(No Model.) 2 Sheets—Sheet 1.

C. L. REDFIELD.

MATRIX MAKING MACHINE.

No. 441,118. Patented Nov. 18, 1890.

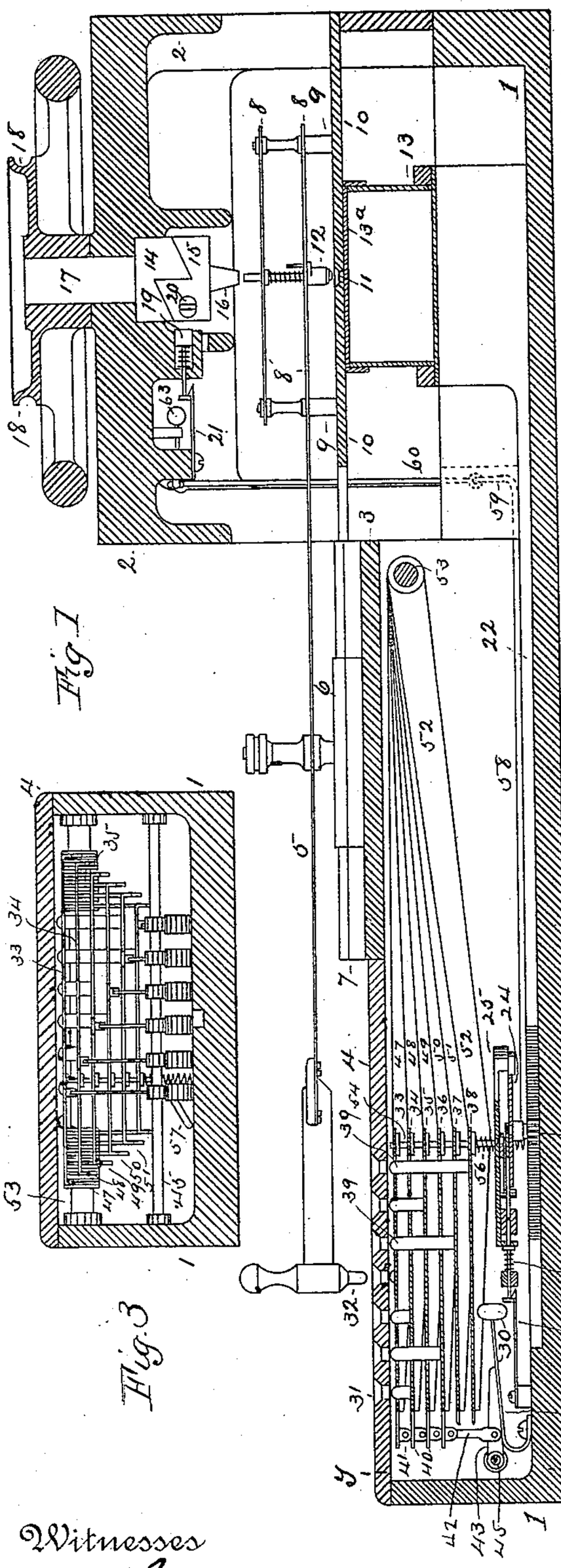

Fig. 1

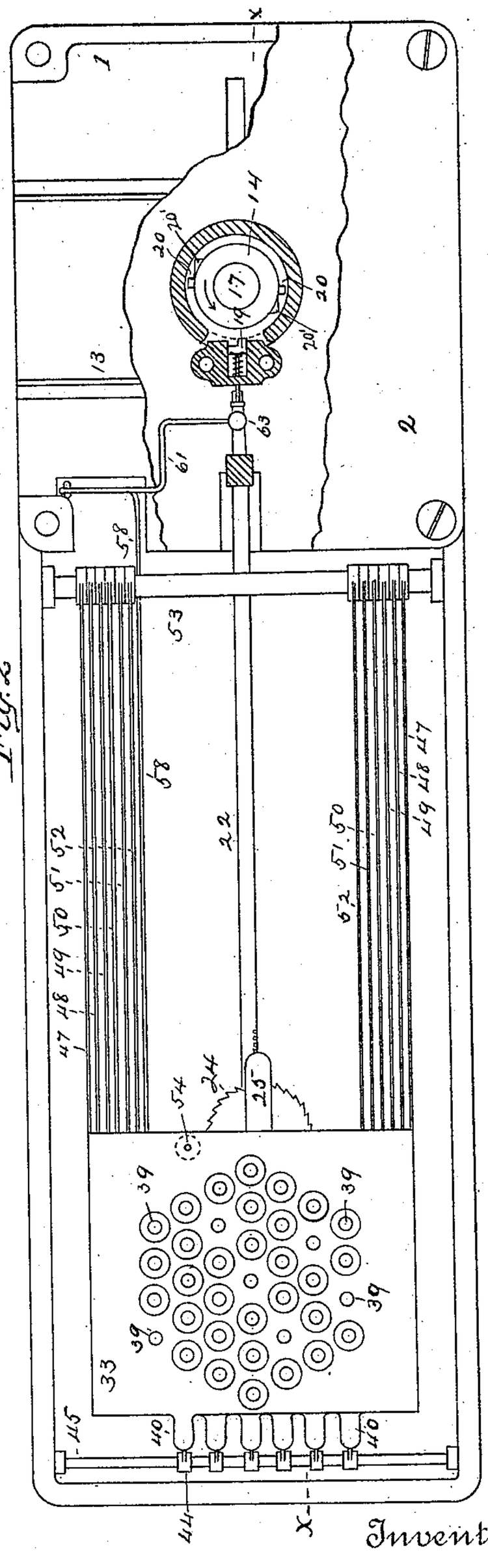

Fig. 2

Fig. 3

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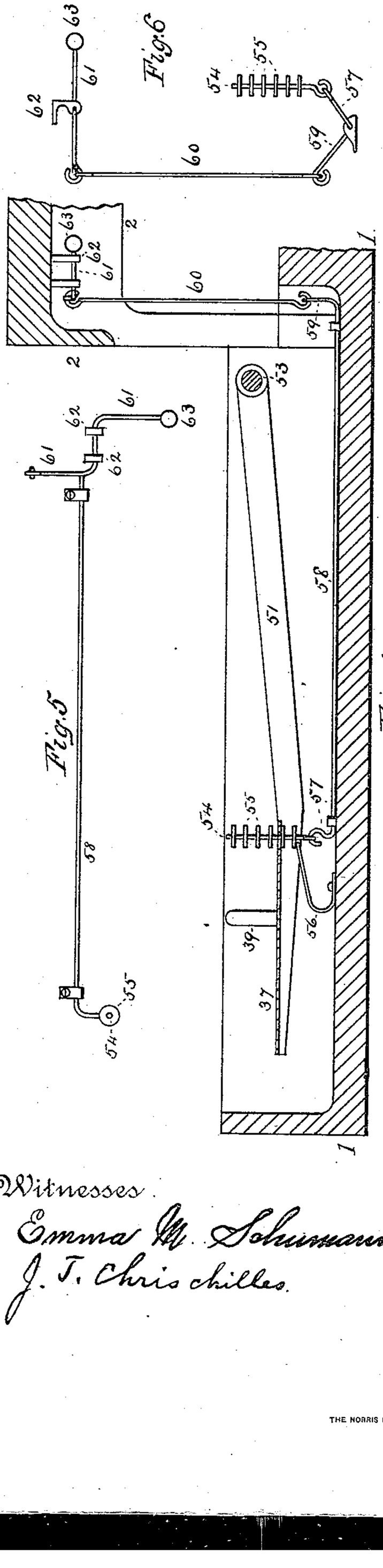

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UNITED STATES PATENT OFFICE.

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MATRIX-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 441,118, dated November 18, 1890.

Application filed June 24, 1889. Serial No. 315,394. (No model.)

To all whom it may concern:

Be it known that I, CASPER L. REDFIELD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Matrix-Making Machines, of which the following is a specification.

My improvements relate to the class of typographic machines in which a type-carrying alignment-lever is employed to move the type to the printing-point and to set in motion the feeding and printing mechanisms. More specifically stated, my improvements pertain to the general character of machines disclosed in prior applications made by me, in which prior machines many of the moving parts are electrically operated. It is the object of the present improvements to accomplish the same results by devices which are set in motion to perform their functions by the manipulation of the alignment-lever without the aid of any electrical devices.

The features of improvement constituting the present invention are hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, illustrating my improvements, Figure 1 is a vertical longitudinal section of the machine on the line *x x* of Fig. 2. Fig. 2 is a plan view of the machine, the upper portions being removed. Fig. 3 is a transverse section of the front portion of the machine on the line *y y* of Fig. 1. Fig. 4 is a longitudinal section of a portion of the machine, showing the devices for releasing the impression device. Fig. 5 is a plan view, and Fig. 6 a front elevation, of a portion of these devices detached. Fig. 7 is a side elevation of a detail of the escapement-releasing devices, and Fig. 8 a plan view of a portion of the escapement devices.

In said drawings, 1 designates the base and sides of the machine-frame; 2, an upper portion covering the rear or printing portion of the machine; 3, a cover for the middle portion, and 4 the cover for the front portion providing the index-plate.

The die-carrying lever 5 is pivoted to a cross-head 6, which slides in the guides 7. The rear portion of the lever has a die-carrying frame 8, that is provided with feet 9, which ride on a plate 10, and in the die-carrier are spring-supported type-dies 12 in hexagonal or other suitable arrangement. The sliding and oscillating movement of the lever 5 is adapted to bring the selected die to the printing-point over an aperture 11 in the plate 10.

Beneath the plate 10 is a matrix-carriage 13, supporting the matrix-body 13^a. The selected die is depressed into the matrix-body by the operation of an impression device consisting of two clutch-box members 14 and 15, the latter carrying a plunger 16 and adapted to be thrust downward upon its rotation being stopped, the rotation of the other member 14 being continuous. These devices are connected to a spindle 17, that is rotated by means of a pulley 18. The rotation of the clutch member 15 is stopped by the engagement of a spring-actuated stop 19 with a projection 20 on the side of the member 15. The stop 19 is held away from the projection 20 by a spring-catch 21, and the engagement occurs upon the release of the catch and continues until the axial movement of the clutch member 15 carries the projection 20 past the stop and presents an inclined surface 20′ to the stop, which, as the clutch member again begins rotating, moves the stop 19 back to the point at which it is re-engaged by its catch 21.

The feed movement of the matrix-carriage 13 to space for successive impressions is produced by a rack 22, connected to the carriage and engaging the pinion 23. On the shaft of the pinion is carried an escapement-wheel 24, the holding-dog for which is on the inner end of a bar 25, that extends diametrically across the scape-wheel, and there is pivoted at its under side near the scape-wheel axis a lever 26, that carries the moving pawl, and at the under side of the lever 26 is pivoted the lever 27, that extends beyond the former and has a beveled end. The axial inward movement of the bar 25 releases the holding-dog and causes engagement of the opposite pawl and permits the scape-wheel to rotate in the direction indicated by the arrow *z* and carry with it the levers 26 and 27.

This axial movement of the bar is produced by the thrust of one of a set of spring-actuated plungers 28. The inward movement of the plunger is restrained by catches 29, and the engagement of the catches with the plungers is released by the operation of spring-hammers 30. These plungers are arranged radially relative to the axis of the scape-wheel, and the extent of the scape-wheel rotation upon the release of the holding-dog is determined by the relative position of the plunger whose operation has thrust inward the bar 25. Upon such release of the dog the scape-wheel rotation moves the levers 26 and 27 from their initial position (that shown in Fig. 8) to the point where the inclined face of the lever 27 forces the engaged plunger back to the position where it is held by its catch 29. The bar 25 meanwhile will have been returned by the force of the spring 64 connected to it to position the dog it carries to re-engage the scape-wheel and stop further rotation.

Many of the features hereinbefore described are the subject-matter of pending applications for patent by me, and are herein shown and described for the purpose of, and only so far as is deemed necessary to, a proper understanding of the present invention, and the patentable features so disclosed and not herein claimed are reserved to be claimed in said pending applications— to wit, the features relative to the means for carrying, presenting, and guiding the dies at the printing-point in application, Serial No. 300,536, filed February 20, 1889; features relative to means for variably feeding the matrix material in applications, Serial Nos. 303,657, filed March 18, 1889, and 340,323, filed February 13, 1890; features relative to means for presenting the dies and setting in motion the feeding and printing mechanisms by the operation of a die-carrying lever in application, Serial No. 301,178, filed February 26, 1889, and features relative to the construction of the dies and their cooperation with a centering device in application, Serial No. 305,569, filed April 1, 1889.

On the upper surface 4 is provided an index, in hexagonal or other suitable arrangement, with coincident openings 31, and on the outer end of the type-carrying lever 5 is provided a pin 32, adapted to enter the aperture 31. Below the index-plate is a series of six separated plates 33 to 38, inclusive, or such other number as may be required to correspond with the number of different measures of feed movement desired for the matrix-carriage. These plates are placed in horizontal position, one above another, and separated by suitable intervening spaces, and on each plate is provided a set of vertical pins extending from the plate through openings in the superimposed plate or plates to a common plane immediately beneath the index-plate. These plates, by means of the pressure downward of the indicator-pin 32 upon their respective pins 39, are designed to depress devices that will cause the release of the appropriate plunger 28 and produce the proper feed movements.

On the forward end of each of the plates 33, 34, &c., is a tongue 40, at the under side of which are ears 41, to which are pivoted pendent arms 42, that in turn are pivoted to horizontal levers 43. The levers 43 are fulcrumed by loose sleeves 44 on a transverse rod 45, and the inner ends of these levers are arranged to bear upon the springs 46, which carry the hammers 30, and when depressed cause the hammers to strike the spring-catches 29 to release their engagement with the plungers 28.

The plates 33, 34, &c., have at their under sides, at each side of the machine, levers 47, 48, 49, 50, 51, and 52, respectively, to which they are attached and which extend rearward and are separately fulcrumed on a transverse shaft 53.

A vertical post 54 passes through openings near the rear of each of the plates 33, 34, &c., and the rear portions of the plates rest upon collars 55, that are fast to the post. A spring 56, (spiral or otherwise,) beneath the lower collar and resting on the base of the machine-frame, holds up the post to its position and returns it to position after it has been pressed down by the depression of any one of the plates. The lower end of this post 54 is connected to the crank-arm 57 of a rod 58 for operating the impression device. The inner end of the rod 58 has a second crank 59 at an opposite inclination, and to this is connected a vertical rod 60, which in turn is connected by a horizontal crank-rod 61, that is supported by brackets 62, pendent from the machine-cover, and the rod 61 carries the hammer 63 for striking the spring-catch 21 to release it and occasion a plunger-thrust. The arrangement of these devices is such that the depression of the indicator-pin 32 upon any of the pins of the plates 33, 34, &c., will produce a downward movement of the post 54 and operate the shaft 58 and the devices for causing a plunger-thrust. A depression of any one of the plates 33, 34, &c., will also cause an appropriate matrix-feed movement by producing a stroke of the hammer 30 upon its appropriate spring-catch to release the plunger 28, arranged for a movement corresponding with the character selected.

It will be understood that each plate 33, 34, &c., is provided with pins 39, coinciding with projections in the index-plate that represent characters, all of which require the same measure of feed. Thus the upper plate 33 and its pins may be arranged for the unit measure of feed, the next plate for the second degree of movement, and so on. Thus when the die-carrying lever is moved so that its indicator-pin 32 will be coincident with the index-plate opening marked with the selected character, and the pin is depressed, its pressure upon the pin 39 beneath the index-plate will correspondingly depress the plate 33 or 34, &c.,

carrying the engaged pin 39, and produce a blow of the hammer 30 to release the corresponding plunger and permit the proper feed movement of the matrix-carriage, and this is followed by a thrust of the impression device upon the die at the printing-point occasioned by the rocking of the rod 58 by reason of the downward movement of the post 54.

Upon the rising of the indicator-pin 32 the plates 33, 34, &c., are free to be lifted to their normal positions by the force of the hammer-springs 46.

What I herein claim is—

1. In a matrix-machine, a die carrying and centering device co-operating with an indicator, a matrix-carriage and variable-feed mechanism therefor, a die-impressing device, an index having perforations, a series of separately-movable plates thereunder having devices connected therewith for producing desired matrix-feed movements and the operation of the impressing device, and means for permitting engagement through the index perforations of said indicator and said plates to move the latter, for the purpose set forth.

2. In a matrix-machine, a matrix-carriage, variable-feed mechanism therefor, a series of releasing devices therefor, a corresponding series of suspended plates, and means, substantially as described, for operating the appropriate escapement-releasing devices by the depression of any of said plates, substantially as set forth.

3. In a matrix-machine, a matrix-carriage, a variable-feed escapement therefor having separate releasing devices for the several measures of feed, an index-plate, a series of suspended plates thereunder, means for depressing them separately, and connections between said escapement-releasing devices and said plates, substantially as and for the purpose set forth.

4. In a matrix-machine, a variable matrix-feed escapement having separate releasing devices for the different degrees of movement, a perforated index-plate, separated horizontal movable plates thereunder having projections rising to a common plane and coincident with the index-plate perforations, an operating-pin, and connections between the respective plates and the escapement-releasing devices, whereby the depression of the operating-pin upon any of said plate projections will produce feed movements of the desired extent, substantially as set forth.

5. The combination, with a matrix-carriage, a variable-feed escapement having radially-arranged controlling devices for the several degrees of movement, holding-catches therefor, and a separate releasing device for each of said catches, of plates connected separately with said releasing devices and adapted to operate them separately upon depression of the plates, and means, substantially as set forth, for depressing the plates.

6. In a matrix-machine, the combination, with a variable matrix-feed escapement, of a series of controlling devices for the different movements, catches, and releasing devices therefor, levers for operating the latter, perforate index-plate, spring-supported plates thereunder connected to said levers, and an operating-pin for depressing the plates separately, substantially as set forth.

7. In a matrix-machine, in combination with a perforated index-plate and an indicator co-operating therewith, a variable matrix-feed mechanism, a series of separately-movable plates underlying the index-plate and having suitable connections whereby their movement will cause the desired matrix-feed movements, each of said plates being arranged to cause a different feed movement from the others and each being accessible to the indicator through the index perforations, substantially as set forth.

8. In a matrix-machine, the combination, with a variable-feed mechanism, of a perforated index-plate and a co-operating indicator, a series of separately-movable plates underlying the index-plate, levers and springs for sustaining them, and means for causing the depression of each plate to effect a different feed movement, and projections on the plates coinciding with the index perforations, for the purpose set forth.

9. The combination, with a variable matrix-feed escapement having its actuating devices released by means of rebounding hammers, of plates capable of independent movement connected with the hammers, projections on the plates, and a device for engaging them to depress the plates, substantially as set forth.

10. In a matrix-machine, an impression device, a controlling-stop to engage it and cause reciprocations, crank-rod devices for operating the stop, and means, substantially as described, for throwing the cranks.

11. The combination of the impression device, its spring-actuated stop, the catch therefor, and the crank devices for releasing the catch, substantially as set forth.

12. In combination, the impression devices, the stop and catch therefor, the crank devices for releasing the catch, the reciprocating post connected to the crank devices, and means, substantially as described, for reciprocating the post.

13. In a matrix-machine, the combination, with an impressing device and a variable-feed mechanism, of a series of parallel separately-movable plates having connections for causing the operation of the impressing and feed devices, and having projections rising from each plate through perforations in the plates above to a common plane, substantially as set forth.

14. In a matrix-machine, a perforated index-plate and a series of parallel separated plates movable thereunder having projections rising to a common plane, substantially as and for the purpose set forth.

15. In a matrix-machine, the combination,

with a perforated index-plate, of a series of parallel plates having projections extending therefrom to a common plane, and springs and levers for supporting them independently of one another, substantially as set forth.

16. In a matrix-machine, the combination, with a perforated index-plate, a character-selecting indicator-pin, and a variable matrix-feed mechanism, of separated plates underlying the index-plate and having suitable connections for producing feed movements differing in degree for each plate, the said plates being capable of independent movement and each being adapted to produce the necessary measure of feed for all characters requiring like matrix space, and means for enabling the indicator to engage each plate through the appropriate index-perforations, substantially as set forth.

17. In a matrix-machine, the combination, with the die-impressing device and releasing devices for controlling its operations, of a sesies of separate horizontal plates and a character-selecting device adapted to depress them separately, a post passing loosely through all of the plates and provided with shoulders which engage their under sides, and suitable connections between said post and said releasing devices, whereby the depression of any of the plates will produce an operation of the impressing device, substantially as set forth.

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