

No. 637,359.

Patented Nov. 21, 1899.

F. M. SPURR.
PRINTING MACHINE.

(Application filed Oct. 21, 1898.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1

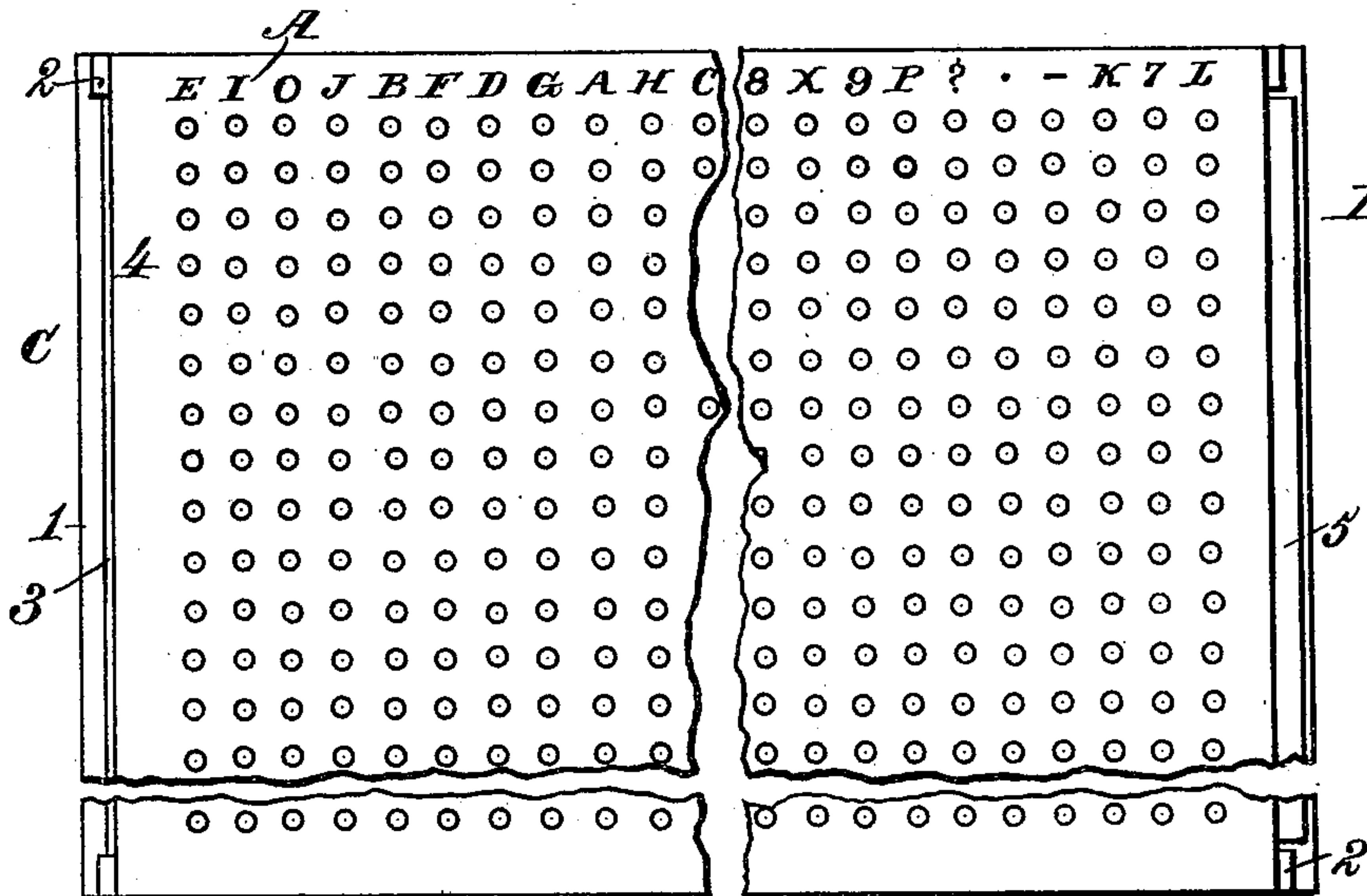


Fig. 11

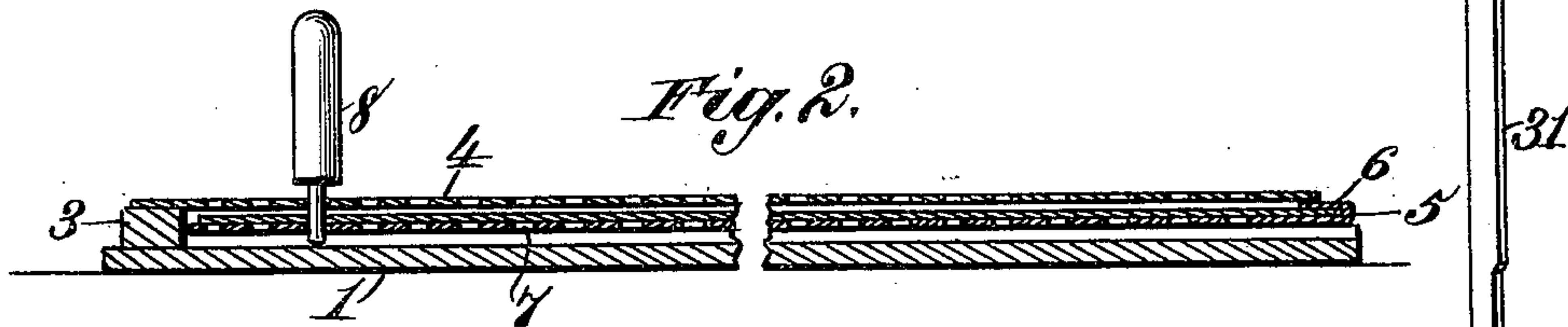
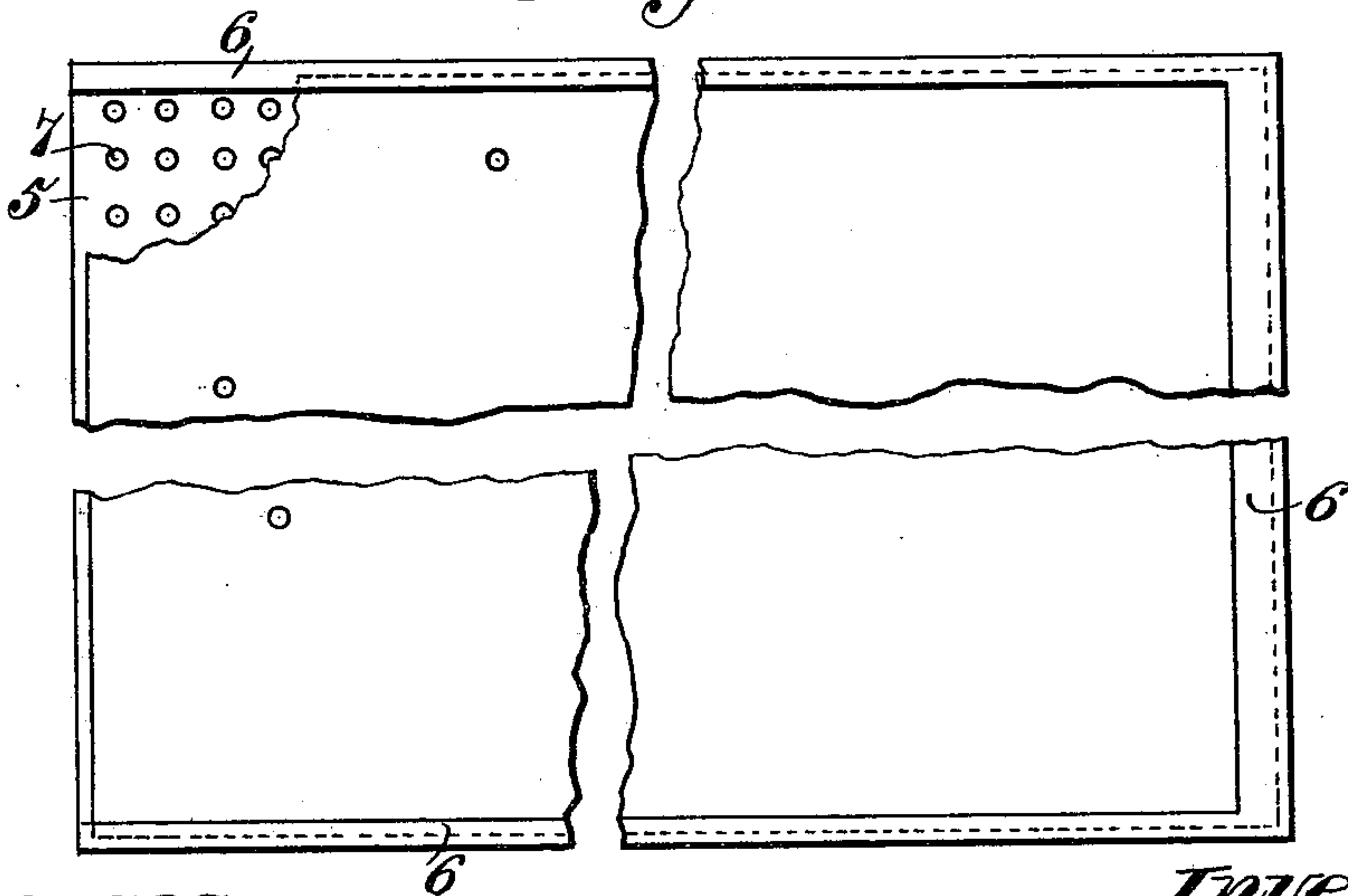


Fig. 3



Witnesses.
Robert G. Watt
L. N. Jackson

Fig. 4



Inventor.
Foster M. Spurr
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Att'y.

No. 637,359.

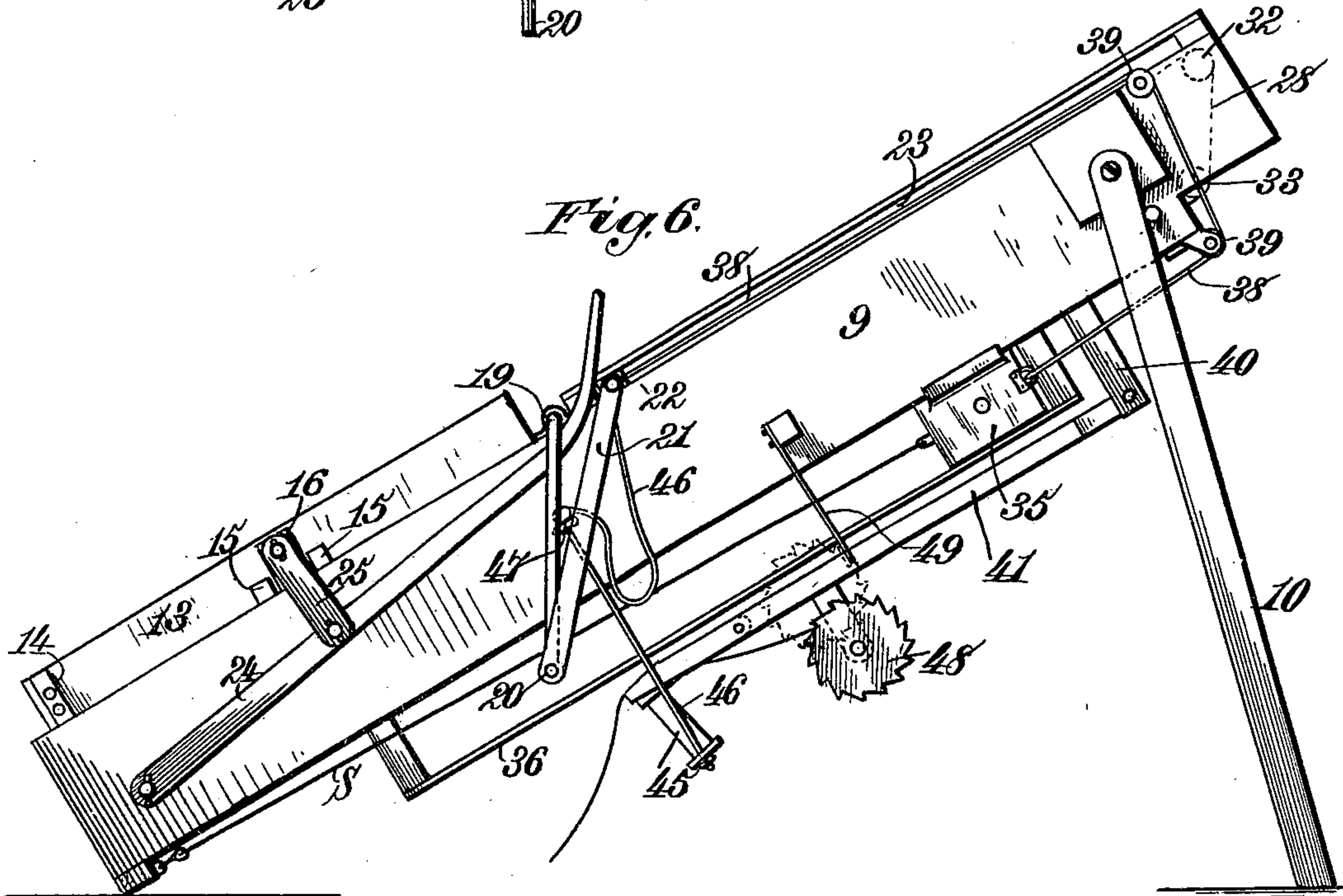
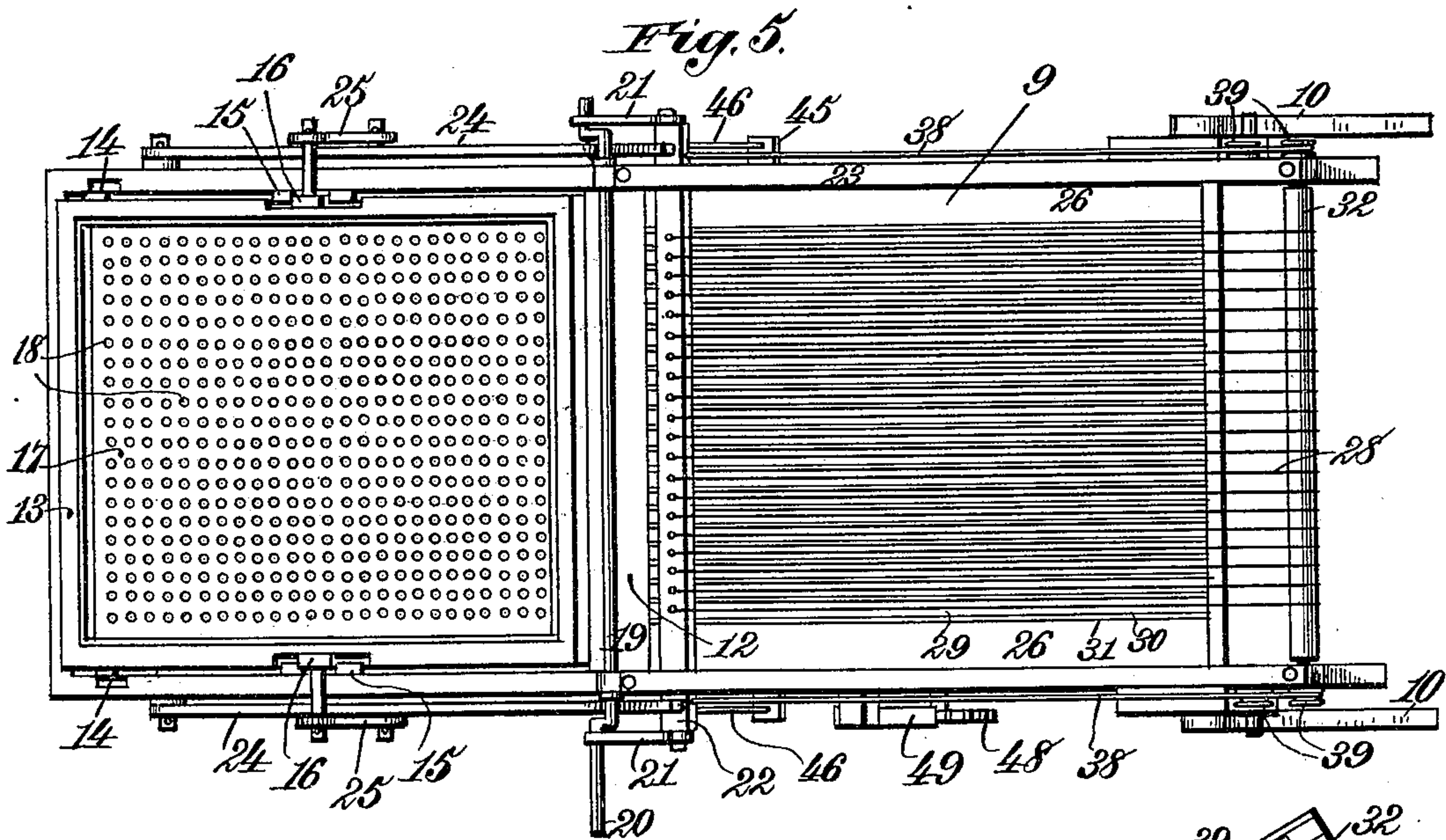
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F. M. SPURR.
PRINTING MACHINE.

(Application filed Oct. 21, 1898.)

(No Model.)

3 Sheets—Sheet 2.



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Atty.

No. 637,359.

Patented Nov. 21, 1899.

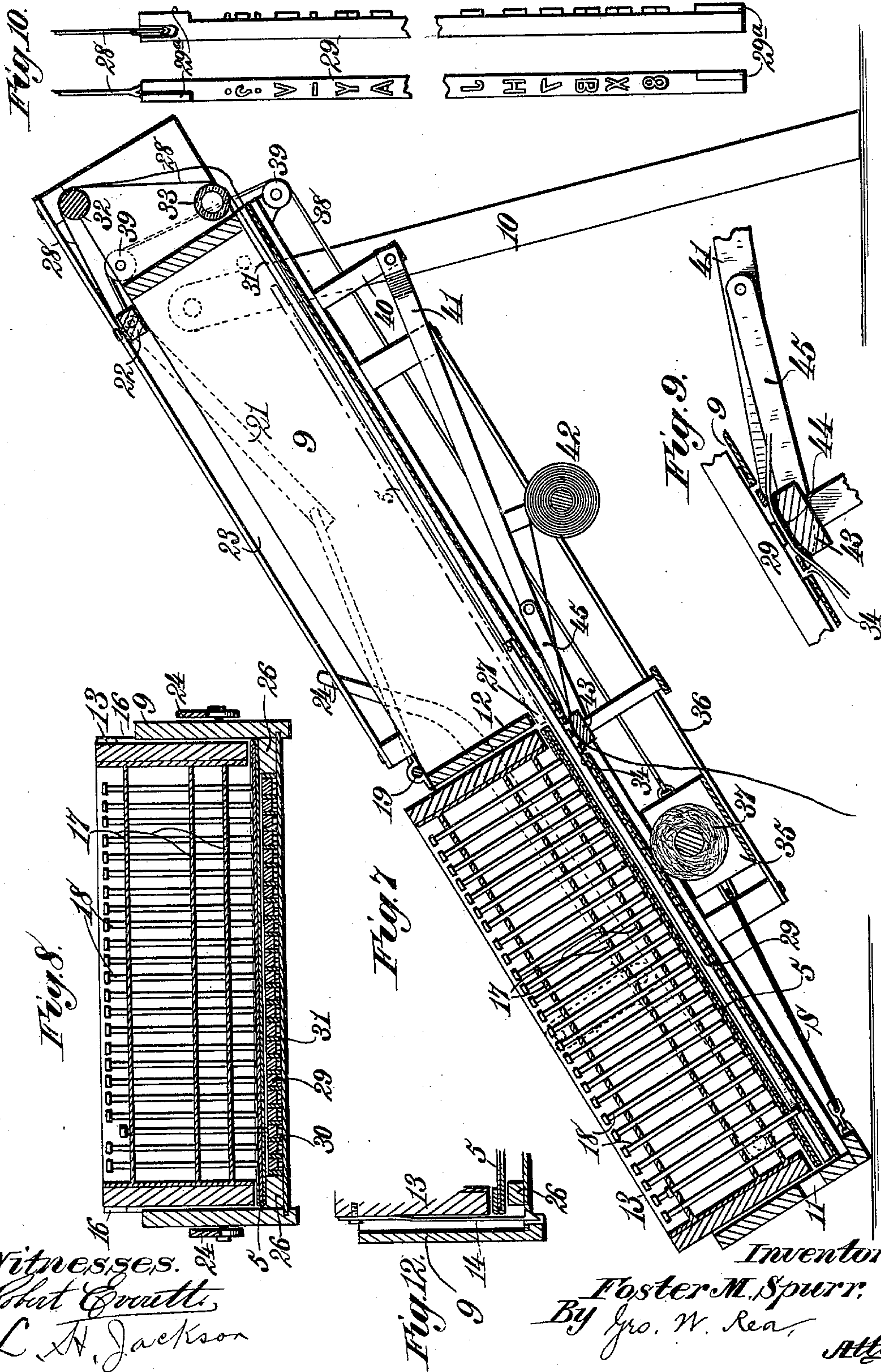
F. M. SPURR.

PRINTING MACHINE.

(Application filed Oct. 21, 1898.)

(No Model.)

3 Sheets—Sheet 3.



UNITED STATES PATENT OFFICE.

FOSTER M. SPURR, OF BOSTON, MASSACHUSETTS.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 637,359, dated November 21, 1899.

Application filed October 21, 1898. Serial No. 694,179. (No model.)

To all whom it may concern:

Be it known that I, FOSTER M. SPURR, a citizen of the United States of America, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Printing-Machines, of which the following is a specification.

My invention relates to improvements in printing-machines, and has for its object to provide a new and improved machine of very simple and economical construction, which is easily operated by hand by operators who need not be skilled in the art of printing, and in which the record-sheets may be used a number of times and be stored for future use.

To these ends the invention consists in the novel construction, combination, and mode of operation of parts hereinafter set forth and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a plan, partly broken away, illustrating the device in which the record-sheets are prepared. Fig. 2 is a transverse section thereof. Fig. 3 is a plan of a record-sheet, broken away at one corner to show the holder therefor. Fig. 4 is a detail showing a sheet-pricking awl. Fig. 5 is a plan view of my improved printing-machine; Fig. 6, a side elevation thereof; Fig. 7, a longitudinal section; Fig. 8, a transverse section of the pin-stack, and Fig. 9 a detail of the pressure-bar in the act of printing. Fig. 10 shows a plan and side elevation of one of the type-bars. Fig. 11 is a detail of one of the metal strips, a number of which constitute the type-bar races. Fig. 12 is a detail view illustrating the fingers carried by the pin-stack for lifting the record-sheet holder into proper position to be discharged from the machine.

To enable others to understand, to make, and to use my invention, I will now describe the same in detail, referring first to the manner of making the record-sheet, which is the initial step in the system of printing according to my invention. This consists of a receptacle or container C, constructed of wood, metal, or other suitable material, comprising a bottom 1, with raised sides 2 and a raised end 3, the other end being open for the insertion and removal of the record-sheet holder, hereinafter referred to. Secured to the raised

sides and end of the bottom is a perforated plate 4, preferably constructed of metal. Along one side of the plate 4 or at both sides, if desired, is secured an alphabet or key A, comprising the letters of the alphabet, numerals, punctuation-marks, and the other known characters and symbols of a font of type. The different letters and other characters of the alphabet or key A register with the different columns of perforations in the plate, one letter or other character to each column. The numeral 5 designates the record-sheet holder, open at one end, as shown, and provided at its sides and at one end with turned-over edges to provide lips 6, under which the record-sheet is slipped and by which it is firmly held against movement while the record is being made. Instead of the lips 6 other suitable means may be employed for receiving and holding the record-sheet. This holder is perforated, as at 7, to correspond with the perforations in the plate 4, and the perforations of said holder and plate coincide or register when the parts are in operative position.

The manner of using the device thus described is as follows: A sheet of paper of suitable size is secured in the holder 5, and the latter is then inserted into the container through the open end thereof. When it is homed therein, the perforations of the plate 4 and the holder 5 are in register with the sheet of paper between them. By means of awls or pricks 8, a convenient form of which is shown in Fig. 4 of the drawings, the paper is now perforated by passing said awls or pricks through the perforations in the plate 4 into the registering perforations in the holder 5. The perforations made in the sheet of paper indicate letters or other characters of the alphabet or key A, and but one perforation is to be made in each row of perforations running parallel to said key or alphabet. For instance, if the name "Washington" is to be printed a perforation is made in the first of such parallel rows under or in line with the letter "W." Another perforation is made in the next row of perforations in line with the letter "a." In the next row a perforation is made in line with the letter "s," and so on until the name is completed. The result is a record-sheet presenting when turned end on

in the proper position for employment in the printing-machine, as hereinafter described, a series of perforations running from left to right of the sheet and indicating the letters composing the name "Washington." This record-sheet, still held in the holder 5, is removed from the container for subsequent use in the printing-machine and constitutes one line of matter to be printed. A number of these record-sheet holders are provided corresponding to the aggregate of lines which the machine will be called upon to print in the class of work it is intended for.

My improved printing-machine, in which the record-sheet is used, consists of a trough or box 9, supported with its floor in an inclined position by means of pivoted or hinged legs 10, which when the machine is not in use may be swung against the sides of the box or trough for compactness in storage. The box or trough 9 is provided at its lower end with a slot or passage 11 for the exit of the record-sheet. A partition 12 divides the trough into upper and lower compartments, in the lower of which is loosely seated a pin-stack 13. This stack is held in the compartment with sufficient security, but not so firmly that it may not be lifted in said compartment, and it is provided with spring lifting-fingers 14, as hereinafter described. The pin-stack is guided in its insertion into and removal from and during its movement in said compartment by suitable guides—such, for example, as those shown in the drawings, consisting of vertical strips 15, secured to the sides of the box or trough, leaving an intervening space to receive the guide-tongues 16 on the pin-stack. This pin-stack, as shown, is box-shaped in form, fitting loosely in the lower compartment of the box or trough 9, and is provided with a series of perforated plates 17, arranged over one another and the perforations whereof are in register. The perforations in these plates receive a corresponding number of pins 18, which perform the office hereinafter ascribed to them.

A crank-shaft 19 is journaled in the box or trough 9 intermediate its ends, one extremity of which is provided with a handle 20, and both its extremities are connected by links or pitmen 21 to a cross-head 22, which moves longitudinally of the box or trough 9 in a raceway 23.

The numeral 24 designates levers pivoted at one end to the sides of the box and free at their other ends. They are connected intermediate their ends with the pin-stack 13 by lifting-links 25. The free ends of the levers bear or rest upon or project into the path of the cross-head 22 when the latter begins its upward movement and are elevated by said cross-head during the movement of the latter, whereby the pin-stack 13 is slightly lifted in its compartment. To go back a little, the record-sheet and holder previously described are inserted into the upper compartment of the box or trough 9, supported at its edges above

the floor upon guide-strips 26, extending the entire length of the box or trough and upon which it rides through the machine. Initially the cross-head is disposed near the limit of its downward travel slightly above the free ends of the levers 24. When the handle 20 is operated, it first imparts downward travel to the cross-head 22 through the medium of the pitman 21, and said cross-head at the beginning of its movement engages and lifts the free ends of the levers 24, whereby the pin-stack 13 is lifted in its compartment, whereupon the record-sheet passes into the lower compartment beneath the pin-stack through a passage 27 in the partition 12, and when it has reached and its passage is arrested by the lower wall of the box or trough the pin-stack falls back into the compartment after the cross-head 22 passes away from the levers 24. When the parts are in this relative position, the perforations of the pin-stack 13 and the holder 5 register, and those pins 18 which register with the perforations which have been made in the record-sheet pass there-through and through the perforations in the holder 5 and project beneath the latter, the remaining pins being retained in their normal position by the imperforate portions of the record-sheet.

Suitably secured to the cross-head 22 by flexible connections 28 are a series of type-bars 29, bearing on their longitudinal edge male type characters corresponding to the letters, numerals, and other characters on the alphabet or key A. The type-bars are disposed in the type-bar magazine formed by the upper compartment of the box or trough with their type characters facing the floor of the box or trough and beneath the record-holder 5 when the latter is in that compartment. The type-bars are supported by the lugs 29^a, so that the type characters are slightly above and out of contact with the floor and are arranged in races 30 provided therefor. These races are preferably formed by thin strips of metal 31, which are coextensive with the length of the floor of the box or trough and are removable and replaceable in the box and movably adjustable laterally of the box. The races may be formed by spaced-apart ribs formed integral with or permanently secured to the floor of the trough or box; but I prefer the series of removable and replaceable and adjustable strips 31, as they can be adjusted to accommodate different thicknesses of type-bars, if necessary.

The connections 28 between the cross-head 22 and the type-bars pass over rollers 32 and 33, journaled to rotate in the upper end of the box or trough to reduce friction and afford ease of movement. During the upward movement of the cross-head 22 the type-bars pass into the lower compartment beneath the record-holder 5 therein. Certain of the bars are engaged by the pins 18, which project into their path and are arrested, bringing the selected type character thereon in front of a

type-slot 34, formed in the floor of the trough beneath the partition 12 and substantially between the type-bar magazine and the pin-stack. Those of the type-bars which are not engaged by the pins pass beyond said type-slot, and this occurs when several words are comprised in the line, in which case one or more of the rows in the plate 4 is or are skipped in the sheet-perforating operation to provide the proper spacing between words. Thus there is presented in front of the type-slot a line of letters for printing.

Supported in a frame 35, which moves upon tracks 36, carried beneath the box or trough, is an inking-roller 37, of felt or other suitable composition. The movable frame 35 is connected also with the cross-head 22 by means of suitable flexible connections 38. Said connections are trained over pulleys 39 at the upper end of the box or trough for reduction of friction and ease and certainty of movement. Said inking-roller frame is also connected with the box or trough by suitable springs S, by means of which while the cross-head 22 is in its upward movement and the connections 38 are slack the inking-roller is caused to pass the type-slot 34 and supply ink to the type exposed in said slot.

Pivotaly connected to brackets 40, depending from the box or trough, is a swinging frame 41, supporting intermediate its ends a paper-take-up roll 42 and at its forward end carrying an impression-bar 43, faced with a yielding substance such as rubber 44. The paper passes from the supply over the impression-bar 43, against which it is confined by a slotted gravity paper-clamp 45, hinged to the swinging frame and through the slot of which the paper is exposed to the type characters on the type-bars and as each line is printed is taken up on the roll 42 by means which will be described. The normal position of the swinging frame 41 and the elements carried thereby are away from the type-slot in the floor of the box or trough. Said swinging frame 41 is connected, by means of flexible connections 46, passing through guide-eyes 47 in the sides of the box or trough, with the cross-head 22, and the impression is effected by means of the cross-head, which when approximately at the limit of its upward travel, through the medium of the connections 46, draws the impression-bar 43 and the paper held thereagainst up to the type-slot and in contact with the type characters exposed therein, accomplishing the impression. During this operation the inking-roller is held down out of the way by the spring 39. The metal strips are recessed, as shown, at the point where they span the type-slot 34 to avoid contact therewith of the inking-roller and impression-bar. When the impression has been made, the cross-bar 22 begins its return or downward travel, loosening the connections to the swinging frame 41, permitting the same to assume its normal position by gravity and drawing upon the connections 28 to the type-

bars, thus bringing the same into their elevated position, or rather restoring them to the type-bar magazine formed by the upper compartment of the box or trough. This movement of the cross-head also draws tight the connections 38 of the inking-roller and restores it to its normal position against the tension of the spring S, ready for another inking operation. When nearing the limit of its down travel, the cross-head 22 again engages the levers 24, lifting the pin-stack 13, which withdraws the pins 18 from the perforations of the record-sheet holder, and then through the medium of the lifting-fingers 14 raises the said record-sheet holder until its end registers with the lower passage 11, when it will pass there-through by gravity and be received in a suitable receptacle, in which it and succeeding record-sheets may be stored for future use in the order in which they have been employed. While the pin-stack is thus elevated a succeeding record-sheet holder passes beneath it and assumes its proper position, the lifting-fingers 14 springing past the sides thereof when the pin-stack settles back to normal position. When the swinging frame 41 is assuming its normal position after impression is effected, it serves to rotate the paper-roll to take up or advance the paper the proper distance to receive the next line to be printed by means of a ratchet 48, fixed to the paper-roll 42, with which ratchet a stationary spring-dog 49, carried by the box or trough, engages and which moves said ratchet one tooth. The dog also prevents any back slip of the paper.

I have now described the construction and one complete operation of my improved machine. Subsequent printing operations require a like operation.

Although I have shown and described in detail the type-bars restored to the magazine by flexible connections with the reciprocating cross-head, I do not wish to be understood as confining myself to this particular means for accomplishing this result.

Having thus described my invention, what I claim is—

1. In a printing-machine, the combination of a series of movable type-bars, a pin-stack having movable pins, a record-sheet holder through which certain pins corresponding to the characters to be printed automatically pass through a record-sheet, means for permitting the type-bars to move longitudinally from normal position under the record-sheet holder and movable pins, the pins passing through the record-sheet intercepting the type-bars to place the required characters thereon in a line at the impression-point, an inking device, an impression-bar for effecting the printing of the line, and devices for operating the impression-bar and restoring the type-bars to normal position, substantially as described.

2. In a printing-machine, the combination of a pin-stack connected with an arm and having movable pins, a perforated record-sheet,

type-bars movable longitudinally under the pin-stack and the said pins, certain pins which correspond to the characters to be printed automatically intercepting certain type-bars to place the required characters in line at the impression-point, an inking device, an impression-bar for effecting the printing of the composed line, means for operating the impression-bar, and means for restoring the type-bar to normal position and engaging the arm of the pin-stack to raise the same and permit the discharge of the record-sheet, substantially as described.

3. In a printing-machine, the combination of a vertically-movable pin-stack having a series of movable pins and means for raising a record-sheet holder through which certain pins corresponding to the characters to be printed automatically pass through a record-sheet, means for permitting all the type-bars to simultaneously move longitudinally under the pin-stack and the record-sheet, the pins which pass through the record-sheet holder and record-sheet intercepting certain type-bars to place the required characters in line at the impression-point, an inking device, an impression device for effecting the printing of the line, means for raising the pin-stack and thereby lifting the pins which passed through the record-sheet, and devices for operating the impression-bar and restoring the type-bars to normal position, substantially as described.

4. In a printing-machine, the combination of a vertically-movable pin-stack having self-acting movable pins, a type-bar magazine at one end of the pin-stack, type-bars stored in the magazine, means for permitting all the type-bars to simultaneously move under the pin-stack, a record-sheet holder through which certain pins automatically pass to intercept certain type-bars and place the required characters in line at the impression-point, a movable inking-roller for inking the composed line, an impression-bar for effecting the printing of the line, means for raising the pin-stack and lifting the pins which intercepted the type-bars and a reciprocating cross-head for moving the type-bars from under the pins and restoring them to the magazine.

5. In a printing-machine, the combination of a reciprocating cross-head, longitudinally-movable type-bars, means for intercepting certain type-bars to place the required characters in line, an inking-roll for the composed line, an impression-bar for effecting the printing of the line, and connections between the impression-bar and the said reciprocating cross-heads, actuated by the latter to operate the former, substantially as described.

6. In a printing-machine, the combination of a reciprocating cross-head, longitudinally-movable type-bars, means for intercepting certain type-bars to place the required characters in line, a traveling inking-roller, a movable impression-bar, and connections between the cross-head and the inking-roller

and impression-bar, whereby said inking-roller and impression-bar are operated by said cross-head, substantially as described.

7. In a printing-machine, the combination of a type-bar magazine, a reciprocating cross-head, longitudinally-movable type-bars stored in the magazine, means for permitting the type-bars to move forward, a pin-stack having automatic pins for intercepting certain type-bars to place the required characters in line, an inking-roller, an impression-bar, and connections between said reciprocating cross-head and the impression-bar, whereby the latter is operated by the former, substantially as described.

8. In a printing-machine, the combination of a type-bar magazine, a reciprocating cross-head, longitudinally-movable type-bars stored in the magazine, means for permitting the type-bars to move forward, a pin-stack connecting with the magazine and having self-acting pins for intercepting certain type-bars to place the required characters in line, a traveling inking-roller, an impression-bar, and connections whereby the said cross-head actuates the inking-roller and the impression-bar, substantially as described.

9. In a printing-machine, the combination with a traveling cross-head, of type-bars connected therewith, means for intercepting said type-bars, and an inking-roller and an impression-bar connected with and operated by said cross-head, substantially as described.

10. In a printing-machine, the combination with a traveling cross-head, of type-bars connected therewith, a pin-stack carrying pins for intercepting said type-bars, and an inking-roller and an impression-bar connected with and operated by said cross-head, substantially as described.

11. In a printing-machine, the combination of an inclined box or trough having in its upper portion a type-magazine and in its lower portion a vertically-movable pin-stack provided with automatic pins, type-bars stored in said magazine and movable longitudinally therefrom under the pin-stack, certain pins of the latter intercepting certain type-bars to place the required characters in line, an inking-roller under the pin-stack, an impression-bar, means for lifting the pin-stack and thereby raising the pins which intercepted the type-bars, and means for operating the impression-bar, substantially as described.

12. In a printing-machine, the combination of an inclined box or trough having in its upper portion a type-magazine and in its lower portion a vertically-movable pin-stack provided with automatic pins, type-bars stored in said magazine and movable longitudinally therefrom under the pin-stack, certain pins of the latter intercepting certain type-bars to place the required characters in line, a traveling inking-roller under the pin-stack, a movable impression-bar, a reciprocating cross-head connected with the inking-roller and the impression-bar for operating the same, and

means for raising the pin-stack substantially as described.

13. In a printing-machine, the combination of a box or trough having in one end portion a type-bar magazine and in the opposite end portion a pin-stack provided with automatic pins, said trough provided with a type-line slot arranged substantially between said magazine and said pin-stack, type-bars stored in the said magazine and movable therefrom under the pin-stack, certain pins of the latter intercepting certain type-bars to place the required characters in line at said type-line slot, an inking-roller, an impression-bar, and means for bringing the inking-roller and impression-bar successively to the type-line slot, substantially as described.

14. In a printing-machine, the combination of a box or trough having in one end portion a type-bar magazine and in the opposite end portion a pin-stack provided with movable pins, said trough provided with a type-line slot arranged substantially between said magazine and said pin-stack, type-bars stored in said magazine and movable therefrom under the pin-stack, certain pins of the latter intercepting certain type-bars to place the required characters in line at said type-line slot, a movable impression-bar, a traveling inking-roller, and a reciprocating cross-head moving on the box or trough and connected with the inking-roller and the impression-bar to bring them successively to the type-line slot, substantially as described.

15. In a printing-machine, the combination of a box or trough having a type-bar magazine, a type-line slot and a vertically-movable pin-stack provided with movable pins, type-bars stored in said magazine and movable therefrom under the pin-stack, a movable impression-bar, a traveling inking-roller, a reciprocating cross-head on the box or trough, and devices, substantially as described, actuated by the said cross-head to bring the inking-roller and impression-bar to the type-line slot and to raise the pin-stack.

16. In a printing-machine, the combination with a trough or box provided with a type-slot in its floor, of a set of movable type-bars, means for intercepting said bars to bring the type characters thereon in front of said slot, an inking-roller, an impression-bar, and means for bringing said roller and bar to said slot to cooperate with said type-bars, substantially as described.

17. In a printing-machine, the combination of longitudinally-movable type-bars, a box having a type-line slot in its floor and a pin-stack having movable type-bar-intercepting pins, an inking-roller, an impression-bar, and a reciprocating cross-head on the box connected with and operating the inking-roller and impression-bar, for successively bringing them to said type-line slot substantially as described.

18. In a printing-machine, the combination with a box provided with a type-slot in its

floor, of a pin-stack carrying type-bar-intercepting pins, located above said slot, a traveling cross-head, a series of type-bars connected to said cross-head, and a cooperating impression-bar, substantially as described.

19. In a printing-machine, the combination with an inclined box or trough provided with a type-slot, of a pin-stack located below said slot and carrying type-bar-intercepting pins, a traveling cross-head, a series of type-bars connected to said cross-head, and a cooperating inking-roller and impression-bar connected to said cross-head, substantially as described.

20. In a printing-machine, the combination with an inclined box or trough provided with a type-slot, of a pin-stack located below said slot, pins carried by said pin-stack, a traveling cross-head, a series of type-bars connected thereto, an inking-roller and a swinging impression-bar connected to said cross-head, substantially as described.

21. In a printing-machine, the combination with a box provided with a type-slot, of a pin-stack located in said box and mainly at one side of said slot, a crank-shaft journaled on said box, a traveling cross-head connected to and actuated by said crank-shaft, and a set of type-bars, an inking-roller and an impression-bar connected to and operated by said cross-head, substantially as described.

22. In a printing-machine, the combination with a traveling cross-head, of a series of type-bars connected thereto, an inking-roller and a swinging frame connected to said cross-head, an impression-bar and a paper-take-up roll carried by said swinging frame and means for automatically taking up said paper intermittently, substantially as described.

23. In a printing-machine, the combination with a traveling cross-head, of a series of type-bars connected thereto, an inking-roller and a swinging frame connected to said cross-head, an impression-bar and a paper-take-up roll carried by said swinging frame, a ratchet-wheel carried by said roll, and a dog cooperating therewith for automatically rotating said ratchet-wheel tooth by tooth to wind the paper on the roll, substantially as described.

24. In a printing-machine, the combination of a swinging frame carrying a paper-roll, and an impression-bar, and a slotted paper-clamp pivoted to said frame to hold the paper against the impression-bar, substantially as described.

25. In a printing-machine, the combination with a box provided with a type-slot, a pin-stack located in the lower portion of said box, a perforated record-sheet adapted to be received in the upper part of said box, means for lifting said pin-stack to permit the record-sheet to pass beneath the same, a series of pins in said pin-stack adapted to pass through the perforations in said record-sheet and a series of movable type-bars adapted to be intercepted by said pins, substantially as described.

26. In a printing-machine, the combination

with a box provided with a type-slot, of a pin-stack located in the lower portion of said box, a perforated record-sheet adapted to be received in the upper part of said box, means
5 for lifting said pin-stack to permit the record-sheet to pass beneath the same, a series of pins in said pin-stack adapted to pass through the perforations in said record-sheet, a series
10 of movable type-bars adapted to be intercepted by said pins, an inking-roller, an impression-bar, and means for operating said type-bars, inking-roller and impression-bar, substantially as described.

27. In a printing-machine, the combination
15 with a box provided with a type-slot, of a pin-stack located in the lower portion of said box, a perforated record-sheet adapted to be received in the upper part of said box, means for lifting said pin-stack to permit the record-
20 sheet to pass beneath the same, a series of pins in said pin-stack adapted to pass through the perforations in said record-sheet, a trav-

eling cross-head and a series of type-bars, an inking-roller and an impression-bar connected to said cross-head, substantially as described. 25

28. In a printing-machine, the combination with a pin-stack, of a series of pins arranged therein, and a perforated record-sheet and holder adapted to receive certain of said pins, substantially as described. 30

29. In a printing-machine, the combination with a traveling cross-head, of type-bars connected therewith, means for intercepting said type-bars, a spring-retracted inking-roller and an impression-bar said roller and said bar being connected with and operated by said cross-head, substantially as described. 35

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FOSTER M. SPURR.

Witnesses:

ALDEN CROCKETT,

SANFORD W. SIPHERS.