event the consequences would be that the knobs would no longer agree with the station-wheels and the combination could be disturbed. Now in order to guard against such a disturbance we provide a device which prevents the operating-knobs from being actuated unless the connecting-heads g^3 h^2 be opposite the knobs g^6 h^6. The device consists, broadly speaking, of an arm h^{16}, Figs. 9 and 10, pivoted at h^{17}, the tail h^{18} being a spring the end of which engages a recess in a holder h^{19}, the spring acting to hold the other end of the arm h^{16} in a line with the axis of the knob h^6 unless the connecting-head h^{13} in its rotary movement shoves the arm h^{16} into the position shown in Fig. 10.

The operation may be briefly explained as follows: The conductor in pushing the knobs g^6 h^6 inwardly sets the station-wheels G H according to the ticket required. At the same time the price-wheel I is actuated accordingly and through the intermediate gearing i^2 m^4 m^3 m^2 m' the cam M is actuated and the registering-teeth k^2 to k^{10} and l' are correspondingly set. This having been done, he turns the crank O to the extent of one revolution, whereby through the train of gears o o' d^9 the drum-axis d^2 is revolved, carrying with it the drum D and the parts therein contained. As the drum revolves ink is supplied from the inking-roller N and the printing-roller is acted on by the mutilated set of teeth c^{12} on the drum and the train of pinions c^6 c^7 c^8, while at the same time the web c^2 is fed between the rolls c^4 c^4 and the registers J K L are operated as explained. When the ticket has been issued from the machine, the conductor tears it off by using the edge of the slot c^{11} as a knife-edge.

Having now entered into a detailed explanation of the construction and operation of our machine, it may be remarked here that, broadly speaking, the gist of the invention resides in that the price-wheel is not separately operable from an external button, knob, or lever, as in other machines hitherto devised, but is operated by the station-wheels. It therefore follows that the price of the ticket issued will always be the correct one.

In the construction so far described with reference to Figs. 1 to 16, inclusive, the above-mentioned result is obtained by causing one or the other of the station-wheels G H to be laterally moved up to and coupled with the price-wheel I, which remains in the same plane; but it is obvious that a like result may also be obtained by making the price-wheel I laterally movable and shifting it up to and coupling it with one or the other of the station-wheels G H, as will now be explained.

In Figs. 17, 18, and 19 we have shown a modified construction of machine by which the above-mentioned result may be obtained. In these figures the same letters of reference represent like parts of the previously-described construction.

The price-wheel I is fastened by a key i^6 or otherwise upon the shaft i and is connected by gears i^7 i^8 i^9 to the drum-axis d^2, which in this instance is loose in the cheeks d d' instead of being integral therewith and is provided with an operating-knob i^{10}, bearing the different prices from "5" to "50." The axis i is held to the axis d^2 by side frames i^{11} i^{12}, (shown in section at Fig. 18,) made of two parts screwed or otherwise secured together, a rod l^{13} acting as a cross-tie and at the same time as an axis for the pinion i^8, so that both lateral and rotary motion of the knob i^{10} will be imparted to the price-wheel I. The axis i, which is capable of being shifted in its bearings in the cheeks d d', is fitted at one end into a pinion m^2, meshing with the pinion m', which is integral with the cam M. The said axis i and pinion m^2 are connected by a feather and key, the pinion always remaining in the same vertical plane, wherein it may

be held by any suitable finger. (Not shown.) The station-wheels G H are formed with grooves in which engage forks g^{20} and h^{20}, formed of a bent piece of metal, the tail g^{21} of which is fastened to the cross-tie g^{22}, so as to lock the said wheels against lateral motion. The price-wheel I carries a pin i^{15}, while in the wheels G H are formed holes whereinto the pin may engage, so that on pulling the knob i^{10} the price-wheel I will connect with the station-wheel H and on pushing, the price-wheel I will connect with the station-wheel G. Thus the same result will be obtained as in the construction shown in Fig. 9, with this difference that one knob having a double action will perform the function of two knobs. An indicator g^{23}, placed outside the box B, operates in unison with the station-wheel G and shows the conductor which station the said wheel will print, it being sufficient for the conductor to know one of the stations and the price in order to enable him to be acquainted with the other station, which will be printed on the ticket to be issued. The said indicator g^{23} is operated from the axis d^2, the end of which is toothed at g^{24}, so as to engage cavities g^{25} in the indicator when the knob is pushed inward. A spring g^{26} acts to prevent the indicator from moving too loosely. The indicator can rotate in a bearing g^{27}.

In order that the axis d^2 may be locked when one of the faces of the price-wheel I is in the right position for printing, it is provided with a pin i^{16}, which may engage one of ten notches i^{17}, cut in the fork g^{20}, Fig. 19. In other respects this modified construction is the same as the construction hereinbefore described.

In the construction described with reference to Figs. 1 to 16, inclusive, it will be readily understood that the letter printed by the station-wheel G must precede as regards alphabetical order the letter printed by the station-wheel H. In other words, the ticket issued, say, from "E" to "F" on the outward trip will be the same as the ticket issued from "F" to "E" on the return trip, excepting, of course, the rotation-number of the ticket—that is to say, the ticket in itself does not show the direction of the trip. Now it may be desirable that the ticket shall show this direction.

In Figs. 20, 21, and 22 we have shown a modified construction of machine by which the above-mentioned result may be obtained. In these figures the same letters of reference represent like parts of the construction previously described with reference to Figs. 1 to 16.

Broadly speaking, the above-mentioned result is accomplished by substituting for the price-wheel I of Figs. 11, 12, and 13, bearing a set of ten ciphers from "5" to "50," a price-wheel I, Figs. 22 and 23, bearing a "0," and two sets of ciphers from "5" to "45" each. Thus it will be seen that although there are ten stations engraved upon the station-wheels G H there are on the tramway-line only ten stations inclusive of the termini, while in the previous case there are eleven. In this instance the wheel G will be used for printing the station of departure, and H the stations of destination. In starting from the station "A" on his outward trip the first ticket to be issued by the conductor will be "A" to, say, "C," in which case he will turn the station-wheel H to the extent of two divisions to the right from the position shown in Fig. 22 and at the same time he will turn the price-wheel I to the extent of two divisions, also to the right, so as to present the numeral "10" of the left side of the dotted line. The last ticket which the conductor may issue on the said outward trip will necessarily be from "I" to "J," the wheels G H assuming the position shown in Fig. 23, in which case the price-wheel I will present the numeral "5" of the left side of the said dotted line. The first ticket to be issued on the return trip being from "J" to "I," the conductor will necessarily turn the station-wheels G and H to the extent of one division to the left. The same movements will turn the price-wheel I also to the left to the extent of two divisions, so as to present in printing position the other numeral "5." It will thus be seen that on the outward trip it is the left-hand side of the price-wheel I which is operative, while on the return trip it is the right-hand one. As in the previous case, stops g^{14} g^{15} and h^{14} h^{15} are provided for the station-wheels G H, respectively, and are incorporated in the machine shown in Fig. 20 in any suitable manner. As to the price-wheel I it does not need any stop. In this modified construction, G and H are the station-wheels, and I the price-wheel, all mounted loose on the axis i and held in position by springs g^{28} h^{28} i^{28}. On the axis i is fastened a disk i^{17}, provided with a pin i^{18}, which may engage at one end one of ten recesses i^{19} in the station-wheel G and at the other one of ten recesses i^{20} in the station-wheel H. On the axis i is fastened a pinion i^{21}, meshing in a pinion i^{22}, loose on a stud i^{23}, fastened to the cheek d of the drum D. The pinion i^{22} meshes in an internal gear i^{24}, formed in the price-wheel I. The axis i carries the previously-described connecting-head g^2, to be connected with the operating-axis i^{25}, which carries the operating-knob i^{26}, and also two indicators, of which one, g^{23}, shows the stations from and the other, h^{23}, the stations to which the ticket is issued, the indicators being contained in a casing i^{27}, wherein is formed an aperture i^{28}, through which the names of the stations appear. The said indicators g^{23} h^{23} are operated by a pin i^{29}, secured on a disk i^{30}, fast on the axis i^{25}, similarly to the manner in which the wheels G H are operated by the pin i^{18}. Two coiled springs tend to keep the disks i^{17} i^{30} in the normal position shown in Fig. 20. In the casing i^{27} are provided a set of ten holes i^{31}, which act to

lock the knob i^{26} until the connection between the knob and the axis i is effected. In other respects this modified construction is the same as the construction hereinbefore described with reference to Figs. 1 to 16.

The operation may be briefly stated as follows: By pushing the knob i^{26} inward the conductor connects the axis i^{25} with the axis i, whereby the station-wheel G and indicator g^{23} will be moved, and by pushing the said knob still farther inward he will disconnect the said wheel and indicator from their respective axes and will connect the latter with the station-wheel H and indicator h^{23}, the price-wheel I being correspondingly actuated by the pinion i^{21}, always in mesh with the pinion i^{22}.

In the construction herein described and shown the machine is devised with a definite number of teeth, of which k^2 to k^{10} are actuated by the cam M, while k' and j' are carried by the drum D and revolve therewith, the registers J, K, and L corresponding to that number of teeth; but it will be readily understood that with the principle of a cam such as M the number of teeth is unlimited and may be increased or decreased to suit particular circumstances. Again, the shape of the teeth may be altered so as to act on star-wheels of registers not placed in the same plane, so that, if desired, each different kind of fare could be recorded separately, according to its value.

We claim—

1. In a ticket printing, issuing and recording machine, the combination of station-printing wheels, means for operating the same, a price-printing wheel and means for connecting or disconnecting the same with or from the station-wheels so as to be dependently operable by the latter, with a printing mechanism, and means for feeding a web through the machine, whereby the price to be printed on the ticket will be determined by the operation of the station-wheels, substantially as set forth.

2. In a ticket printing, issuing and recording machine, the combination of station-printing wheels, means for operating the same, a printing-wheel fitted, together with the station-wheels, in a revolving drum, and means for connecting or disconnecting the same with or from the station-wheels so as to be dependently operable by the latter, with a printing mechanism, and means for feeding a web through the machine, whereby the price to be printed on the ticket will be determined by the operation of the station-wheels, substantially as set forth.

3. In a ticket printing, issuing and recording machine, the combination of station-printing wheels, means for operating the same capable of being connected with and disconnected from the said wheels, a price-printing wheel and means for connecting or disconnecting the same with or from the station-wheels, with a printing mechanism, and means for feeding a web through the machine, whereby the price to be printed on the ticket will be determined by the operation of the station-wheels, substantially as set forth.

4. In a ticket printing, issuing and recording machine, the combination of station-wheels, means for operating the same capable of being connected with or disconnected from the said wheels, a price-printing wheel fitted, together with the station-wheels, in a revolving drum, and means for connecting or disconnecting the price-wheel with or from the station-wheels, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

5. In a ticket printing, issuing and recording machine, the combination of station-printing wheels, means for locking the same, means for operating the same, a price-printing wheel and means for connecting or disconnecting the same with or from the station-wheels so as to be dependently operable by the latter, with a printing mechanism, and means for feeding a web through the machine, whereby the price to be printed on the ticket will be determined by the operation of the station-wheels, substantially as set forth.

6. In a ticket printing, issuing and recording machine, the combination of station-printing wheels, means for locking the same, means for operating the same, a printing-wheel fitted, together with the station-wheels, in a revolving drum and means for connecting or disconnecting the same with or from the station-wheels so as to be dependently operable by the latter, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

7. In a ticket printing, issuing and recording machine, the combination of station-printing wheels, means for locking the same in their inoperative position, means for operating the same capable of being connected with or disconnected from the said wheels, a price-printing wheel and means for connecting or disconnecting the same with or from the station-wheels, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

8. In a ticket printing, issuing and recording machine, the combination of station-printing wheels, means for locking the same in their inoperative position, means for operating the same capable of being connected with or disconnected from the said wheels, a price-printing wheel fitted, together with the station-wheels, in a revolving drum, and means for connecting or disconnecting the price-wheel with or from the station-wheels, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

9. In a ticket printing, issuing and recording machine, the combination of station-printing wheels, a price-printing wheel, an operating device for the said wheels and means for locking the said device in its inopera-

tive position, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

10. In a ticket printing, issuing and recording machine, the combination of station-printing wheels fitted to move longitudinally so as to be separately connected with or disconnected from a price-printing wheel and means for preventing both station-wheels from being simultaneously connected with the price-wheels, and means for operating the station-wheels, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

11. In a ticket printing, issuing and recording machine, the combination of station-printing wheels fitted to move longitudinally so as to be separately connected with or disconnected from a price-printing wheel, means for preventing both station-wheels from being simultaneously connected with the price-wheel, and means for operating the station-wheels, such means being adapted to be connected with or disconnected from the station-wheels, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

12. In a ticket printing, issuing and recording machine, the combination of station-printing wheels fitted to move longitudinally so as to be separately connected with or disconnected from a price-printing wheel, means for preventing both station-wheels from being simultaneously connected with the price-wheel, and means for operating the station-wheels, such means being adapted to be connected with or disconnected from the station-wheels, means for locking the station-wheels with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

13. In a ticket printing, issuing and recording machine, the combination of station-printing wheels fitted to move longitudinally so as to be separately connected with or disconnected from a price-printing wheel, means for preventing both station-wheels from being simultaneously connected with the price-wheel, and means for operating the station-wheels, such means being adapted to be connected with or disconnected from the station-wheels and also to be locked in inoperative position, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

14. In a ticket printing, issuing and recording machine, the combination of station-printing wheels fitted to move longitudinally so as to be separately connected with or disconnected from a price-printing wheel, means for preventing both station-wheels from being connected with the price-wheel, means for operating the station-wheels, such means being adapted to be connected with or disconnected from the station-wheels and also to be locked in inoperative position, and means for locking the station-wheels, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

15. In a ticket printing, issuing and recording machine, the combination of station-printing wheels fitted to move longitudinally so as to be separately connected with or disconnected from a price-printing wheel, means for preventing both station-wheels from being simultaneously connected with the price-wheel, means for operating station-wheels, such means being adapted to be connected with or disconnected from the station-wheels, means for locking the station-wheels, a drum and means for revolving the same, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

16. In a ticket printing, issuing and recording machine, the combination of a price-printing wheel, station-printing wheels, operating means for the same, means for connecting or disconnecting the same with or from the price-wheel, and stops for limiting the extent of motion of the station-wheels, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

17. In a ticket printing, issuing and recording machine, the combination of a price-printing wheel, station-printing wheels, operating means for the same, means for connecting or disconnecting the same with or from the price-wheel, and a stop for limiting the extent of motion of the said price-wheel, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

18. In a ticket printing, issuing and recording machine, the combination of a price-printing wheel, station-printing wheels, operating means for the same, means for connecting or disconnecting the same with the price-wheel, stops for limiting the extent of motion of the station-wheels, and a stop for limiting the extent of motion of the price-wheel, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

19. In a ticket printing, issuing and recording machine, the combination of station-printing wheels, means for operating the same by being connected thereto or disconnected therefrom, and means for preventing the operating means for the station-wheels from being actuated until after the preceding ticket has been completely issued, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

20. In a ticket printing, issuing and recording machine, the combination of a drum, a price-printing wheel, means for operating the same, a cam operated through the price-wheel, a set of teeth operated by the cam and a set of registers operated by the teeth, with a printing mechanism, and means for feed-

ing a web through the machine, substantially as set forth.

21. In a ticket printing, issuing and recording machine, the combination of a drum, a price-printing wheel, means for operating the same, a cam operated through the price-wheel, a set of teeth k^2 to k^{10} operated by the cam and acting upon the register K for recording the price, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

22. In a ticket printing, issuing and recording machine, the combination of a drum, a price-printing wheel, means for operating the same, a revolving tooth k' acting upon a register K for recording the price, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

23. In a ticket printing, issuing and recording machine, the combination of a drum, a price-printing wheel, means for operating the same, a cam operated through the price-wheel, a set of teeth k^2 to k^{10} operated by the cam and a revolving tooth k', all acting upon a register K for recording the price, with a printing mechanism, and means feeding a web through the machine, substantially as set forth.

24. In a ticket printing, issuing and recording machine, the combination of a drum, a price-printing wheel, means for operating the same, a revolving tooth j' acting upon a register J for recording the number of tickets issued, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

25. In a ticket printing, issuing and recording machine, the combination of a drum, a price-printing wheel, means for operating the same, a cam operated through the price-wheel, a set of teeth k^2 to k^{10} operated by the cam, a revolving tooth k' all acting upon a register K for recording the price, and a revolving tooth j' acting upon a register J for recording the number of tickets issued, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

26. In a ticket printing, issuing and recording machine, the combination of a drum, a price-printing wheel, means for operating the same, a cam operated through the price-wheel, and a tooth l' operated by the cam and acting upon a register L for separately recording a given kind of fare, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

27. In a ticket printing, issuing and recording machine, the combination of a drum, a price-printing wheel, means for operating the same, a cam operated through the price-wheel, a set of teeth k^2 to k^{10} and l' acting respectively upon a register K for recording the price and a register L for separately recording a given kind of fare, with a printing mechanism, and means for feeding a web through the machine, substantially as set forth.

28. In a ticket printing, issuing and recording machine, the combination of printing-wheels, means for setting the same, a drum, means for revolving the same, a printing mechanism, means for feeding a web through the machine, a register J for recording the number of tickets issued, means for operating the same, and a register K for recording the price, substantially as set forth.

29. In a ticket printing, issuing and recording machine, the combination of printing-wheels, means for setting the same, a drum, means for revolving the same, a printing mechanism, means for feeding a web through the machine, and registers J K L for recording the number of tickets issued, the price and a given kind of fare, substantially as set forth.

30. In a ticket-printing machine, the herein-described device for actuating the numbering-wheels F for printing the rotation-number of the ticket, consisting of an arm f^4, a counter-arm f^7 on a revolving drum D, a pin f' depending from the register and a stationary spring f^6 acting upon the said arms, substantially as set forth.

31. A ticket-printing machine formed of a box divided by a partition into two compartments, one of which contains the mechanism proper inaccessible to the conductor, while the other contains the paper-spool C and is accessible to the conductor, for the purpose of enabling him to replace the said spool when exhausted, substantially as set forth.

32. A ticket-printing machine formed of a box divided by a partition into two compartments one of which contains the mechanism proper inaccessible to the conductor, while the other contains the paper-spool C and is accessible to the conductor for the purpose of enabling him to replace the said spool when exhausted, the said partition being provided with an aperture through which projects the printing-roller c^3 and which is adapted to be closed when the conductor is gaining access to the compartment by an automatically-operated sliding door b^9, substantially as set forth.

33. In a ticket printing, issuing and recording machine, the combination of a price-printing wheel, means for operating the same, station-printing wheels, and means for connecting the price-wheel with either one of the station-wheels, with a printing mechanism, means for feeding a web through the machine, substantially as set forth.

In witness whereof we have hereunto set our hands, this 9th day of June, 1902, in presence of two subscribing witnesses.

VICTOR RAPHAEL HEFTLER.
CHESTER BENTON WEEKS.

Witnesses:
R. H. BRANDON,
JOHN BUTLER.