

R. COOPERSMITH.
MACHINE FOR MAKING MATRICES.
APPLICATION FILED SEPT. 23, 1908.

931,998.

Patented Aug. 24, 1909.
4 SHEETS—SHEET 1.

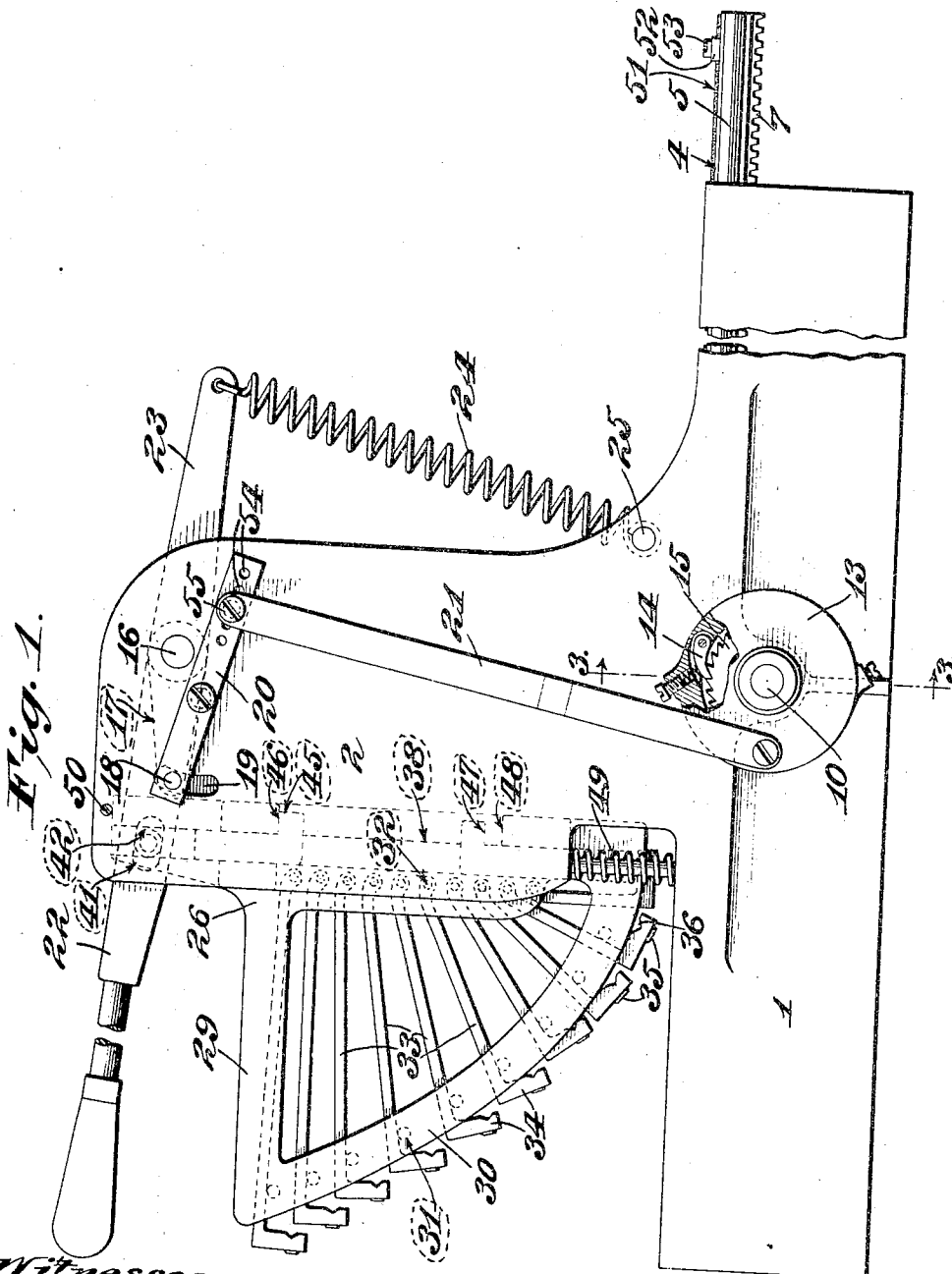


Fig. 1.

Witnesses:

E. A. Pennington
Edgar T. Farmers

Inventor:

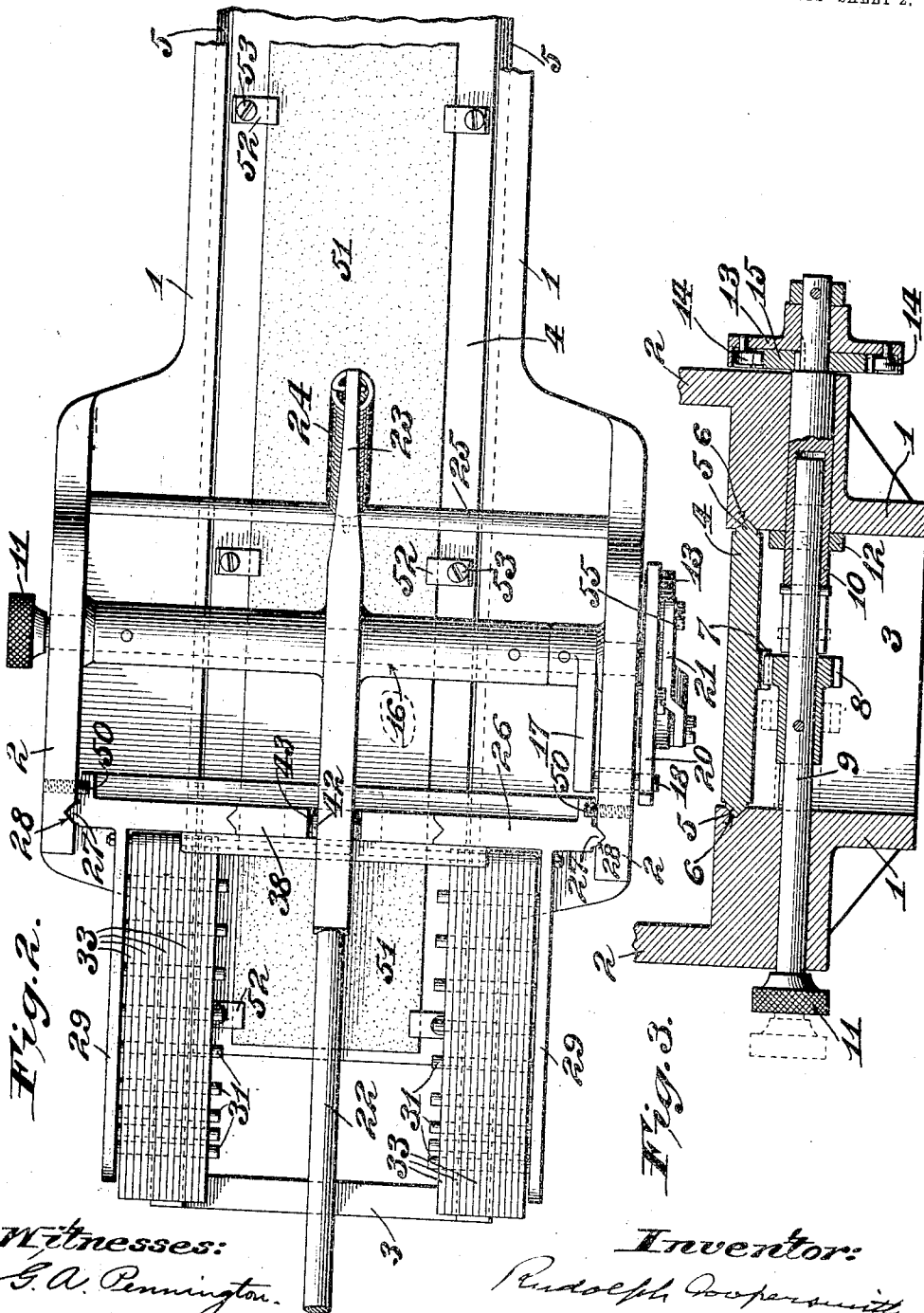
Rudolph Coopersmith,
By *Samuel H. Davis*,
Attys

R. COOPERSMITH.
MACHINE FOR MAKING MATRICES.
APPLICATION FILED SEPT. 23, 1908.

931,998.

Patented Aug. 24, 1909.

4 SHEETS—SHEET 2.



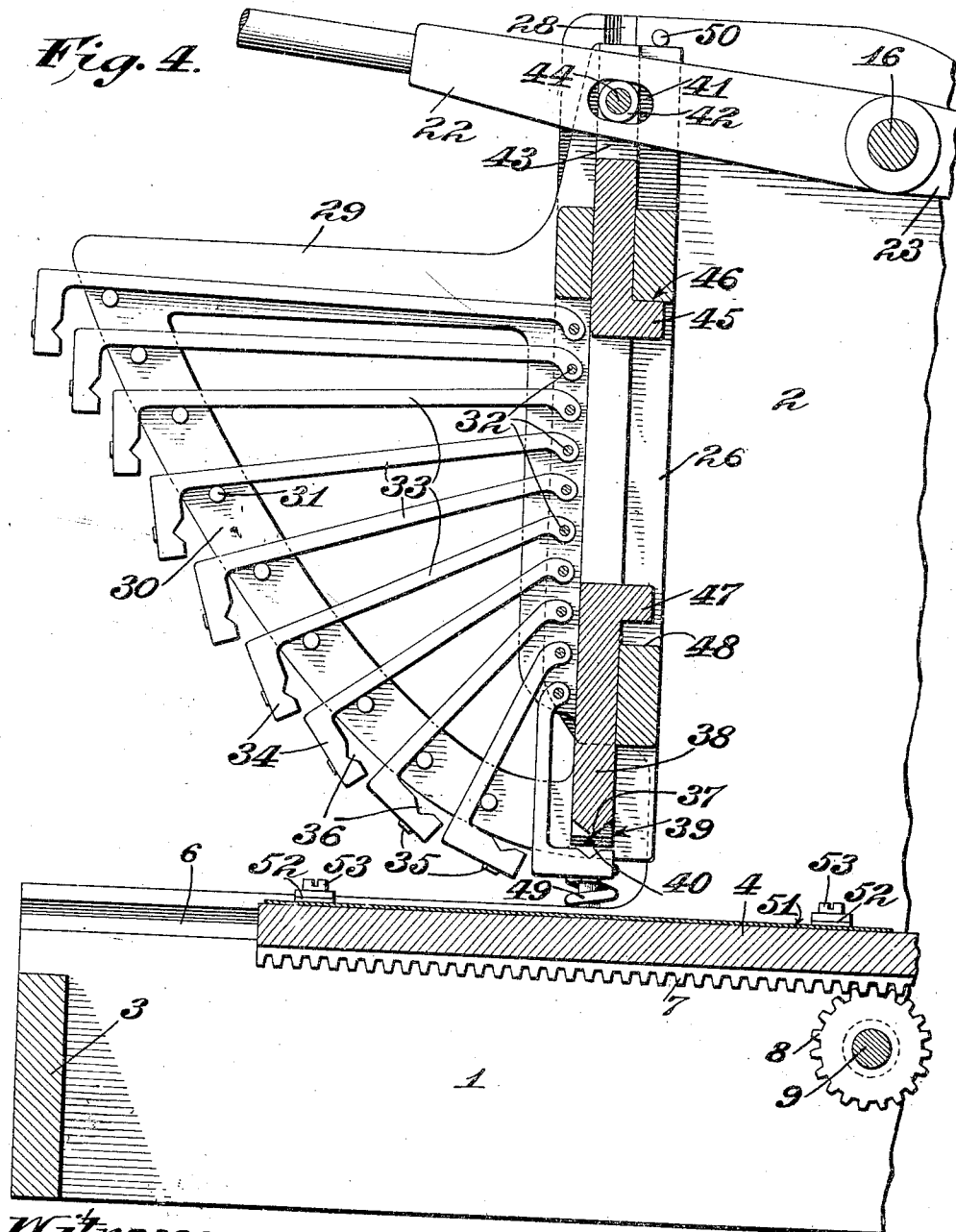
Witnesses:
G. A. Pennington.
Edgar T. Farmer

Inventor:
Rudolph Coopersmith,
By *Carroll Davis*,
Att'y.

R. COOPERSMITH.
MACHINE FOR MAKING MATRICES.
APPLICATION FILED SEPT. 23, 1908.

931,998.

Patented Aug. 24, 1909.
4 SHEETS—SHEET 3.



Witnesses:
S. A. Pennington
Edgar T. Farmer

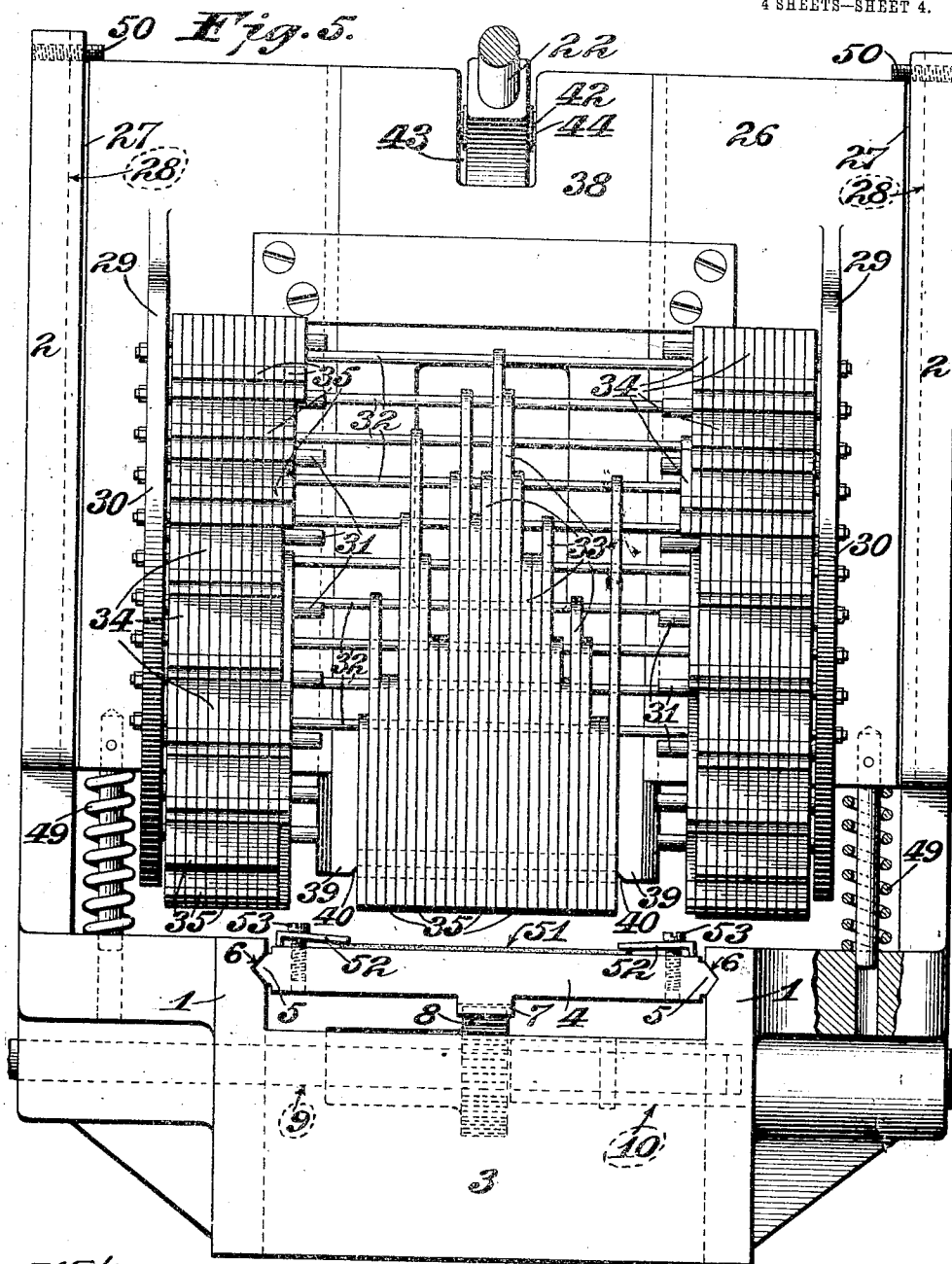
Inventor:
Rudolph Coopersmith
By [Signature]
Attys.

R. COOPERSMITH.
MACHINE FOR MAKING MATRICES.
APPLICATION FILED SEPT. 23, 1908.

931,998.

Patented Aug. 24, 1909.

4 SHEETS—SHEET 4.



Witnesses:
G. A. Pennington
Edgar T. Farmer

Inventor:
Rudolph Coopersmith,
By *Amos C. Carr*
Attys.

UNITED STATES PATENT OFFICE.

RUDOLPH COOPERSMITH, OF ST. LOUIS, MISSOURI.

MACHINE FOR MAKING MATRICES.

931,998.

Specification of Letters Patent. Patented Aug. 24, 1909.

Application filed September 23, 1908. Serial No. 454,337.

To all whom it may concern:

Be it known that I, RUDOLPH COOPERSMITH, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a certain new and useful Improvement in Machines for Making Matrices, of which the following is a specification.

My invention relates to the art of printing from stereotype plates and has for its principal objects to minimize the number of steps or operations in making and preparing the stereotype plates, to minimize the cost of machinery and labor, and to attain certain advantages hereinafter more fully appearing.

In the art of printing from stereotype plates it is the usual practice to set the matter up in forms, either from individual type set by hand or by a typesetting machine, or cast lines of type from a linotype machine. In the first case, great quantities of type are necessarily carried in stock, and in the latter case the machinery is very expensive in first cost as well as maintenance. The matrix or matrices are made from the type set up in the form or forms and the stereotype plates are cast therefrom.

In preparing the matrices heavy card board or paper is used for taking the impressions from the type.

The invention consists in a machine for impressing line by line and intermittently moving the impression device or the matrix material with respect to each other.

It further consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawings forming part of this specification and wherein like symbols refer to like parts wherever they occur, Figure 1 is a side elevation of a printing or impression machine embodying my invention with an intermediate portion of the frame and traveling bed-plate broken away to foreshorten the view; Fig. 2 is a top plan view of the front portion of the machine; Fig. 3 is a cross section taken on or about the line 3—3 of Fig. 1; Fig. 4 is an enlarged central vertical section of the front portion of the machine; and, Fig. 5 is an enlarged front elevation of the machine.

The machine illustrated in the drawings comprises two elongated side frames or plates 1 having upstanding portions 2 near

their front ends. The ends of the side members are connected by cross members 3.

Slidably mounted between the elongated side plates 1 is a bed-plate or table 4. This bed plate is preferably provided with beveled ribs 5 lengthwise of its side edges which are made to fit counterpart grooves 6 in the inner faces of the side plates 1. Extending lengthwise of the movable bed-plate 4 on the under face thereof is a toothed rack 7 which is adapted to mesh with a pinion 8. This pinion is pinned or keyed on a driving shaft extending cross-wise through the side frame members 1. Preferably, the driving shaft comprises two sections 9 and 10, respectively. The section 9 which carries the pinion 8 is telescoped into an axial bore in the section 10 and has a slot-and-pin connection therewith. By this arrangement, the section 9 may be reciprocated so as to throw the pinion 8 into and out of mesh with the rack 7 whenever it is so desired. On the other end of the shaft section 9 is secured a knurled knob 11 or other suitable manipulating device. The shaft section 10 has a collar 12 secured thereon so as to limit the outward movement of the same, and on the outer end thereof is loosely journaled a disk or member 13. This member carries a spring-pressed pawl 14 which is arranged to engage the teeth of a ratchet wheel or disk 15 which is fixed on the shaft section 10.

Mounted on the upper portions of the side frame extensions 2 is a rock-shaft 16 which has an arm 17 fixed thereon. This rock-arm 17 is provided with a pin or stud 18 which projects through a slot 19 in the side frame member and is pivotally connected to one end of a lever 20 which is mounted on the outside of said side frame extension 2. The opposite end of the lever 20 is pivotally connected to one end of a link 21 whose opposite end is pivotally connected to the disk 13 at a point normally in a horizontal plane in front of the axle section 10.

An operating handle 22 is fixed to the rock-shaft 16 and is arranged to extend forwardly from the machine. Preferably, this handle has a rearward extension 23 whose outer end is connected by a spring 24 to a cross-rod or bar 25. This spring should be strong enough to return the handle to its raised position after being depressed and also to feed the table or bed-plate 4 a step for-

ward at each return stroke of the handle through the instrumentality of the pawl and ratchet connections hereinbefore described.

The printing and impression mechanism 5 comprises a reciprocatory main carrier frame 26 which is preferably provided with guide ribs 27 which slidably fit vertical grooves 28 in the inner faces of the side frame extensions 2. The carrier frame 26 is provided 10 with forwardly extending brackets 29 which are preferably open frames and have curved marginal portions 30 from which a series of pins or studs 31 project inwardly. Extending across from the side bracket extensions 15 29 are a plurality of rods 32 which are arranged in vertical alinement near the carrier frame 26. Sleeved on these rods 32 are the type-carrying bars 33. The number of rods 32 depends upon the number of individual 20 numbers, letters or characters to be printed or impressed by the machine. That is, upon each rod is mounted a plurality of type bars carrying the same character. Obviously, although only ten bars are shown in the 25 drawings, it will be merely a matter of judgment to increase or diminish the number thereof as desired. For example, if the English alphabet is used, there will necessarily be twenty-six rods for the letters and 30 about ten more for numerals and punctuation marks, making about thirty-six in all. It is preferable to nest the type bars in groups on each side of the middle portion of the machine, as shown in Figs. 2 and 5. In 35 this way, for example, the capital letters may be arranged on one side and the small letters on the other side.

Preferably, the hinge or eye portion of each of the type bars is offset so that the bars 40 on the upper rods may hang vertically without interference when it is desired to set up a line of type to be printed or impressed on the matrix material. Normally, when the type bars 33 are not in use, they are supported 45 upon their respective supporting studs or pins 31. When it is desired to set a line, the required type bars are moved inwardly on their rods and swung down into proper position in the line to be printed. To distribute 50 or restore the type bars to normal position, it is only necessary to swing the bars upwardly and move them laterally onto their respective supporting studs or pins 31.

The outer or free ends of the type bars 33 55 are provided with widened angular extensions 34 on which the type faces 35 are secured or formed. The inner edges of each of the type bar extensions 34 are notched as at 36, so that when a series of type bars are set 60 side by side, in printing position, a continuous V-shaped groove is provided lengthwise of the row of type bars in position to receive the beveled portion 37 of a plunger 38 which is slidably mounted on the main carrier 65 frame 26 so that said plunger may be initially

70 moved until its portion 37 engages the, aligned notches 36 of the type bars to maintain them in alinement during the continued actuation of the plunger in making the impression. The plunger is also provided with 75 downward extensions 39 at each side and beveled as at 40 so as to straddle the row of type bars when set in printing position and hold them together.

Preferably, the handle 22 is provided with 75 a slot 41 in which fits an antifriction roller 42 which is set in a notch 43 and journaled on an axle 44 at the top of the plunger 38. The plunger is provided with a lug or projection 45 which is adapted to contact with a shoulder 80 or stop 46 on the main carrier frame 26 when the handle 22 is raised, and it is also provided with a lug or projection 47 which is arranged to contact with a shoulder or stop 48 when the handle is depressed. Normally, 85 the carrier frame 26 is yieldingly held in raised position by springs 49, and stops 50 are provided to limit the upward movement of the frame. By this arrangement, the plunger 38 is first moved downward until its 90 beveled portion 37 enters the notches 36 in the type bars when the handle is depressed. The lug or projection 47 engages the shoulder 48 on the carrier frame about the same time 95 the plunger contacts with the line of type bars, and a continued downward movement of the plunger causes the carrier frame to move therewith against the tension of the springs 49 until the type are impressed in 100 the matrix strip 51.

The matrix strip 51 may be of the usual 105 card board or material used for the purpose and treated in the same manner as when taking the impression from type in a form. The strip 51 may be held on the bed plate or table 105 4 by clips 52 which are secured at intervals near the side edges of the bed-plate by screws 53, or other suitable securing devices may be employed for the purpose.

By the arrangement of machine herein set 110 forth, the type may be readily set in lines and impressed line by line upon the matrix strip as the same is intermittently moved with respect to the impression mechanism of the machine, and by adjusting the travel of 115 the connecting link 21 for the ratchet mechanism the space between the lines may be varied. This adjustment may be readily effected by changing the point of connection 120 between the link 21 and lever 20. To secure such adjustments, a series of holes 54 may be provided in the lever 20 for the reception of the connecting pivot stud 55.

If it is desired to feed the bed-plate or table 4 rearwardly instead of forwardly, it is 25 only necessary to reverse the arrangement of the ratchet wheel and pawl-carrying disk and connect the link 21 to the disk at the rear of the driving shaft.

Obviously, the machine may be modified 130

without departing from my invention, and, therefore, I do not wish to be limited to the construction and arrangement shown.

What I claim as my invention and desire to secure by Letters Patent is:

1. A machine for making matrices for casting stereotype printing plates comprising a horizontally movable carrier for the matrix material, an impression device comprising a vertical reciprocatory carrier frame having thereon a multiplicity of interchangeable type arranged to be moved to a common effective position, a plunger mounted on said reciprocatory carrier frame, arranged to engage the type when set in effective position and adapted to impress the same into the matrix material, means for actuating said plunger and said reciprocatory carrier frame, and means for moving the carrier for the matrix material successively and intermittently with relation to said impression device.

2. A machine for making matrices for casting stereotype printing plates comprising a horizontally movable carrier for the matrix material, an impression device comprising a vertical reciprocatory carrier frame having thereon a multiplicity of interchangeable type arranged to be moved to a common effective position, a plunger mounted on said reciprocatory carrier frame and arranged to have a limited initial movement independently thereof, and being also arranged to engage the type when set in effective position and adapted to impress the same into the matrix material, means for actuating said plunger and said reciprocatory carrier frame, and means for moving the carrier for the matrix material successively and intermittently with relation to said impression device.

3. A machine for making matrices for casting stereotype printing plates comprising an intermittently movable carrier for the matrix material, an impression device comprising a reciprocatory carrier frame provided with a multiplicity of interchangeable type arranged to be set in common printing alignment and a plunger mounted on said reciprocatory frame, arranged to engage and hold the type when set in printing alignment, and adapted to impress the same into the matrix material, means for actuating said plunger and said reciprocatory carrier frame, means for actuating said carrier for the matrix material, and means for regulating the distance said carrier travels at each actuation thereof.

4. A machine for making matrices for casting stereotype printing plates comprising an intermittently movable table having means for securing the matrix material thereon, means for actuating said table, an impression mechanism comprising a reciprocatory carrier frame, a multiplicity of type

bars pivotally and slidably mounted thereon and having angular portions arranged to be moved to a common effective position in a restricted line, a plunger mounted on said reciprocatory frame and arranged to engage the angular portions of the type bars when set in effective position, said plunger having a portion adapted to straddle lengthwise of said line of type, means for actuating said plunger and said reciprocatory carrier frame, and an operating handle common to said table, plunger and carrier frame actuating means.

5. A machine for making matrices for casting stereotype printing plates comprising an intermittently movable table having means for securing the matrix material thereon, and an impression device comprising a resiliently supported reciprocatory carrier frame having a multiplicity of type bars pivotally and slidably mounted thereon and having type-carrying portions arranged to be moved to a common effective position in a restricted line, a plunger slidably mounted on said carrier frame and having a limited initial movement independently thereof, said plunger having a portion arranged to engage the type-carrying portions of the type bars when set in effective position and adapted to straddle said line of type-carrying portions to hold the same together, and an operating handle connected to said plunger and adapted to actuate the same and said carrier frame, said operating handle also having a connection with the actuating means for said matrix-carrying table, whereby said table may be moved intermittently with relation to said impression device.

6. A machine for making matrices for casting stereotype printing plates comprising a supporting frame, an intermittently movable table slidably mounted therein, said table having means for securing the matrix material thereon, an operating shaft journaled in said supporting frame and having a rack and pinion connection with said intermittently movable table, an actuating lever pivotally mounted in said supporting frame and having a ratchet and pawl connection with said operating shaft, and an impression device operably connected to said actuating lever and arranged to be actuated thereby when said intermittently movable table is at rest, said impression device comprising a resiliently supported reciprocatory carrier member having a multiplicity of type bars arranged interchangeably thereon and adapted to be moved to a common effective position in a restricted line, and a plunger slidably mounted on said carrier member and having a limited initial movement independently thereof, said plunger being adapted to engage and hold said type bars when set in effective position.

7. A machine for making matrices for

casting stereotype printing plates comprising a supporting frame, an intermittently movable table slidably mounted therein, said table having means for securing the
 5 matrix material thereon, an operating shaft journaled in said supporting frame and having a rack and pinion connection with said intermittently movable table, an actuating lever pivotally mounted in said supporting
 10 frame and having a ratchet and pawl connection with said operating shaft, means for regulating the stroke of said ratchet and pawl connection to regulate the distance said intermittently movable table travels at
 15 each actuation thereof, and an impression device operably connected with said actuating lever and arranged to be actuated thereby when said intermittently movable table

is at rest, said impression device comprising a reciprocatory carrier member having a
 20 multiplicity of type bars interchangeably mounted thereon and arranged to be moved to a common effective position in a restricted line, and a plunger slidably mounted on said carrier member and adapted to engage and
 25 hold the type bars when set in effective position.

In witness whereof I have signed my name to this specification in the presence of two subscribing witnesses this 21st day of September, 1908, at St. Louis, Missouri.

RUDOLPH COOPERSMITH.

Witnesses:

G. A. PENNINGTON,
 J. B. MEGOWN.