

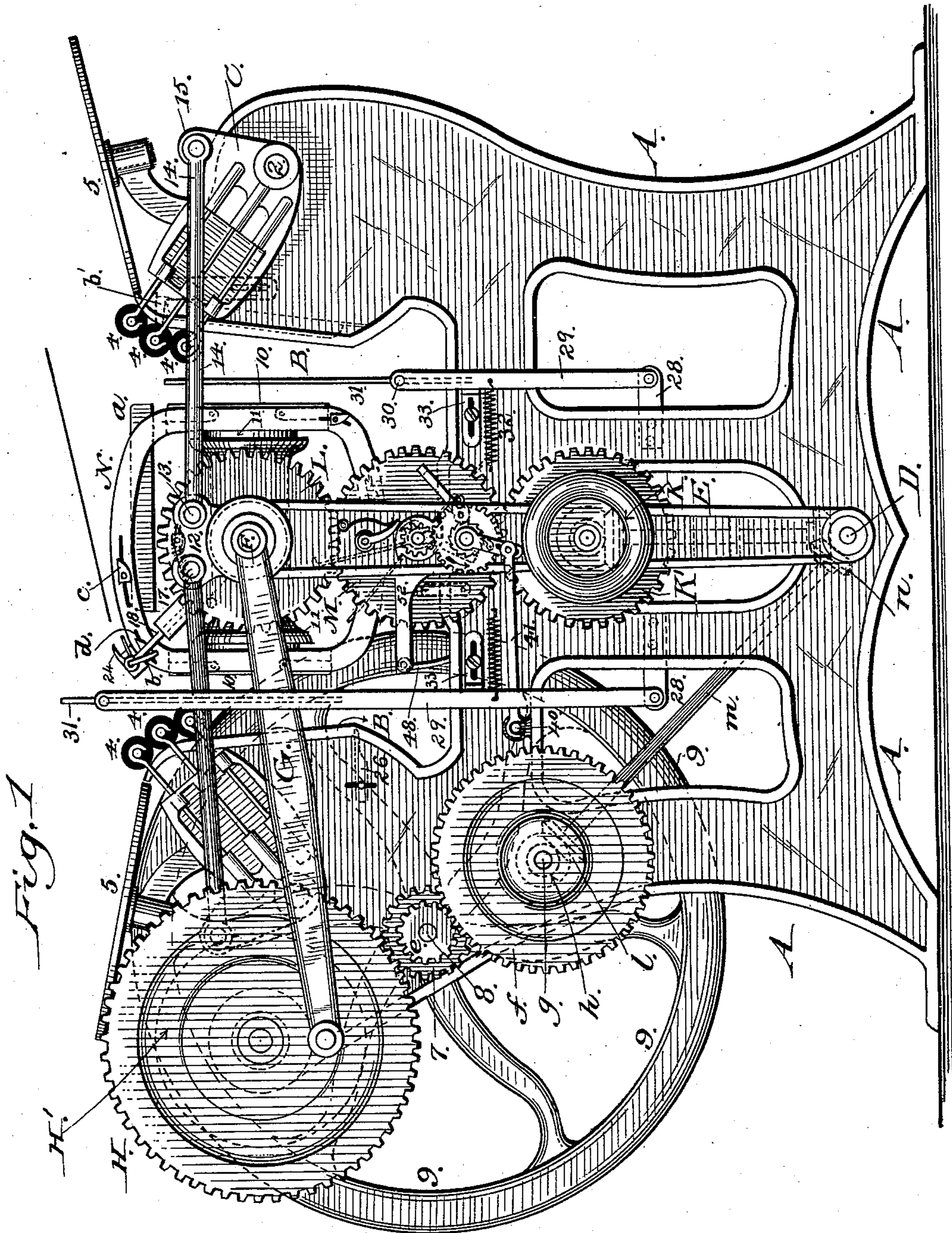
(No Model.)

4 Sheets—Sheet 1.

O. B. REYNOLDS.
PRINTING MACHINE.

No. 364,671.

Patented June 14, 1887.



WITNESSES

J. V. Fowler,
H. B. Applewhite,

INVENTOR

Oliver B. Reynolds
per O. H. Evans & Co.
Attorneys

(No Model.)

4 Sheets—Sheet 2.

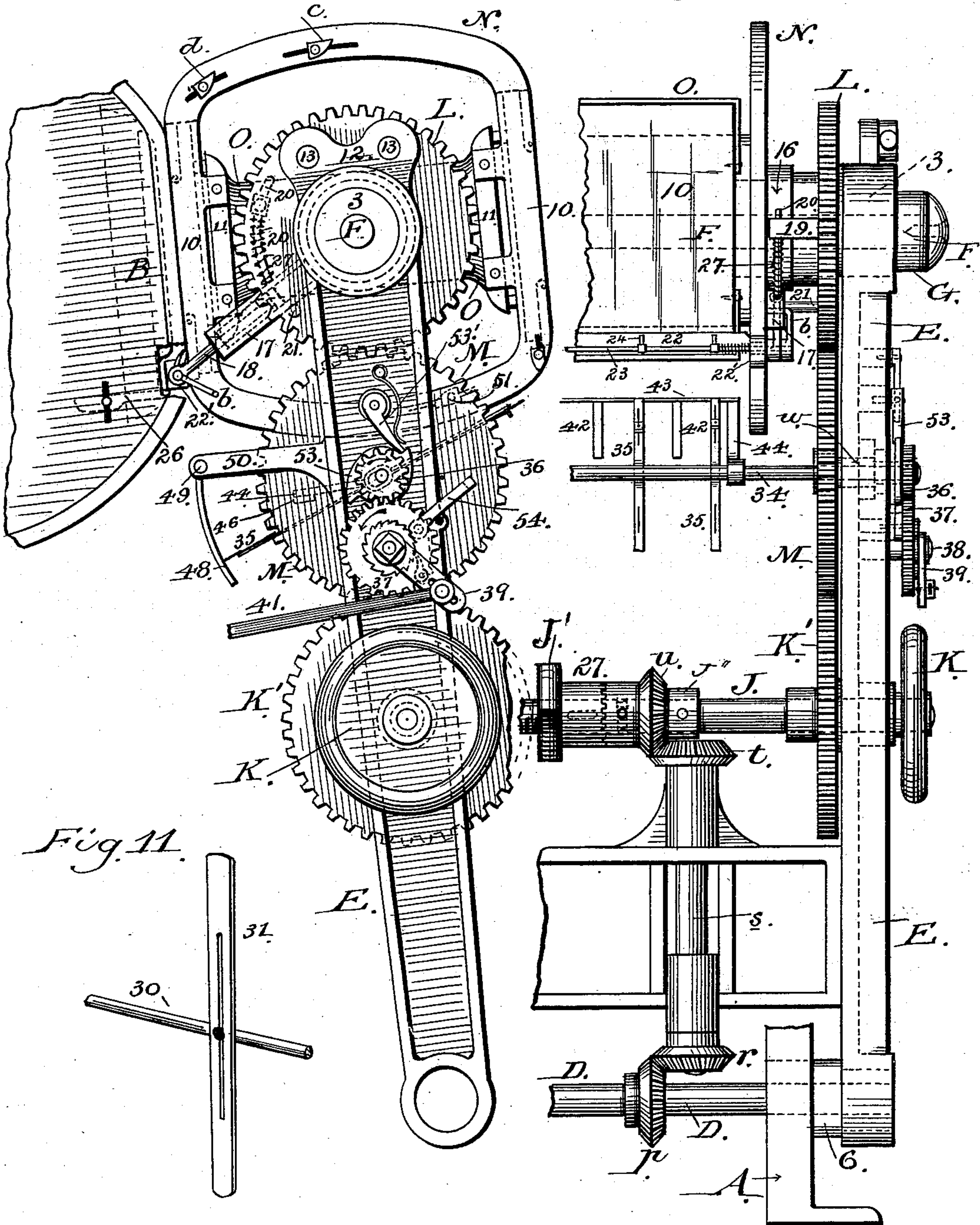
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Fig. 2.

Fig. 3.



WITNESSES
J. W. Fowler,
H. B. Applewhite,

INVENTOR
Oliver B. Reynolds
Per A. H. Evans & Co.

Attorney 5

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Fig. 4.

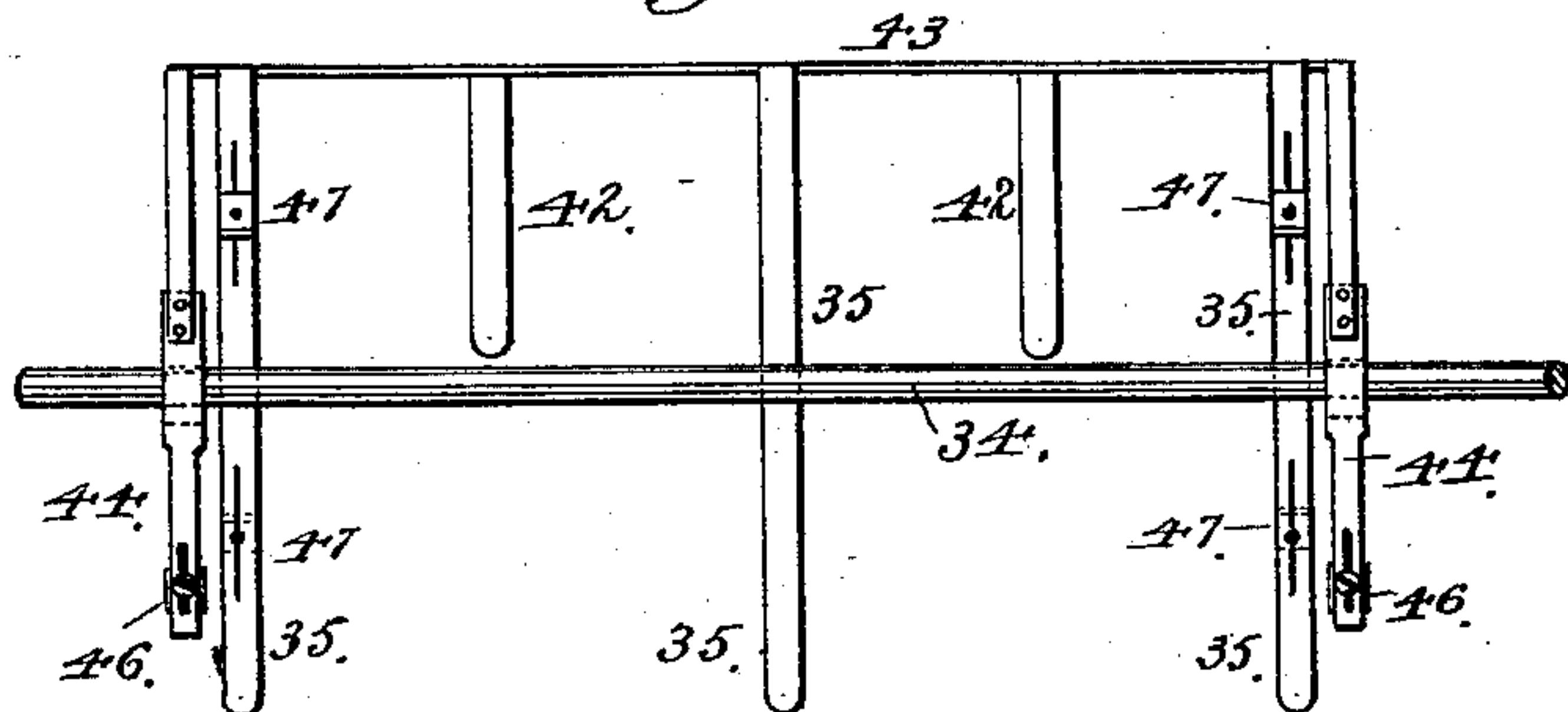


Fig. 5.

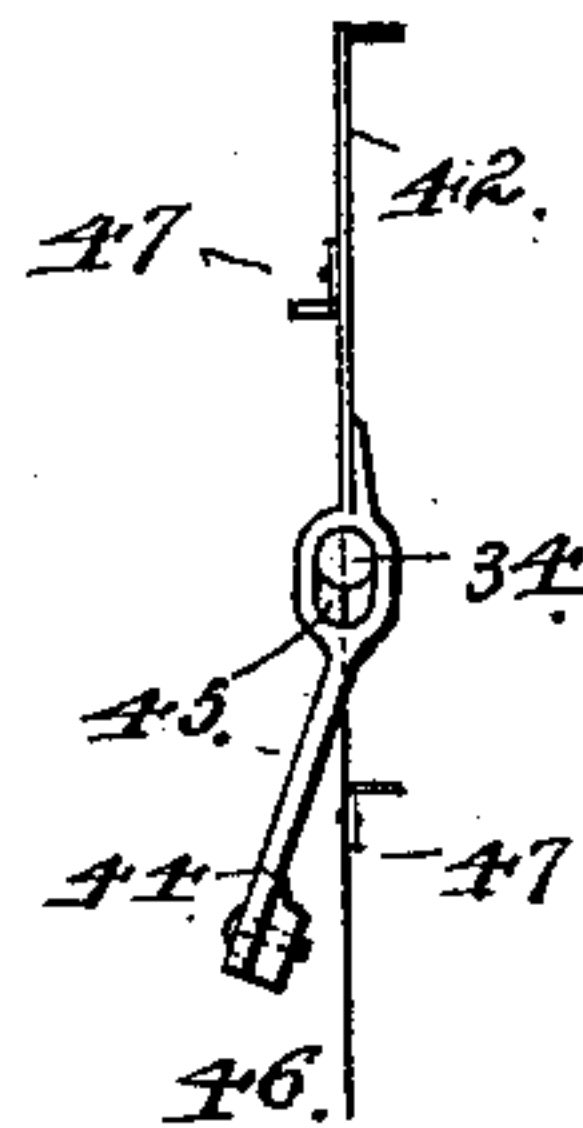


Fig. 6.

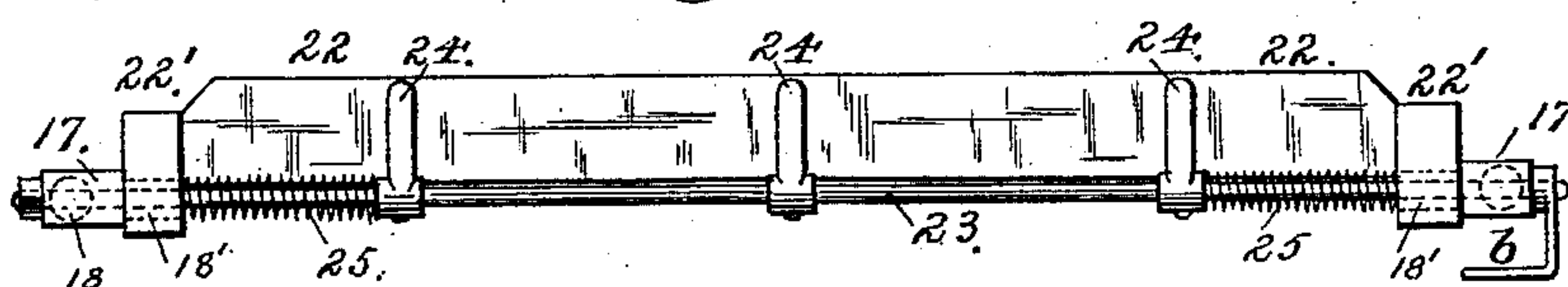


Fig. 7.

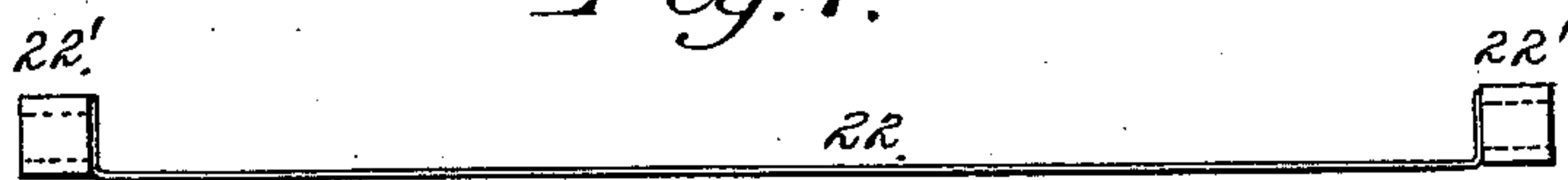


Fig. 8.

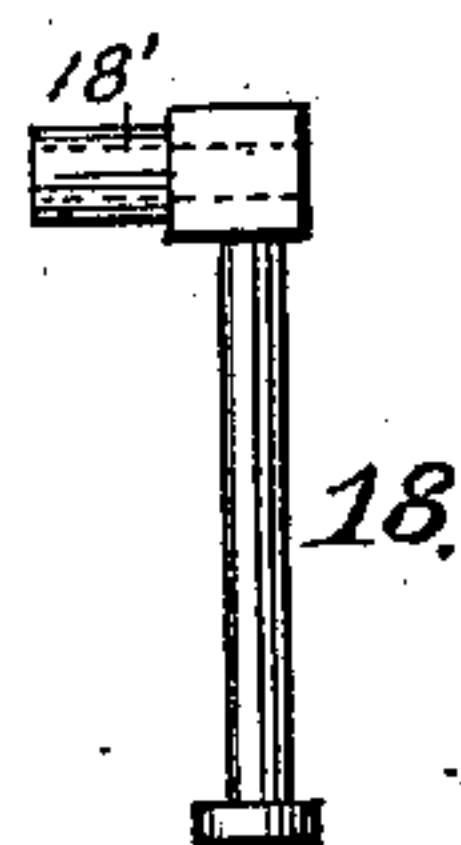


Fig. 9.

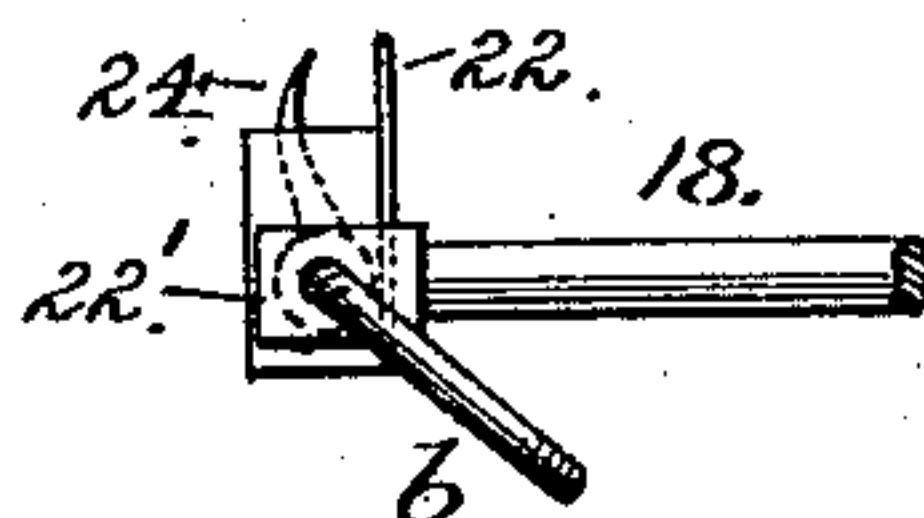
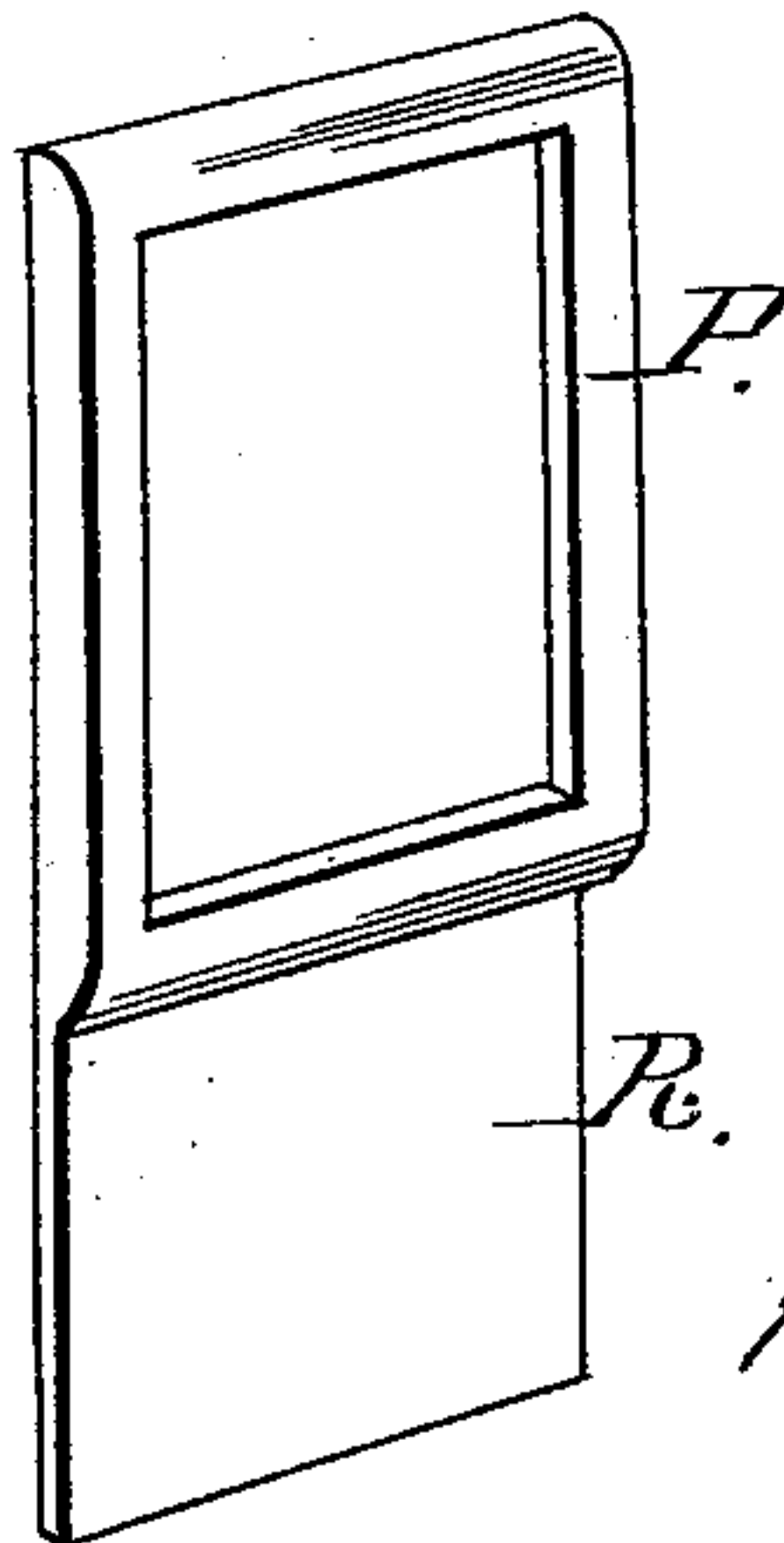


Fig. 10.



WITNESSES

J. V. Fowler
H. B. Applewhite

INVENTOR

Oliver B. Reynolds
Per A. N. Evans & Co

Attorneys

(No Model.)

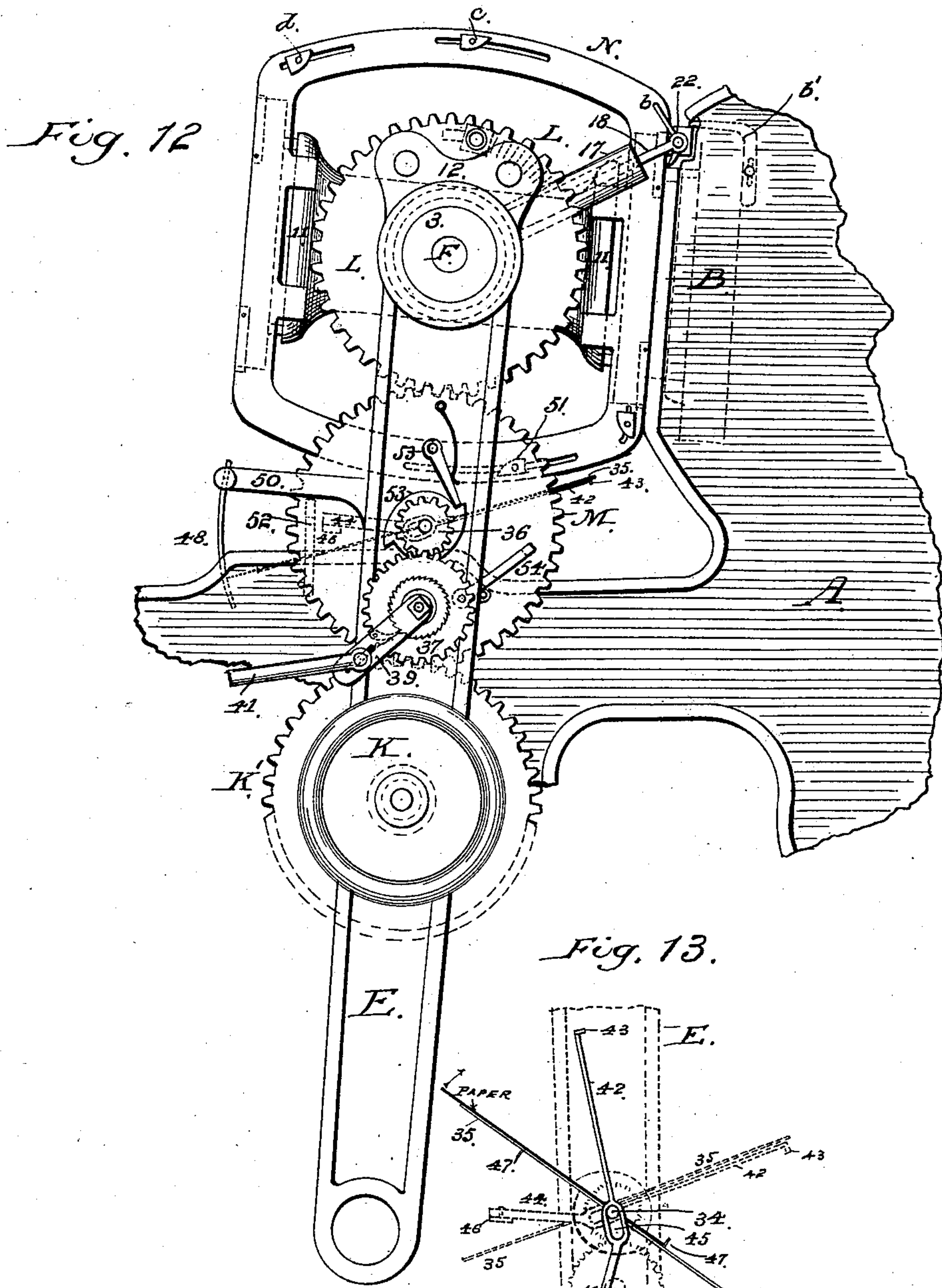
4 Sheets—Sheet 4.

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Witnesses

J. W. Fowler,
W. H. Patterson

Inventor

Oliver B. Reynolds

By his Attorneys

A. H. Evans & Co.

UNITED STATES PATENT OFFICE.

OLIVER B. REYNOLDS, OF BROCKTON, MASSACHUSETTS.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 364,671, dated June 14, 1887.

Application filed December 16, 1885. Serial No. 185,809. (No model.)

To all whom it may concern:

Be it known that I, OLIVER B. REYNOLDS, a citizen of the United States, residing at Brockton, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Printing-Presses, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a side elevation of a printing-press embodying my improvements. Fig. 2 represents a side elevation showing one of the platens in contact with its type-form, mechanism for operating the nippers, and mechanism for turning the printed sheet. Fig. 3 is a detail showing, in front elevation, one side of the press and its attachments. Fig. 4 represents a plan view of the paper-reversing frame. Fig. 5 is an end view of the same. Fig. 6 represents a plan view of the nippers. Fig. 7 is an edge view of the plate 22, with the blocks 22' secured thereto. Fig. 8 is a detail of the nipper-arm 18. Fig. 9 represents an end view of the parts shown in Fig. 6. Fig. 10 represents, in perspective, my improved chase. Fig. 11 represents a detail to be referred to. Figs. 12 and 13 represent the different positions of the sheet-reversing frame.

My invention relates especially to oscillating printing-presses; and the same consists in the devices hereinafter described and specifically pointed out in the claims.

To enable others skilled in the art to which my invention appertains, I will now describe a preferred form of construction and the manner whereby my invention is carried out.

In the said drawings, A represents a frame of suitable material, design, and dimensions adapted to sustain the working portions of my machine.

The frame A is provided with means for receiving and for securing two type-forms, the beds for the same being arranged upon two sides of the transverse center of the frame, as shown at B B, Fig. 1. The ink-roller frames C are pivoted at 2, and are operated by suitable mechanism to cause the ink-rollers to pass over the face of the type and return in the usual manner. The ordinary disks, 5, from which the rollers 4 receive and distribute the ink, are mounted on the upper portion of the

frame, and are operated in the usual manner; but these features form no essential part of my invention, as they are well known, but are simply shown and referred to to illustrate a working combination of elements. A transverse shaft, D, is mounted in the lower portion of the frame, its outer ends passing through hubs 6, on the frame A, which furnish bearings for the lower ends of oscillating arms E, the upper ends of said arms E being mounted upon hubs 3 projecting from the platen-carrying frame. A shaft, F, passes through the hubs 3 and extends beyond the sides of the frame, and to these extended ends is attached and secured one end of links G, the opposite end of said links being attached to a gear-wheel, H, mounted on the frame at one side, and a suitable face-plate, H', on the opposite side and operated by a pinion, 7, on the main or driving shaft 8, which also carries the customary balance-wheel, 9. From this arrangement of the pivoted arms and their connection with the driving mechanism it is manifest the movements of the gear H and face-plate H' cause the link G to bring the platens 10 against the type-form and thereby take an impression. In order to print with more than one color, or to print both sides of the paper during its progress through the machine, I employ a duplex platen, the platens 10 being formed in the platen-frame 11, which is provided with cams N, and are so arranged with relation to the type-forms that the movements of the gear H and links G bring first one and then the other platen against its respective type-form. The oscillating arms E are also provided with projections 12, having pins 13, to which are connected links 14, the said links being connected to the short arm 15 of the ink-roller frame C, and causes the rollers 4 to distribute a fresh supply of ink over the type at each of the oscillating movements of the swinging arms.

Mounted loosely on the hubs 3 are collars 16, provided with extending arms 17, which bear against stops 21, and are bored to receive spring-actuated rods 18, which carry the nipper-frame. A gear-wheel, L, on hub 3 is provided with a stud, 19, through the outer end of which one end of curved rods 20 pass, the opposite ends of said rods bearing against the arms 17, as shown in Fig. 2.

The nipper-frame, as shown in detail in

Figs. 6 and 7, consists, essentially, of a plate, 22, the ends of which are secured to blocks 22', that are bored to receive hubs 18' on the rods 18. Suitable rods, 23, pass through these hubs and are provided with fingers 24, between which and the plate 22 the edge of the sheet of paper is held. To cause these nippers to hold the paper in a satisfactory manner during the time the impression is being made, as well as during the future movements of arms 17, I introduce between the end fingers, 24, and the blocks 22' suitable springs, 25, which cause the fingers to bear with sufficient friction upon the paper to retain it in its position.

During the period in which the impression is being taken it is necessary to adopt some means to check the onward movement of the nipper-carrying arms. I therefore secure to the frame A, at points near the base of the chase P, suitable stops, 26, against which the blocks 22' of the nipper-frame are designed to come in contact. In order to provide a yielding movement for the arms 17 I introduce around the curved rods 20, and between the studs 19 and arms 17, coiled springs 27, which permit the arms to yield, but force said arms forward to their normal position against the stops 21 as soon as the gear H and intermediate mechanism have forced the nipper-frame from its engagement with the stops 26. As soon as this latter object is obtained, the rotation of the gear-wheel L causes the nipper-frame and printed sheet to resume its course, the spring-actuated rods 18 causing the nipper-frame to follow the curvature of the cams N of the platen-frame and to bring the printed face of the sheet in position for its second impression, at which point the nipper-frame is temporarily checked by a stop similar to the one described. This is practically the movement of the paper when it is desired to print, say, two colors on one side of the sheet, the said sheet, after receiving its second impression, being again carried by the nippers over the top of the platen-frame, and finally deposited on its table *a*, by reason of an arm, *b*, engaging a cam, *c*, thereby forcing the fingers 24 from their frictional contact with the plate 22 and releasing the paper. After dropping the sheet the nippers are again opened by means of a cam, *d*, engaging the arm *b*, and are again ready to receive and bring a fresh sheet of paper to the action of the platens and deposit said sheet in the manner previously described. While the above-described mechanism would be sufficient for the successful printing of sheets of the same size, yet some additional means must be provided for sheets of different sizes, as the onward movement of the nipper-frame must be checked in such position as would leave the sheet in or about the center of the platen. This could not be done in a satisfactory manner if the nipper-frame were permitted to stop at the position shown in Fig. 2, and the stops 26 could hardly be adjusted to meet the difficulty, because the continued revolution of the gear-

wheel L would strain or otherwise injure the arms 17 which carry the nipper-frame, as said gear-wheel L is operated by power derived from the driving-shaft 8.

I will now indicate the connection between the gear L and the driving-shaft. In addition to the pinion 7, the drive-shaft 8 carries a pinion, *e*, which meshes with a gear, *f*, on a shaft, *g*, the said shaft carrying on its opposite end a miter-gear, *h*, which engages and drives a similar gear, *i*, on the upper end of an inclined shaft, *m*. The lower end of said shaft has a gear, *n*, which communicates its power to a similar gear on the transverse shaft D, before described. This shaft also carries a gear, *p*, which drives a gear, *r*, on a short vertical shaft, *s*, and through the agency of gears *t* and *u* communicates power to a transverse shaft, J, on which is mounted a hand-wheel, K, and a spur-gear, K', the latter meshing with a similar gear, M, which in turn operates the gear L and nipper-frame, as before described. It is thus manifest the motion of the drive-shaft 8 is communicated directly to the arms which carry the nipper-frame, and therefore some means must be employed to adjust the position of said nipper frame with relation to the different sized sheets of paper to be printed. This latter object I accomplish as follows: On the shaft J is mounted a nut, J', which engages threads on said shaft, which is also provided with a fixed collar, J'', and a sliding sleeve, 27, having a notched face, which engages the notched face of a hub carried by gear *u*. It is now evident, if it be desired to "time" the machine to different sizes of sheets, the operator simply releases the clutch mechanism by turning the nut J', just described, and by turning the hand-wheel K he adjusts the gear K' with relation to the time of the distance sufficient to permit the nipper-frame to come into contact with its adjusted stop 26. I am thereby enabled to print sheets of different sizes by the simple adjustment of the hand-wheel.

Bolted to the frame at convenient points are lugs 28, to which are pivoted upwardly-extending arms 29, in the upper ends of which transverse rods 30 are mounted. These rods 30 carry arms 31, which are slotted, as shown in Fig. 11, and have a vertical adjustment with relation to the size of sheets to be printed. From this description it is manifest the oscillating movements of the platen-frame cause said frame to engage the arms 31, forcing said arms against the sheet and holding said sheet against the type until the return movement of the links G withdraws the platen from its contact with the type-form, the arms 31 being also immediately withdrawn to their normal position through the agency of springs 32, their return movement being limited by suitable adjustable stops, 33, secured to the side of the main frame.

In order that I may produce a machine that is superior to many of those used at the present time, I construct a mechanism whereby

the sheet after receiving its first impression is deposited upon a suitable frame and reversed, whereby the unprinted side of the paper is brought to the action of the second platen and the remaining side of the sheet printed. This feature is an important one in the art of printing, as much labor and time are saved, the sheet being printed on both sides during a single passage through the machine. I will now describe the mechanism whereby this important feature is obtained.

A transverse shaft, 34, is journaled in a stud, *w*, mounted in the swinging arms E, and is provided with a series of arms, 35, (see Figs. 4 and 5,) on which the sheet is deposited after it has received the first impression. On the end of the shaft 34 is mounted a gear, 36, which meshes with a similar gear, 37, mounted on a stud, 38, which in turn carries an arm, 39, and pawl-and-ratchet mechanism, the purpose of which will be hereinafter described. Projecting from the main frame A is a stud that carries a pin, 40, over which one end of a link, 41, is detachably secured. The opposite end of the link 41 is adjustably secured to the lower end of the arm 39, as shown in Figs. 1 and 2. From this description it is manifest if the link 41 be attached to the pin 40 the oscillating movements of the swinging arms in one direction will cause the gear-wheel 37 to revolve in the direction of the arrow. (See Fig. 2.) This movement of the gear 37 affects the gear 36 and causes the latter to move in a reverse direction; and inasmuch as the arms 35, which hold the paper after it has received its first impression, are rigidly secured to the shaft 34, on which the said gear 36 is similarly secured, it is manifest the said arms 35 will revolve and carry with them the printed sheet. During the revolution of said arms and sheet they come into contact with a second series of arms, 42, depending from a cross-rod, 43, the ends of which are in turn connected to arms 44, provided with elongated slots 45, through which passes the revolving shaft 34, before described. The lower ends of the arms 44 are also slotted and have secured thereon adjustable weights 46, as shown in Figs. 4 and 5.

Suitable stops, 47, adjustably secured to the arms 35 on opposite sides, are designed to receive the printed sheet, the said sheet lying between the stops 47 and suitably-arranged fingers 48, depending from a rod, 49, journaled in projections 50, the fingers 48 being curved and forming a guide for the lower projecting end of the sheet during the first movements of the reversing mechanism. After the paper has been deposited upon the inclined arms 35 by the action of the arm *b* and cam 51 the further movements of the swinging arms will cause the gears 36 and 37 to revolve, thereby carrying arms 35 and printed sheet upward until the said arms come in contact with the weighted arms 44 and move said arms around until, on the return movement of the swinging arms, their weighted ends come into engagement with a stop, 52, secured to the

frame, as shown in Fig. 1. The onward movement of the arms 44 causes the stop 52 to force the arms forward on the shaft 34, when the rod 43 is released from its contact with the arms 35 and is immediately returned to its normal position by the action of the counter-balance overcoming the weights of the arms. A double-faced cam, 53, on the shaft 34 is now engaged by a suitable pawl, 53', and the reversing mechanism is thereby locked until a new sheet has been deposited and the nippers have taken hold of the first sheet, (the edge of which projects slightly,) when the return movements of the swinging arms E and intermediate mechanism cause the reversing mechanism to again move forward, and in the manner previously described.

When the machine is to be used for printing but one side of the sheet, either with one or two impressions, the link 41 is released from the pin 40, and a lug, 54, pivoted to the swinging arms E is designed to hook over and hold in a locked position the double-faced cam 53. When these devices are used the arms 35 lie in a horizontal position beneath the platen-frame and may receive or guide the sheets after they have received their first impression. However, when both sides of the sheet are to be printed the lug 54 is released and rests against a stop-pin on the swinging arms, and the receiving and reversing of the printed sheet is accomplished automatically in the manner previously described.

In conjunction with the adjustable stops 26, which check the onward movements of the paper-carrying devices, I employ chases P, substantially as shown in Fig. 10, wherein the chase is illustrated as having a plate, R, extending from its lower end, the said plate resting against the type-bed in such manner that the nipper-frame is permitted to come at rest beneath the main or type-receiving portion of the chase and nearer the center of the platen, as shown in Fig. 2. I am thereby enabled to print upon one press different sized sheets and at the same time so adjust the paper-carrying devices that they will be temporarily stopped at the desired point the moment the type-form and platen come together.

The operation of my machine is essentially as follows: The nipper-frame being engaged by the cam *d* is in condition to receive the edge of the sheet, which it takes and carries down over the face of one of the platens and until the said nipper-frame comes in contact with its stops 26. This movement arrests temporarily the progress of the paper-carrying devices and keeps them in a position to enable the platen to come squarely against the sheet, the arms 31 in the meantime being forced against the paper by the action of the platen-frame. As soon as the impression is taken the swinging arms withdraw the platen and the paper-carrying devices again move forward until they come in contact with a stop, *b'*, at the upper portion of the opposite platen, when the same movements of the several de-

vices above named permits a second impression to be made on the same side of the paper, after which the paper is dropped upon the table *a*. This is the operation of the device when the paper-reversing mechanism is not used; but when the latter is brought into play the sheet after its first impression is deposited upon the lower portion of the arms 35 by the action of the arm *b* and cam 51. At the same time this is done the nippers take hold of a sheet which had been previously laid upon the arms with the edge projecting slightly beyond the same, and now occupies the upper portion of said arms, and carry said sheet to receive the action of the second platen, after which it deposits said sheet on the table *a*, receives a fresh sheet, carries it until it has been laid upon the arms 35, then takes hold of the previous sheet, which in the meantime has been reversed, and after subjecting it to the action of the second platen finally deposits it in the manner before described.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a printing-press, a duplex platen mounted in an oscillating frame and adapted to print in each direction of the frame's oscillation, substantially as herein described.

2. A printing-press having an oscillating duplex platen, in combination with a main frame provided with a duplex type-bed engaged by said platen during each of its oscillations, substantially as herein described.

3. In a printing-press, the frame *A*, provided with duplex type-bed, in combination with oscillating arms *E*, pivoted to the frame, a platen-frame having a duplex platen, and mechanism connected with the drive-shaft for oscillating the arms and frame, substantially as and for the purpose described.

4. In a printing-press, the frame *A* and the arms *E*, in combination with a platen on opposite sides of said arms, pinions on the main drive-shaft, gears engaging the pinions, and the links connecting the swinging arms with the gears, substantially as herein described.

5. In a printing-press, a rotating gripper mounted on an oscillating platen-frame and adapted to automatically receive and carry the sheets to receive two impressions during one revolution, substantially as described.

6. In a printing-press, an automatically-operating paper-carrying gripper mounted on an oscillating platen-frame and adapted to deposit the sheet at the completion of each semi-revolution, substantially as herein described.

7. In a printing-press, an automatically-operating paper-carrying gripper mounted on an oscillating platen-frame and adapted to receive in turn two separate sheets and subject said sheets to the action of a duplex platen during one revolution of said gripper, substantially as herein described.

8. In a printing-press, a revolving paper-carrying gripper adapted to an adjustment to allow the nipper to come into different posi-

tion on the platen, substantially as and for the purpose herein described.

9. In a printing-press, a duplex oscillating platen-frame having cams thereon, in combination with a paper-carrying device adapted to engage the cams, substantially as and for the purpose described.

10. In a printing-press, a platen-frame having cams adjustably secured thereon, in combination with a paper-carrying device adapted to engage the cams and automatically receive and deposit the sheets, substantially as herein described.

11. In a printing-press, a platen-carrying frame having hubs formed thereon, in combination with loosely-mounted arms 17, a spring-actuated arm, 18, a transverse shaft, 23, having arms *b*, suitable nippers for receiving the sheets, and adjustable cams on the platen-carrying frame, with which the arms *b* engage to automatically take hold and release the sheets, substantially as described.

12. In a printing-press, the combination of a platen-carrying frame, the arms 17, loosely mounted thereon, spring-actuated rods 18, mounted in the arms 17, a shaft, 23, carrying the fingers 24, a plate, 22, between which and the fingers 24 the edge of the paper is held, suitable springs on the shaft, and the arms *b*, adapted to engage cams on the platen-carrying frame, substantially as and for the purpose described.

13. In a printing-press, a main frame and the swinging arms mounted thereon, in combination with the ink-roller frames *C* and rollers 4, the connecting-rods 14, attached to the short arm 15 of the frame *C*, and the pins 13, secured to projections 12 on the upper end of the swinging frames, substantially as herein described.

14. In a printing-press, an automatically-revolving sheet-reversing frame, in combination with an oscillating platen-frame, substantially as herein described.

15. A printing-press having an oscillating frame, in combination with an intermittently operating and revolving sheet-reversing frame carried by said oscillating frame, substantially as herein described.

16. In a printing-press, an oscillating platen-frame, in combination with a paper-reversing frame, substantially as herein described.

17. A duplex platen, in combination with an automatically-operating paper-reversing frame, substantially as herein described.

18. In a printing-press, a swinging frame, in combination with a paper-reversing frame automatically operated by the movements of said swinging frame, substantially as herein described.

19. In a printing-press, a paper-reversing frame and mechanism comprising the link 41, cam 53, and lug 54, for disconnecting the reversing-frame, whereby the latter is not affected by the future movements of the machine, substantially as described.

20. In a printing-press, a paper-reversing

mechanism comprising a paper-receiving frame and a counterbalanced frame adapted to be automatically released and returned to its normal position when the sheet has been reversed, substantially as described.

21. In a printing-press, an automatically-revolving sheet-receiving frame, in combination with a counterbalanced frame engaging and adapted to be automatically released from contact with the sheet-reversing frame, substantially as and for the purpose herein described.

22. In a printing-press, the main frame and the arms E journaled thereon, in combination with mechanism for oscillating the arms, the gears 36 and 37, an arm, 39, and a link, 41, detachably secured to the frame, whereby the movements of the swinging arms actuate the gears 36 and 37 and reverse the sheet, substantially as herein described.

23. In a printing-press, a paper-reversing mechanism comprising the swinging frame E, a link connecting this frame with the main frame, an arm, 39, gears 36 and 37, a shaft, 34, having arms 35, and a suitable counterbalanced frame adapted to be automatically disconnected from the arms 35 and returned to its normal position, substantially as herein described.

24. In a printing-press, the shaft 34, provided with arms 35, and the means, substantially as described, for rotating said shaft, in combination with the counterbalanced arms 44, having an elongated slot, 45, the rod 43, connecting the arms 44, fingers 42, depending from the rod, and a stop, 52, for releasing said weighted arms, substantially as herein described.

25. In a printing-press, a sheet-reversing frame, in combination with a double-faced cam, 53, and a dog, 54, for locking the reversing-frame in a horizontal position, and forming a guide or table for the sheets, substantially as and for the purpose set forth.

26. In a printing-press, the shaft 34, and means, substantially as described, for rotating the same, in combination with arms 35, adjustable stops 47 on said arms, the slotted arms 44, the adjustable weights 46, and the stop 52 for tripping the counterbalanced frame, substantially as herein described.

27. In a printing-press, a mechanism comprising a revolving frame for reversing the sheet, in combination with curved guide-fingers 48, between which and suitable adjustable stops on the reversing-frame the sheets are held, substantially as herein described.

28. In a printing-press, a sheet-reversing mechanism comprising a paper-receiving frame, a counterbalanced frame engaged by said receiving-frame, the gears 36 and 37, actuated by the movements of the oscillating arms E to revolve said frames, and a locking-cam, 53, substantially as and for the purpose set forth.

29. In a printing-press, a sheet-revolving mechanism having adjustable stops 47 secured thereon, in combination with an arm, 50, a transverse rod, 49, and suitable curved fingers against which the lower edge of the sheet rests and is guided, substantially as herein described.

30. In a printing-press, a mechanism for regulating the movement of the paper-carrying devices, comprising a clutch mechanism, substantially as described, suitable gearing, as described, operated by the main shaft for driving the said paper-carrying devices, a hand-wheel for changing the time of the machine with relation to the size of sheet to be printed, and adjustable stops 26, for temporarily arresting the movements of the paper-carrying devices, substantially as herein described.

31. In a printing-press, a mechanism, substantially as described, for regulating the movement of the paper-carrying devices, in combination with adjustable stops for temporarily arresting the movements of said devices, substantially as described.

32. In a printing-press, the main frame provided with suitable beds, in combination with a chase having an extension, the paper-carrying devices, substantially as described, mechanism, substantially as set forth, for regulating the progress of said paper-carrying devices with relation to the size of sheet, and adjustable stops for arresting the movements of said devices, substantially as herein described.

33. In a printing-press, the main drive-shaft, the pinion e, secured thereon, the spur-gear f, shafts m and s, and intermediate miter-gears, the spur-gears K', L, and M, a clutch mechanism between the spur-gears and miter-gears, and a hand-wheel whereby the time of the paper-carrying devices may be varied, substantially as described.

34. A chase for printing-presses, provided with a thin extension at its lower portion, substantially as and for the purpose set forth.

35. In a printing-press, the intermittently-operating paper-carrying grippers, in combination with a chase having a thin extension at its lower portion, substantially as and for the purpose herein described.

36. In a printing-press, a platen-frame having a duplex platen and the cams N, having the adjustable cams secured thereto, in combination with a paper-carrying gripper traveling around said cams on the platen-frame and automatically operated by the adjustable cams, substantially as herein described.

OLIVER B. REYNOLDS.

Witnesses:

H. B. APPLEWHITE,
DANIEL CLARK.