

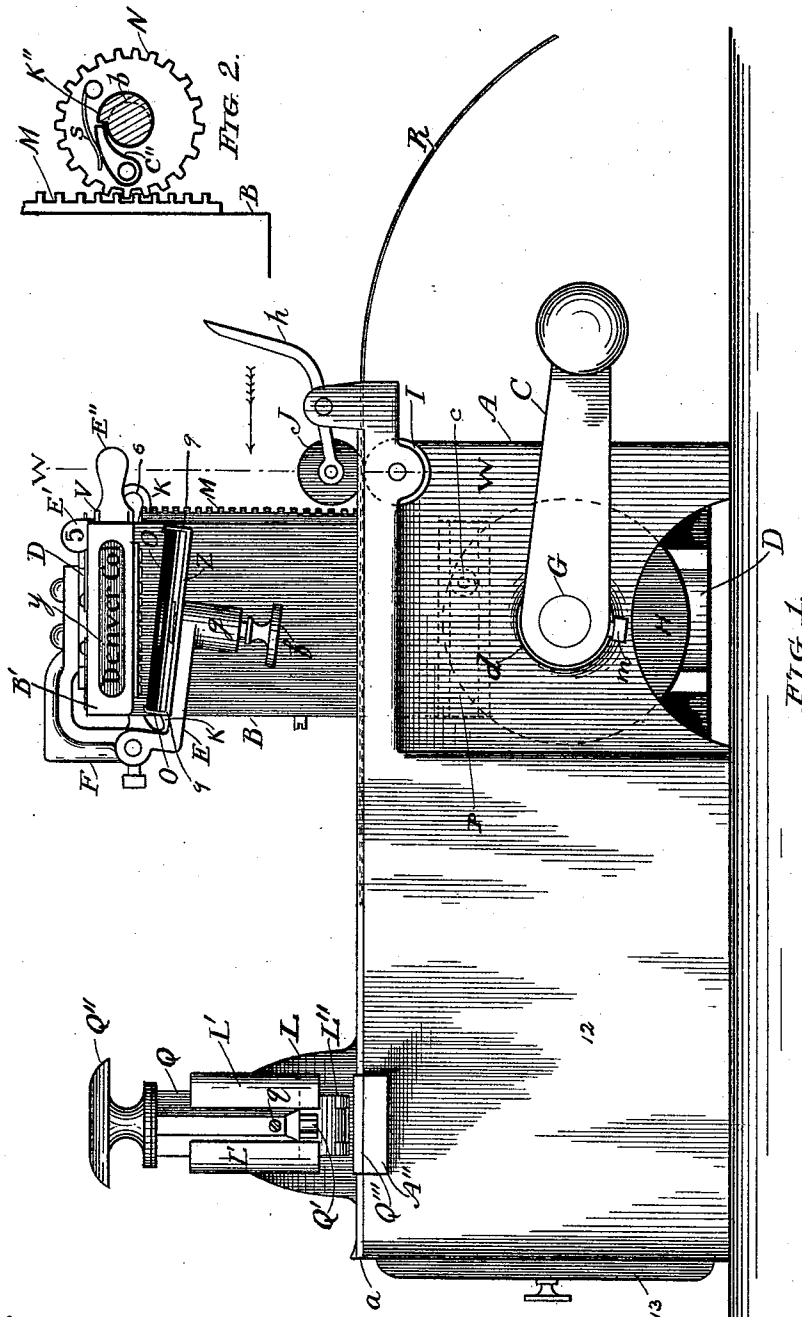
(No Model.)

4 Sheets—Sheet 1.

J. DYER & C. O. MALMGREN.
TICKET PRINTING APPARATUS.

No. 464,194.

Patented Dec. 1, 1891.



Witnesses:
J. Halpinny
M. E. Wheeler

Inventors
John Dyer
and Charles O. Malmgren
By *Chas. F. White*
their attorney

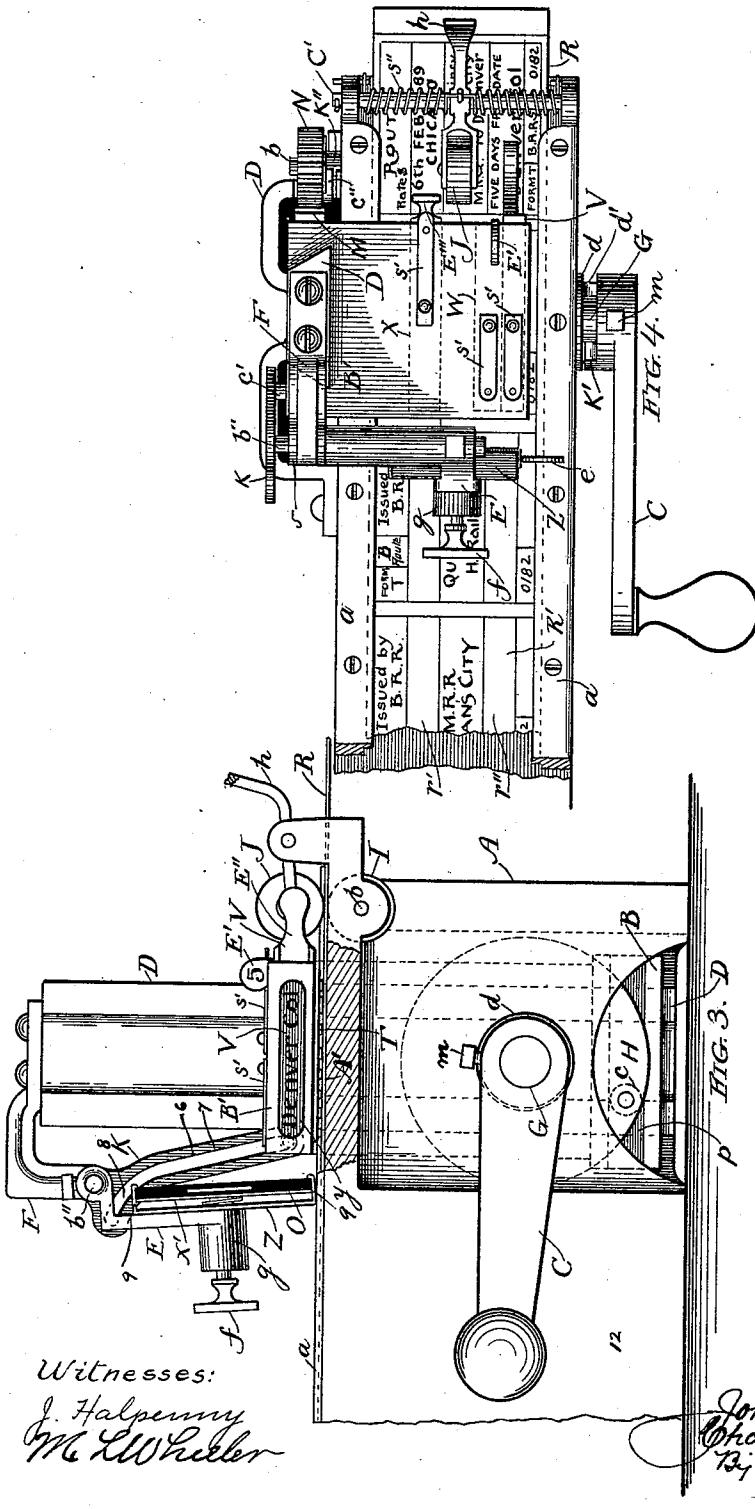
(No Model.)

4 Sheets—Sheet 2.

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Witnesses:

J. Halpern
W. L. Wheeler

Inventors

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Charles O. Malmgren
By Chas. F. White
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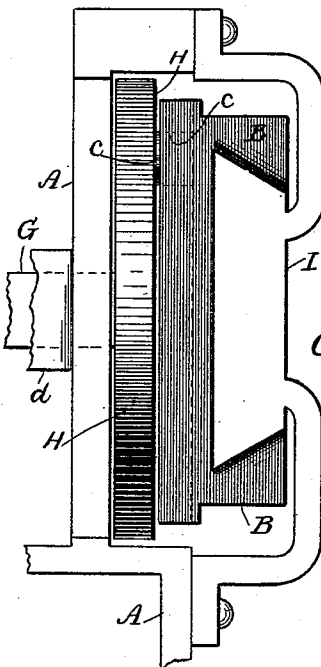
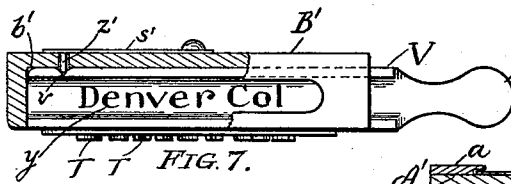
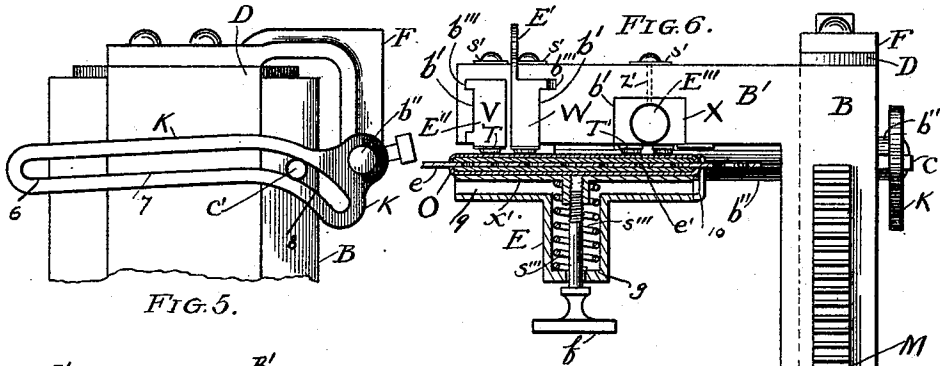


FIG. 8.

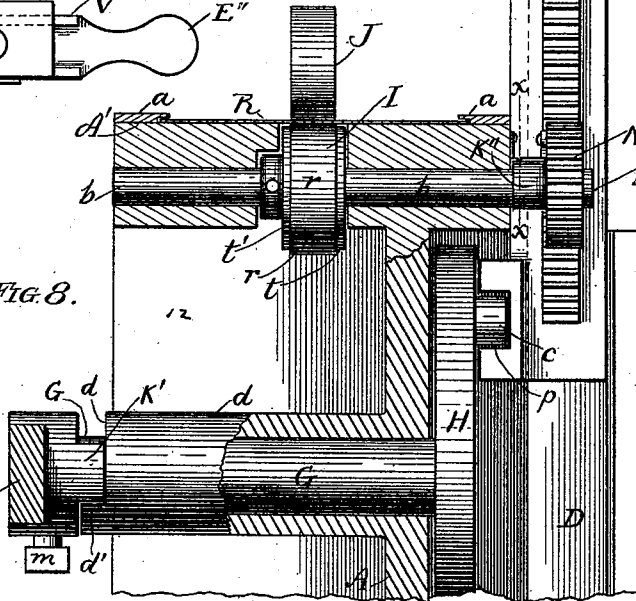


FIG. 9.

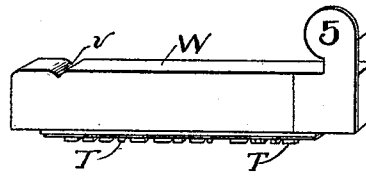


FIG. 10.

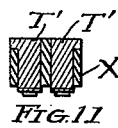


FIG. 11.

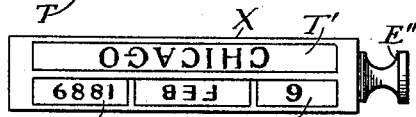


FIG. 12.

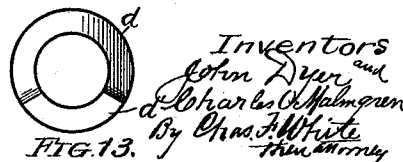


FIG. 13.

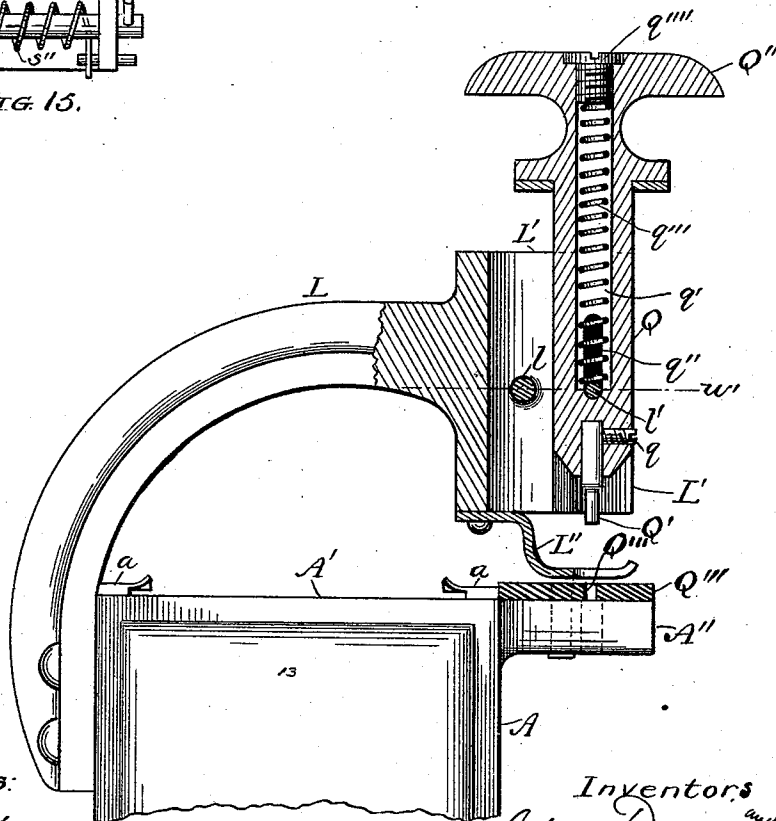
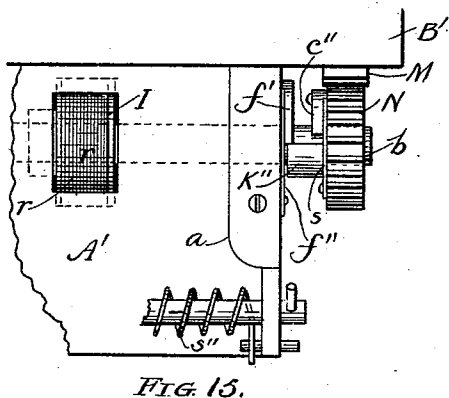
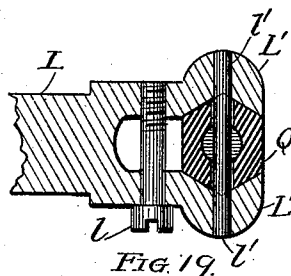
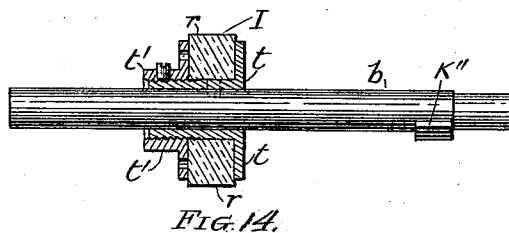
Witnesses
J. Halpenny
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Inventors
John Dyer and
Charles O. Malmgren
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Witnesses:
J. Halpenny.
M. S. Wheller

FIG. 16.

Inventors
John Dyer and
Charles O. Malmgren
By Chas F. White
their attorney.

UNITED STATES PATENT OFFICE.

JOHN DYER AND CHARLES O. MALMGREN, OF CHICAGO, ILLINOIS; SAID
MALMGREN ASSIGNOR TO SAID DYER.

TICKET-PRINTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 464,194, dated December 1, 1891.

Application filed March 16, 1889. Serial No. 303,552. (No model.)

To all whom it may concern:

Be it known that we, JOHN DYER and CHARLES O. MALMGREN, of the city of Chicago and county of Cook, in the State of Illinois, have invented certain new and useful Improvements in Ticket-Printing Apparatus, which are fully described in the following specification, reference being had to the accompanying drawings, forming a part thereof.

This invention relates to a novel construction in printing apparatuses, and more particularly to a device of this character for printing at intervals upon a continuous strip or piece, combined with mechanism for intermittently feeding forward the piece or strip to be printed.

The invention consists in the features of construction and combinations of parts hereinafter fully described, and pointed out in the appended claims.

In the drawings forming a part of this specification, Figure 1 is a side elevation of a printing apparatus constructed in accordance with our invention. Fig. 2 is a detail view in side elevation of the devices for controlling the intermittent feed of the strip to be printed. Fig. 3 is a fragmentary view, partly in side elevation and in section, showing the parts in the position they will assume when an impression is being made. Fig. 4 is a top plan view of the parts shown in Fig. 3. Fig. 5 is a detail view in side elevation of the mechanism for controlling the inking devices. Fig. 6 is a vertical sectional view, partly on the line *ww* of Fig. 1. In this figure a portion of the lower part of the main frame is broken away to show the interior construction, and the inking devices are shown in vertical section. Fig. 7 is a view, partly in elevation and in section, of the type-holding cross-head, showing one of the type-frames therein. Fig. 8 is a bottom plan view of the slide and the guide and actuating mechanism therefor. Fig. 9 is a perspective view of one form of type-block. Figs. 10 and 11 are bottom plan and cross-sectional views of another form of type-frames. Fig. 12 is a view, partly in section and in plan, of an inking-pad. Fig. 13 is an end elevation of the bearing for the operating-shaft of the

apparatus. Fig. 14 is a detail sectional view of the roller for feeding forward the strip. Fig. 15 is a fragmentary plan view showing the roller for feeding the strip and actuating mechanism therefor. Figs. 16 and 17 are views respectively in vertical and horizontal section, illustrating a punch which is conveniently secured upon the printing apparatus.

The particular use for which this invention is intended is for printing or filling in partially-printed tickets for railroads; but it will be obvious that it can be applied equally as well for printing anything of a like nature—namely, a continuous strip or piece having spaces arranged at intervals in which certain characters, words, figures, or directions are to be printed.

Referring to the drawings, A indicates the main frame or support of the device, preferably made of metal. The top of main frame is smooth and of sufficient width to receive the ticket-blank. Upon the upper marginal edges of said main frame guide-flanges *a a*, Figs. 1, 4, and 6, are located, which serve to guide and confine the ticket in its passage under the printing devices. The said top portion of the frame provides the bed for the printing devices. The said printing devices have a movement toward and away from the said bed, and are carried by a slide B, which is located upon and slides upon an upright guide D, secured upon the main frame. Upon the upper end of the slide B a horizontal extension or head B' is provided, which is located immediately over the bed of the frame. The said head B' carries the printing-type and is adapted to be brought down near enough to said bed to cause the type to print upon the ticket or blank thereon.

The mechanism for securing the up-and-down movement of the slide B and its head is made as follows: As shown in Fig. 8, the guide D is dovetailed and it fits into a dovetailed groove in the slide B in an obvious manner, the parts being very nicely fitted to each other, whereby the friction is reduced to a minimum. The frame or support D is provided beneath the bed with a tubular bearing *d*, which is preferably formed integral therewith. A shaft G is located within said

tubular bearing and is provided at its outer end with a handle C for turning the same. At the other and inner end of said shaft is rigidly mounted a crank-disk K, having at its inner face a crank-pin *c*. The said crank disk and pin embody a preferred form of construction; but it is obvious that an ordinary crank would serve the same purpose. The said slide B is provided near its lower end and on the side adjacent said crank-disk with a slot or groove *p*, Figs. 3 and 4, in which said crank-pin *c* is located. It will thus be seen that upon turning the shaft by means of the handle the said crank-pin will be turned about the shaft as an axis, and owing to its engagement with the slot *p* will elevate and depress the slide and its head, so as to cause the type to print, as desired. The movement of the handle is limited, so that it completes about a half or a little more than a half of a revolution, and the mechanism is operated by a backward-and-forward movement of said handle between its limits of movement. To limit the revolution of said shaft and handle the latter is provided with an inwardly-projecting lug or projection K', adapted to come into contact with two shoulders or abutments on the end of the tubular bearing *d*, said shoulders being formed by a projection *d'* on the ends of said tubular bearing. The said shoulders are located so as to permit about half or a little more than a half of a revolution of the shaft, more fully explained hereinafter.

The ticket or strip to be printed upon is confined by the guide-flanges *a*. As before stated, the blank is to be printed at intervals with the same characters, and to accomplish this the said blank is intermittently advanced upon the bed-plate. The said advancement of the blank is attained by feed mechanism now to be described, which is operated by the elevation of the slide B, and remains inactive during the descent of the latter. In Figs. 1, 2, 8, 6, 14, and 15 said feed mechanism is clearly shown, and comprises a feed-roller I, carried by a rotary shaft *b*, the said roller I projecting through a suitable opening in the bed of the apparatus, so as to engage the blank thereon. The said shaft *b* is supported in bearings on the frame of the apparatus, and is provided at one end with a gear-pinion N, which intermeshes with a rack-bar M, located upon the slide. Thus it will be seen that as said slide moves up and down such movement will rotate the pinion. The pinion is loosely mounted upon the shaft and is provided with a spring-pressed pawl *c''*, whose free end rides over a cam-surface K'' upon the shaft and engages a shoulder formed thereby. The parts are so constructed that when the slide rises the pinion will be turned so that the pawl will engage said shoulder and turn the shaft *b* and the feed-roller carried thereby in a direction to advance the blank; but, on the other hand, when the slide descends the pinion turns freely

upon the shaft as the pawl rides freely over said cam-surface. The pinion is of such size that it will be turned just once during the ascent of the slide, and to prevent any accidental backward movement of the shaft and feed-roller during the descent of said slide a click *f'* is pivoted to the frame and is adapted to engage the said shoulder on the shaft *b*. The said click *f'* is so located that said shoulder passes thereunder and the click falls down behind it, when the revolution of the shaft is completed by the ascent of the slide and the blank thereby advanced, so as to be in position for another impression by the type. It will thus be seen that the click *f'* prevents a backward revolution of the shaft, which would displace the blank, and thereby cause the impression to be made in the wrong place. It is obvious that to secure the positive advancement of the blank said blank must be held against the feed-roller tighter than it would be held by its own weight, and for this purpose a pressure-roller J is provided which turns freely in its bearings and bears on top of said feed-roller, so that the blank must pass between the two rollers when passing through the apparatus. The said pressure-roller J is supported by a lever *h*, and said lever *h* is mounted upon a rod or cross-bar C', journaled in bearings on the frame, so that the rod can be turned to bring the pressure-roller away from the feed-roller. It is manifest that the pressure-roller can be held against the feed-roller with the desired pressure by any desired means; but as a convenient manner of accomplishing this a coiled spring *s''* is applied to said rods C' and serves to hold the pressure-roller against said feed-roller. It will thus be seen that the blank being firmly held against the feed-roller the said blank will be advanced during the revolution of the feed-roller.

While our apparatus is designed to print upon any desired blank, yet it is especially intended for printing upon the kind of railroad-ticket hereinbefore referred to, which is composed of a stub and a plurality of coupons of the same length, upon each of which the same matter is to be printed. It is therefore necessary to advance the blank the length of one coupon after each impression, and to accomplish this the circumference of the feed-roller is equal in length to a coupon.

Means are provided for increasing and diminishing the circumference of the feed-roller, so as to vary the feed of the blank to accommodate blanks having coupons of different lengths. As shown in detail in Fig. 14, said feed-roller comprises a ring or band *r*, preferably made of rubber, held upon the shaft between a flanged hub *t* and a flanged collar *t'*. The hub *t* is rigidly secured upon the shaft and has its flange located at one end thereof and is screw-threaded externally at its other end. The collar *t'* is screw-threaded internally and fits upon the hub *t*. The rubber ring *r* is held between the flanges of the col-

lar and hub, so that by turning said collar upon the hub the distance between the flanges will be changed, and consequently the rubber ring can be compressed between the flanges, with the effect of increasing the length of the circumference of the feed-roller. When the flanges are separated, the feed-roller will be made smaller. A set-screw is provided for holding the collar in its adjusted position.

As before stated, the printing characters are carried by and project from the under face of the head B'.

F indicates an arm, Figs. 1, 3, 4, 5, and 6, which is secured to and projects from the upper end of the guide D. The said arm F supports the inking mechanism of the apparatus and is provided with a horizontally-arranged bearing 5 for this purpose. The said bearing 5 lies in a plane parallel with the head B' and supports a rotary shaft b''. Upon the end of the shaft b'' adjacent the slide B a cam-lever K is rigidly secured, Figs. 3, 4, and 5, said cam-lever being formed with a cam-slot 6, which is engaged by a pin c', carried by the slide B. The said cam-slot 6 is formed with a long straight portion 7 and a short curved portion 8. Owing to the configuration of said cam-slot 6 and the vertical movement of the pin c' in engagement therewith, when said pin in its movement travels along the straight portion 7 of the cam-slot the movement imparted to the shaft b'' will be very slight and gradual, while, on the other hand, while the pin travels along the short curved portion 8 of the cam-slot the movement of the shaft will be greater and more abrupt and quicker.

O indicates the inking-pad, which is rigidly secured to the shaft b''. The said cam-lever and inking-pad are secured upon the shaft b'' in such relation to each other that when the slide descends and brings the head B' upon the bed of the apparatus, as shown in Fig. 3, the cam-lever will stand in a substantially vertical position, with the pin c' at the lower end of the straight portion of said cam-slot, and the inking-pad will project downwardly almost vertically from the shaft b'', so as to be out of the way of the head B'. When, however, the slide and head ascend, the pin c' travels at first in the straight portion of the slot 6 and turns the shaft but slightly, so that the inking-pad will be moved but slightly. The movement of said inking-pad will be inconsiderable until the head B' almost reaches the upper limit of its movement, at which moment the pin will enter the short curved portion of the cam-slot, and will also be nearer the pivotal point of said lever K. Owing to such condition, the shaft will be turned very abruptly and will swing the inking-pad up against the face of the type on the head just as the latter reaches the upper limit of the movement. It will also be observed that when the slide descends a reverse movement on the part of the inking-pad is accomplished. This quick movement of the inking-pad while the head is at the upper part of its movement and

the slow movement of said pad while the head is completing the lower part of its movement is necessary, otherwise said parts would interfere with each other, owing to a swinging movement on the part of one and a vertical movement on the part of the other in close proximity thereto.

As hereinbefore described, the handle C and shaft G are permitted to complete about a half or a little more than a half revolution. When the projection K' encounters the shoulder on the bearing a during the throw of the handle C to the left-hand side of the machine to bring the head down, said head will simultaneously be brought against the bed of the apparatus to make an impression. The pin c on the crank-disk will then stand at or near the lowest point in its circular path. When the handle is thrown to the right-hand side of the machine, the pin c will traverse its path, and when it reaches the highest point thereof the inking-pad will have been swung against the type on the lower face of the head in an obvious manner. The handle can yet be turned a short distance before the projection K' engages the other shoulder on the tubular bearing, and during this additional movement of the handle the head will descend a little distance, while the inking-pad will be swung away from the face thereof, and the parts will then be in position shown in Fig. 1, which is termed their "normal position."

From the foregoing it is manifest that two important advantages are obtained by causing the crank-pin to ascend to its highest point and then descend slightly—namely, the double inking of the type, as the pad will be pressed thereon when the handle is again swung to the left, and the withdrawal of the pad from the type when the apparatus is at rest.

The inking-pad O, Figs. 1, 3, 4, and 6, is supported by a bracket E, which is rigidly secured to the shaft b''. Said bracket E carries a plate Z, provided at its sides with upturned marginal flanges 9, which are bent inwardly a little distance at the top. In the rear said plate is provided with an upturned finger 10. The inking-pad O, Fig. 12, is adapted to fit within the flanges 9 on said plate and to be restrained from going too far inwardly by the finger 10.

x' indicates a supplemental plate located between the pad and the plate Z and held against the pad by a spring s'', which is placed within a barrel g, formed on the plate Z and having its upper end open, so that said spring may, as its other end, press against the said supplemental plate.

f indicates a thumb-piece and bolt passing through the end of the barrel and engaging the said supplemental plate, whereby the latter can be retracted against the action of said spring. The purpose of said spring-pressed supplemental plate is to hold the inking-pad in place and to give the proper pressure to said pad and also to present a yielding sur-

face to the type. The said pad O comprises a plate 11, having perforations e' e' and handles e . The said plate is covered or padded on both sides with felt or other suitable material for absorbing and holding ink. The said pad is intended as a changeable one and capable of being used in four different positions. The perforations in the plate are made so that the ink can pass from one side of the pad to the other side thereof, thus permitting both sides of the pad to be exposed, while the handles on both ends of the pad permit either end thereof to be inserted first into the pad-holding plate Z.

It will be readily understood that any suitable printing characters can be carried by the head for the broader purposes of our invention; but we have illustrated and will now describe a convenient manner in which the printing characters can be arranged when the apparatus is designed for use in printing railroad-tickets of the kind referred to. It will be obvious that any words or phrases may be printed, and information is printed from type which are held in changeable type-frames V, W, and X, which are inserted within suitable slots in the head B'.

The type-frame V carries the type for printing a certain class of information. It consists of a wooden block provided with a handle E'', and is rabbeted on one side and fits within a slot in the front part of the head B'. On the upper edge side of said block V a notch v is made to be engaged by a pin z , which is held therein by one of the plate-springs s' on the top of the head B'. An opening y is made in the front end of the head B', and exposes the side of the said type frame or block V upon which is printed or otherwise indicated the name of the station printed thereby.

W is the type-frame carrying the type printing another class of information, and comprises a wooden block having a notch v on its upper side, which is engaged by a pin held by one of the plate-springs s' on the head B'. The said block or frame W fits within a slot or groove in the head adjacent the destination type-frame V. This type-frame W is provided with a handle, preferably of metal, which passes through a slot in and projects above the top of the head B', and on said handle is indicated the limit of time that will be printed thereby.

The type frame or box X carries the type for printing still another class of information. Said frame is provided with a handle E''', and is adapted to fit within a suitable slot in the head B'.

It is highly essential and useful to have in connection with an apparatus of this kind a canceling-punch. Such punch should be conveniently located and within easy reach of the ticket-seller. In Figs. 1 and 16 is shown a punch specially adapted for this purpose. Upon the frame A of the apparatus in the rear of the printing devices and on one side

thereof an arm or reach L is securely fastened and rises from the bed of the frame and extends over the same to the opposite side thereof. The free end of said arm is provided with a bearing for the plunger Q of the punch carrying the male die Q', located over the female die Q'', which is carried by an overhanging table or support A'' upon the side of the frame A opposite that to which the reach L is secured. The particular construction of said punch does not form a part of this invention, and hence will not be minutely described.

The frame A of the apparatus is provided in the rear of the printing devices with a receptacle or inclosure, which is cast integral therewith, and indicated by 12 in Figs. 1, 3, 6, and 16. A drawer 13 is located within said receptacle or housing and is adapted to contain the changeable type-frames that are used to print tickets to different destinations and for different limits of time.

The manner of using and operating this apparatus will be obvious, it being only necessary to insert the blank or ticket under the flanges a until the end is engaged by the rollers I and J when the parts are in the position shown in Fig. 1. By then swinging the handle to the left the head will descend and bring the type upon the ticket to make an impression. When the handle is swung back to the right-hand position, the head will be raised and the ticket advanced to bring another coupon in position for printing, the type will be inked, and the head is ready for another descent.

We claim as our invention—

1. A printing apparatus comprising a main frame having a bed and a guide, a slide mounted upon said guide and adapted to carry the printing devices, means for reciprocating said slide, a rack-bar upon said slide, a shaft b , mounted in bearings upon said frame and provided with a pinion which intermeshes with said rack-bar and is intermittingly connected with said shaft, and a feed-roller rigidly mounted upon said shaft and located within an opening in said bed.

2. A printing apparatus comprising a main frame having a bed and a guide, a slide mounted upon said guide and adapted to carry the printing characters, devices for reciprocating said slide, a rack-bar upon said slide, a shaft b , mounted in bearings upon said frame, a pinion loosely mounted upon said shaft and carrying a pawl which is adapted to engage a projection on said shaft, said pinion intermeshing with said rack-bar, and a feed-roller rigidly mounted upon said shaft and located within an opening in said bed.

3. A printing apparatus comprising a main frame having a bed and a guide, a slide mounted upon said guide and carrying a head in which the printing characters are located, an arm upon said guide, a swinging inking-pad mounted upon a shaft which is located in bearings upon said arm, the axial line of said

shaft being parallel with the length of said head, a cam-lever connecting said shaft with the slide and adapted to bring the printing characters at intervals against the printing characters as the slide is reciprocated, and devices for reciprocating said slide, said cam-lever being formed so that during the movement to withdraw the printing characters from contact with the bed by the devices for reciprocating the slide the inking-pad will be thrown against said printing characters and withdrawn therefrom at the limit of said movement.

4. In a printing apparatus, a printing-head carried by a slide and an inking-pad mounted upon the frame of the apparatus and operated by the movement of said slide, and a reciprocating actuating device for moving said slide, arranged practically as described, so that one limit of movement of said actuating device is adapted to bring the type into a printing position and swing the inking-pad away from the head and the other limit of movement of said actuating devices is adapted to retract the type and swing the inking-pad against the type and then withdraw said inking-pad.

5. In a printing apparatus, a main frame, a guide mounted thereon, a reciprocating slide mounted upon said guide and carrying a head in which the printing characters are arranged and which is movable toward and away from said bed in a direct line, a swinging inking-pad mounted upon said guide and connected with said slide, said slide being adapted to throw the inking-pad at intervals against the printing characters carried by said head, a revoluble shaft for reciprocating said slide, devices for turning said shaft, and stops for limiting the movement of said shaft, one of said stops being located to engage a stop carried by the shaft when the printing characters

come into contact with the bed and the other stop being located to engage a stop carried by the shaft after the latter has turned more than sufficient to carry the head to the upper limit of its movement.

6. An inking-pad carried by a plate and retained by its edges and a spring-pressed supplemental plate located between said inking-pad and plate for pressing said pad forward.

7. An inking-pad carried by a plate having upturned flanges at the sides thereof and an upturned finger at one end thereof, adapted to retain said inking-pad, and a spring-pressed supplemental plate located between said inking-pad and plate.

8. An inking-pad carried by a plate, a supplemental plate located between said inking-pad and plate, a spring located within a barrel formed on said plate and arranged to bear against and press said supplemental plate forward, and a thumb-bolt connected with said supplemental plate and extending through said barrel, whereby the supplemental plate can be retracted.

9. In a ticket-printing apparatus comprising a main frame A, having a bed upon its upper surface extending the entire length of said frame and printing devices located at one end of said frame, and an arm or reach rigidly secured to said frame on one side thereof and near its upper marginal edge, said arm or reach rising from the said bed of the frame and extending over the same and provided on its free end, which is located over the other side of the frame, with a canceling-punch.

JOHN DYER.

CHAS. O. MALMGREN.

Witnesses:

EDWIN A. MUNGER,
W. L. WHEELER.