

No. 637,591.

Patented Nov. 21, 1899.

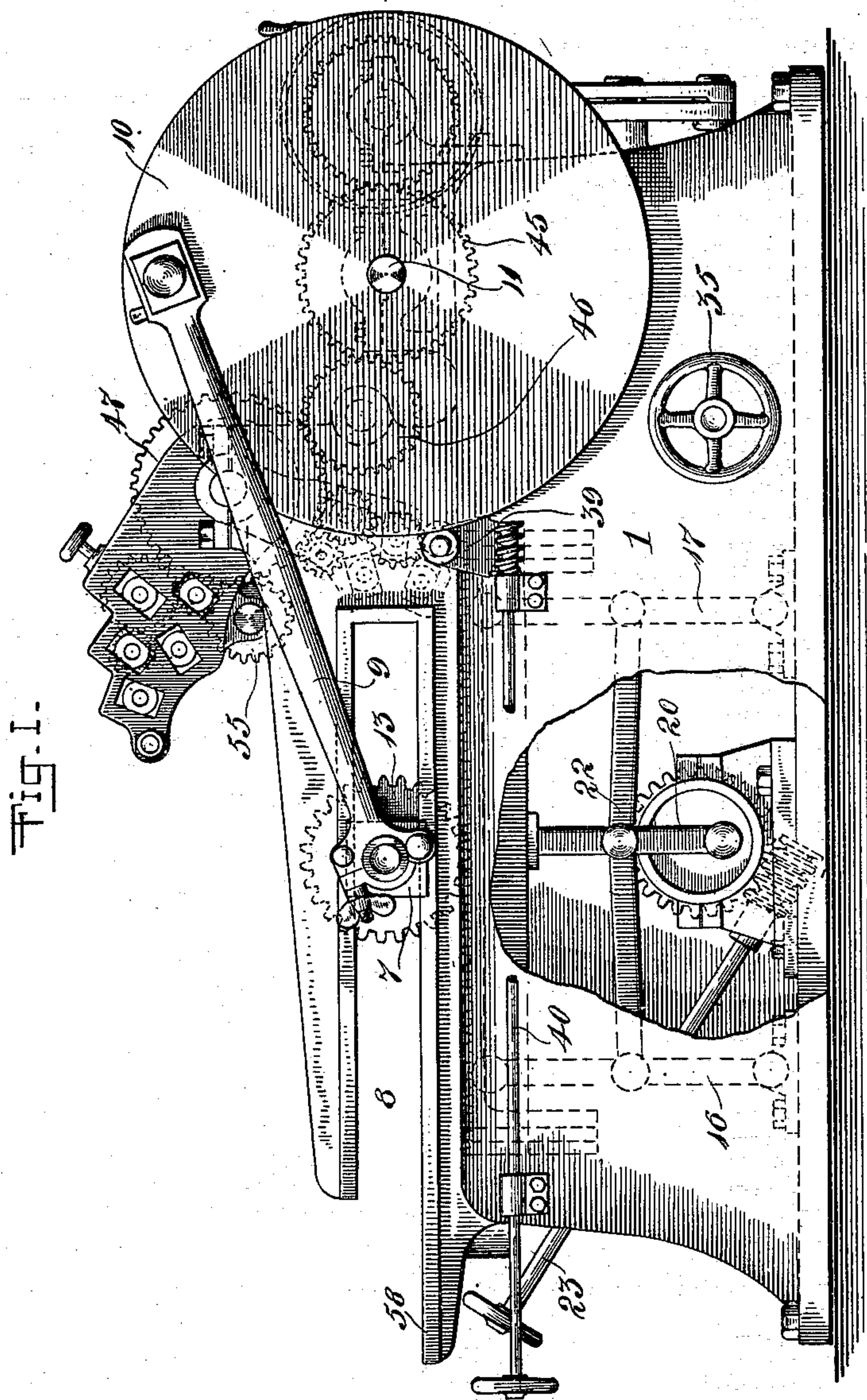
E. HETT.

MACHINE FOR MAKING PRINTING SURFACES.

(Application filed Jan. 5, 1899.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES:

*Georg D. Hoff*  
*Sidney Mann.*

INVENTOR

*Edward Hett*

BY

*Kennyon & Kennyon*  
ATTORNEYS

No. 637,591.

Patented Nov. 21, 1899.

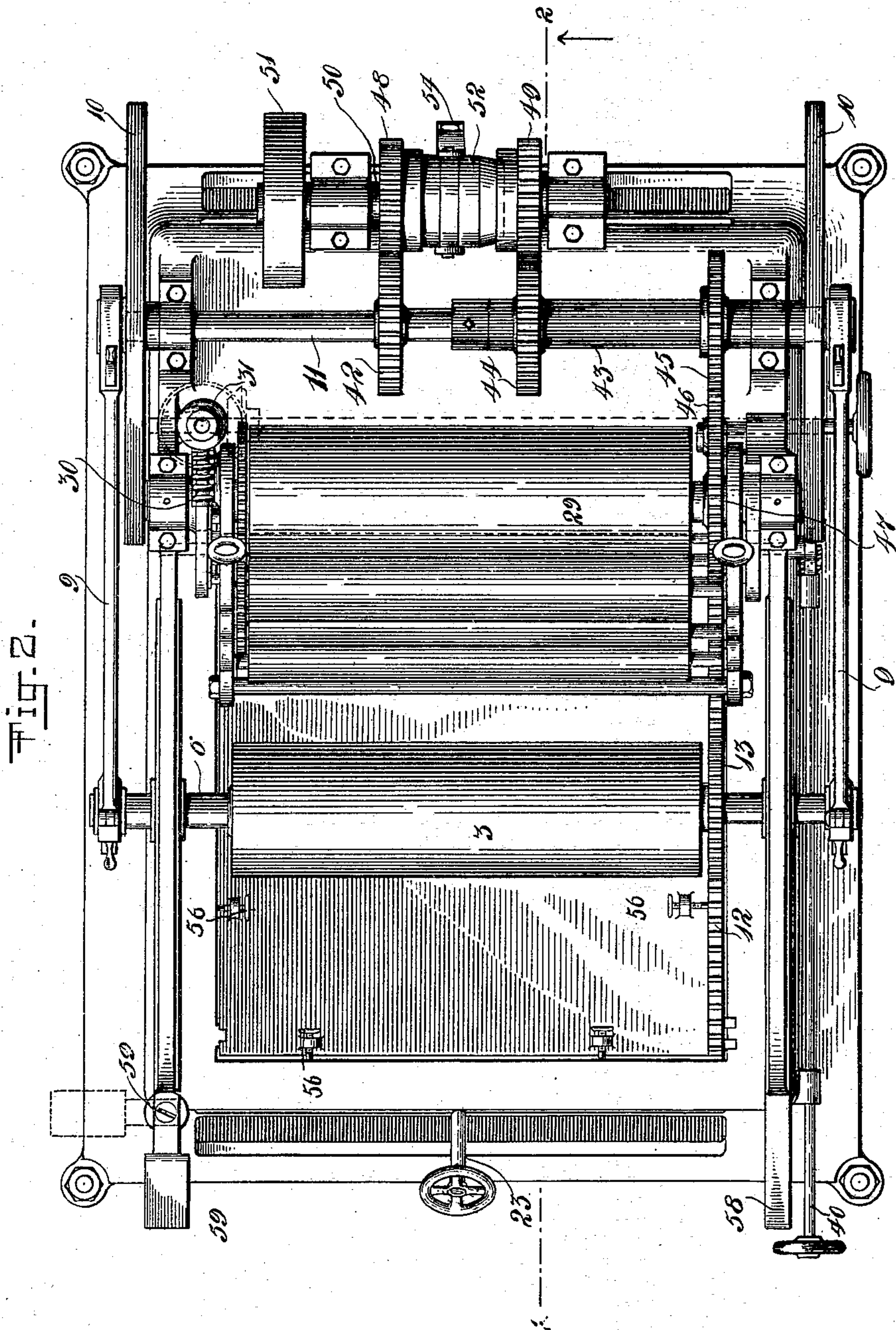
E. HETT.

MACHINE FOR MAKING PRINTING SURFACES.

(Application filed Jan. 5, 1899.)

(No Model.)

4 Sheets—Sheet 2.



WITNESSES:

*Georgie J. J. J.*  
Sidney Mann.

INVENTOR

Edward Hett

BY

*Kerrym & Kerrym*  
ATTORNEYS



No. 637,591.

Patented Nov. 21, 1899.

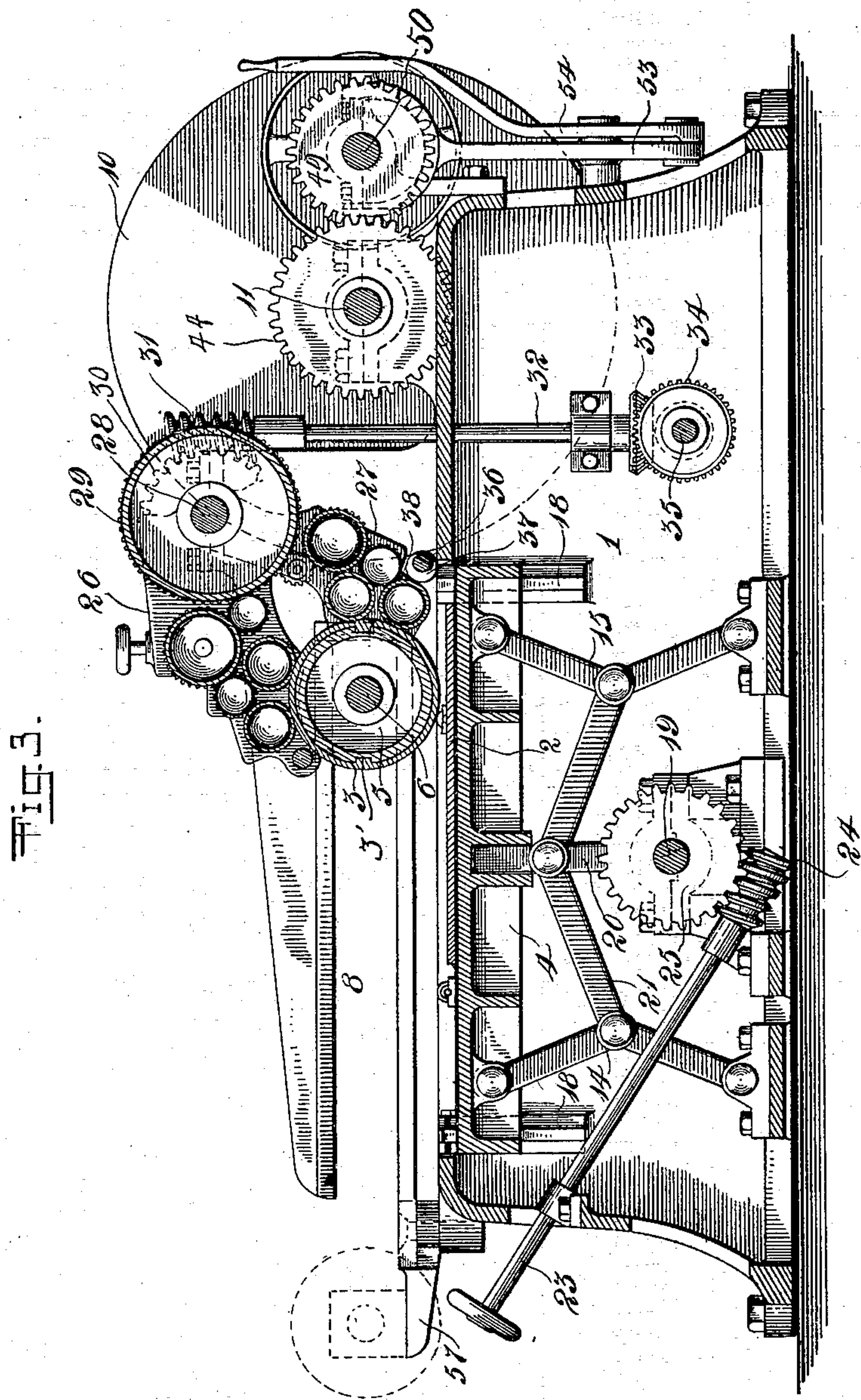
E. HETT.

MACHINE FOR MAKING PRINTING SURFACES.

(Application filed Jan. 5, 1899.)

(No Model.)

4 Sheets—Sheet 3.



WITNESSES:

*Geoffrey H. Hett*  
*Sidney Mann*

INVENTOR

*Edward Hett*

BY

*Kerrison & Kerrison*  
ATTORNEYS

No. 637,591.

Patented Nov. 21, 1899.

E. HETT.

MACHINE FOR MAKING PRINTING SURFACES.

(Application filed Jan. 5, 1899.)

(No Model.)

4 Sheets—Sheet 4.

Fig. 4.

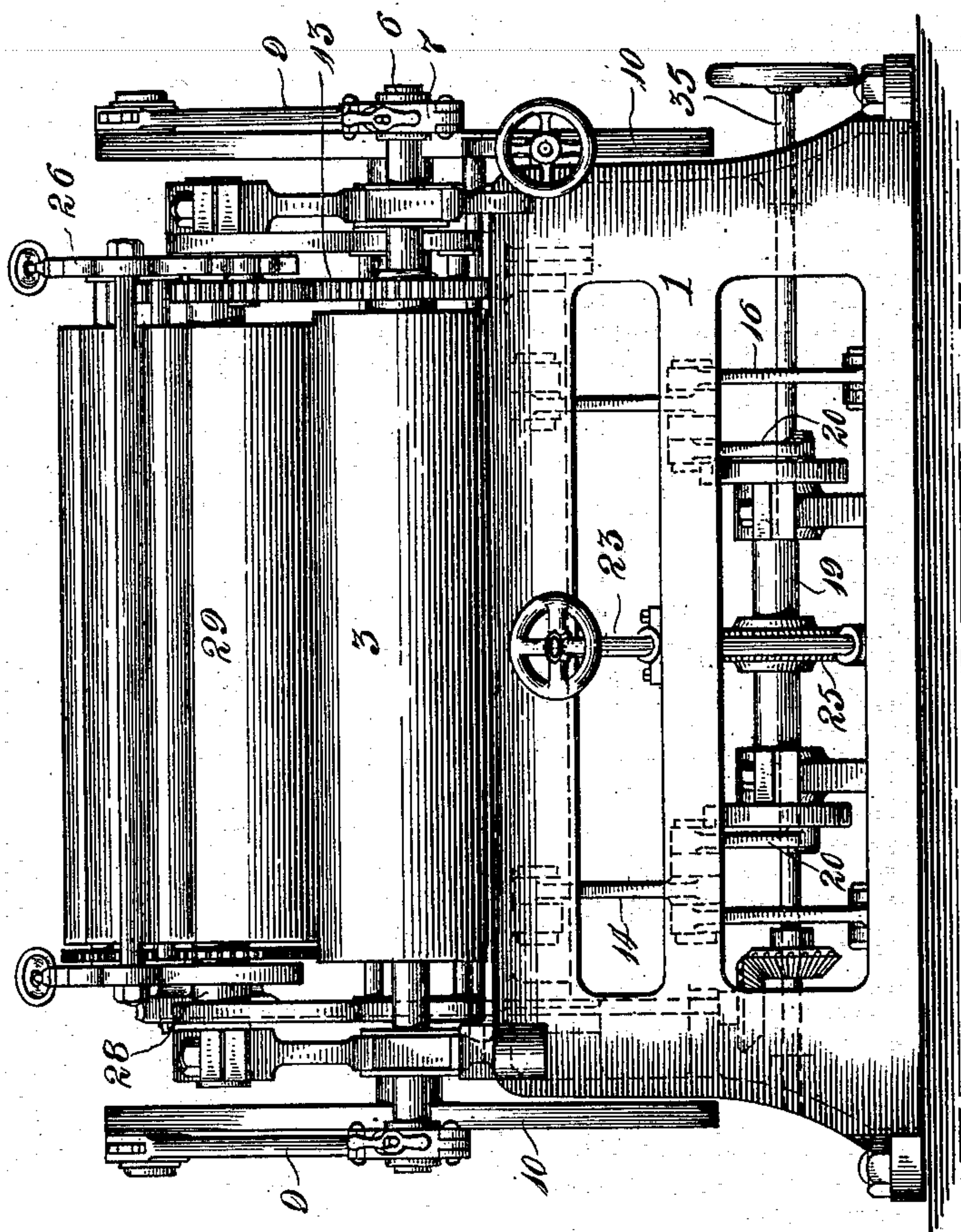
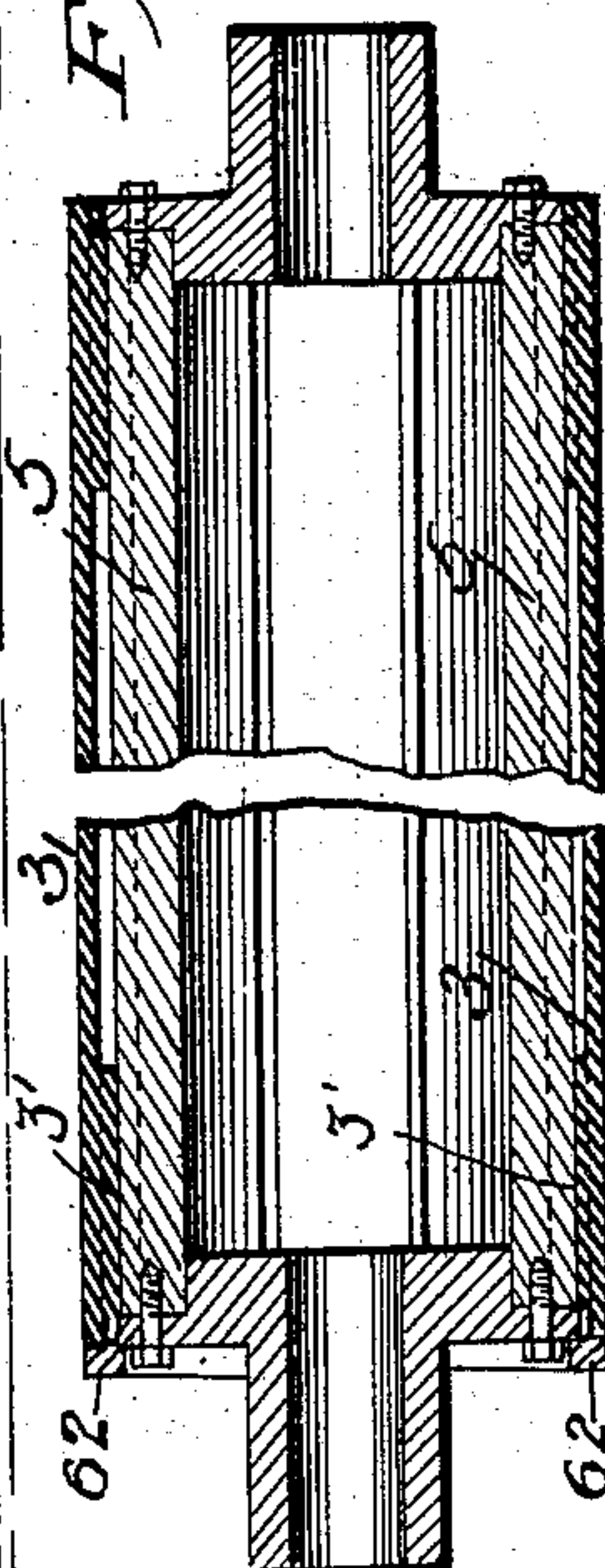


Fig. 5.



WITNESSES:

*Sidney Mann*  
Sidney Mann.

INVENTOR

*Edward Hett*  
Edward Hett

BY

*Kennyon & Kennyon*  
Kennyon & Kennyon  
ATTORNEY ✓



# UNITED STATES PATENT OFFICE.

EDWARD HETT, OF NEW YORK, N. Y.

## MACHINE FOR MAKING PRINTING-SURFACES.

SPECIFICATION forming part of Letters Patent No. 637,591, dated November 21, 1898

Application filed January 5, 1899. Serial No. 701,197. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD HETT, a citizen of the United States, residing at New York, (New Dorp,) in the county of Richmond, State of New York, have invented certain new and useful Improvements in Machines for Making Printing-Surfaces, of which the following is a specification.

This invention relates to machines for making printing-surfaces whereby a design may be turned over, transferred, or otherwise imparted from a setting-up plate, transfer-plate, or other transfer-base upon or to a printing-form adapted to be thereafter developed into a printing-surface. It is based upon the principle of rolling contact in the transferring and upon the principle of transferring by bringing a basic surface or a transfer-base and a printing-form together in accurate predetermined coöperating relation both longitudinally and transversely with reference to guides, all for the purpose and as fully set forth in a pending application filed by me on January 23, 1899, Serial No. 703,082.

The present invention consists in a transfer-base preferably carried on a support and removable therefrom and a printing-form preferably carried on a support and removable therefrom one being curved and arranged to rotate and reciprocate over the other in connection with guiding means whereby the basic surface and printing-form are brought together in accurate predetermined coöperating relation both longitudinally and transversely for the purpose of locating the design on the printing-form in an exact predetermined position and especially with reference to register in printing. By this arrangement I am enabled to quickly and accurately and with reference to register turn over the transfers or otherwise impart the designs of the transfer-base upon or to the printing-surface.

It also consists of a suitable non-expansible and non-contractible basic surface having a design adapted to be imparted by contact and operating in conjunction with the printing-form, one of said bodies rolling and reciprocating over the other.

The invention also consists of certain features and combinations of features whereby

a complete transfer and rolling up or developing machine is provided.

It further consists of the various features and combinations of features hereinafter set forth, and particularly specified in the claims.

In the drawings I have shown the features and combinations of features constituting the invention as embodied in a complete machine adapted to turn over or impart transfers from a setting-up plate upon a printing-surface and to then roll up or develop such surface to make it suitable for printing.

In the several figures of the drawings which form a part of this specification and in which like characters of reference designate corresponding parts, Figure 1 is a side elevation of a machine embodying various features of my invention. Fig. 2 is a plan view of said machine, and Fig. 4 is a front elevation of the same. Fig. 3 is a sectional elevation of said machine on the line 2 2 of Fig. 2. Fig. 5 is a longitudinal section showing a printing-form seated on its support.

Referring now more particularly to the various features and combinations of features comprising this invention as illustrated in the accompanying drawings, 1 is the frame of the machine.

2 is a setting-up plate, and 3 is a printing-form. The printing-form and setting-up plate are arranged to be brought together in firm rolling contact, and for this purpose either the setting-up plate or the printing-form is made to rotate and reciprocate over the other. In this way the design of the transfer-base may be imparted to the printing-form. The surface of the setting-up plate is non-expansible and non-contractible, and the design is so affixed thereto that it is non-expansible and non-contractible thereon, in accordance with the well-known and ordinary practice in the lithographic art. In the present embodiment of the invention the setting-up plate is supported upon a horizontal bed 4, and the printing-form is curved and preferably made cylindrical and continuous, as shown, so as to rotate and reciprocate over the setting-up plate. The printing-form is generally carried upon a support comprising a drum 5, carried on a shaft 6. For the purpose of reciprocating the printing-form the



ends of the shaft 6 are journaled in boxes 7, arranged to slide in the ways 8, formed in the frame of the machine above and parallel with the setting-up plate. The boxes 7 are connected with crank-arms 9, actuated by wheels 10, mounted on the ends of shaft 11. In order that the printing-form may not slip as it reciprocates over the setting-up plate, I provide suitable means for positively rotating the printing-form at this time. The means efficient for this purpose and preferably employed consist of the rack 12, carried by the bed 4, and the gear-wheel 13, mounted on the shaft 6 and adapted to mesh with the rack. The rack and gear may, however, be dispensed with, the printing-form being made to roll in any suitable manner on the transfer-base while the one or the other of these bodies reciprocates.

For the purpose of applying sufficient pressure to the rolling contact of the printing-form and setting-up plate the bed 4, and thereby the setting-up plate, is made movable to and from the printing-form. Various means may be employed for moving the bed 4; but I preferably employ toggles for this purpose, and I have constructed a novel arrangement of toggles for the purpose referred to. In this arrangement of toggles there are four toggles 14, 15, 16, and 17, pivoted at their upper ends to the corners of the bed and at their lower ends to the frame of the machine. By simultaneously bending the toggles at their middle joints the bed is moved up and down, being guided in this movement by suitable means—such, for example, as the flanges 18—fixed to the frame of the machine and fitting corresponding grooves in the corners of the bed. The shaft 19 actuates the four toggles through the arms 20, pivoted to cranks carried by the shaft and pivotally connected to two secondary toggles 21 and 22, the former of which is pivotally connected at its ends to the pairs of toggles 14 and 15 and the latter of which is pivotally connected at its ends to the pairs of toggle-levers 16 and 17. The shaft 19 is preferably actuated by a hand-shaft 23, carrying a worm 24, which meshes with a worm-wheel 25, fast on the shaft 19. Thus it will be seen that the bed 4 may be moved to and from the printing-form by the operation of the hand-shaft 23 and that the requisite pressure may be applied to the contact of the setting-up plate and the printing-form.

For inking and dampening the printing-form 3 ink and water frames 26 and 27, respectively, are provided, carrying the usual ink and water rollers. The frame 26 is fixed on the shaft 28, on which is loosely carried the main ink-distributing cylinder 29. The frame 26 on one side is provided with teeth 30, which mesh with the worm 31 on the shaft 32. Fixed on the shaft 32 is a gear 33, meshing with gear 34 of the hand-shaft 35. By operating the hand-shaft 35 the inking-frame 26 may be moved to and from the printing-

form 3. The dampening-frame 27 is mounted loosely on the shaft 28 and is moved to and from the printing-form 3 by the shaft 36, carrying the eccentric 37, which works in recess 38 in the frame. Fixed on the shaft 36 is a gear 39, meshing with a worm on the hand-shaft 40. By operating the hand-shaft 40 the dampening-frame is moved to and from the printing-form. On the main shaft 11 is the fixed gear 42 and the loose sleeve 43, carrying the gears 44 and 45. The gear 45 meshes with the idle gear 46, which in turn meshes with the gear 47, fixed on the sleeve of the cylinder 29. The gears 42 and 44 mesh with the gears 48 and 49, loose on the pulley-shaft 50. 51 is the driving-pulley. On the pulley-shaft is a clutch 52, operated by the levers 53 and 54 and adapted to lock the wheel 48 or the wheel 49 on the pulley-shaft. On the inking-frame 26 is an idle wheel 55, meshing with the gear 47 and adapted to mesh with the gear 13 on the drum 5 when the frame is lowered, so as to bring its inking-rollers in contact with the printing-form.

When the gear 48 is locked on the pulley-shaft and power is applied, the shaft 11 is driven and with it the arms 9, thus carrying the cylinder 5 back and forth over the setting-up plate, so that the printing-form may have imparted to it the design of the setting-up plate. The bed 4 is then lowered by operating the hand-shaft 23, so that the printing-form and setting-up plate are out of contact and their gears out of mesh. In rolling up or developing the printing-forms the inking and dampening rollers are brought into contact with the printing-forms by the means described and the printing-form is driven, in conjunction with the inking and dampening rollers, through the gear 49, made fast on the shaft by clutch 52, the gear 44, gears 45, 46, and 47, and cylinder 29, with which the inking and dampening rollers of the inking and dampening frames are geared in the usual manner, as shown.

The printing-form 3 is preferably shell-like and made of metal and continuous in the form of a tube, as shown in the drawings. The printing-form may be developed so as to be planographic, relief, intaglio, or other form of printing-surface, and light or deep etching and routing out or other suitable process may be employed in developing the printing-form. The removable printing-form and others which are intended to be successively mounted in the machine are provided with devices to insure that they shall always be mounted in identically the same place on the support 5. The longitudinal position of the printing-form 3 in its support is determined by the shoulder or stop 62, formed on one end of the form-support 5, against which the printing-form 3 accurately fits. The transverse or circumferential position of the printing-form is determined by the ribs 31, which slide in corresponding grooves in the support—a marked rib in a marked groove. This arrange-



ment of the printing-form and its support is substantially the same as that shown and described in my pending application, Serial No. 537,582, filed February 7, 1895. The support 4 is provided with devices to insure that the setting-up plate or successive setting-up plates shall always be mounted in identically the same place. In the drawings these devices comprise abutments 56, fixed on the support 4 and between which the setting-up plate is firmly fixed. The intermeshing gears for the transfer-base and printing-form are so marked as to insure that they shall always be intermeshed in identically the same way. These marked teeth constitute guides with reference to which the transfer-base and printing-form mounted in the machine may be brought together in accurate predetermined coöperating relation both longitudinally and transversely; but other means for this purpose may be employed. By this arrangement duplicate identical and interchangeable printing-surfaces may be readily made, having their design identically placed thereon, and accuracy of register may be obtained in the process of making printing-surfaces.

The main frame forming the lower side of the ways 8 is provided with extensions 57 and 58, the extension 57 being pivoted at 59 or otherwise made movable, so that it can be moved out of the way when the cylindrical printing-form is removed from its support. In removing a printing-form from the support 5 the shaft 6 is disconnected from the arm 7 and is moved out upon the extensions 57 and 58, together with the cylinder 5 and printing-form. The printing-form is then slipped off of its support, the extension 57 being moved out of the way to permit this to be done, and the shaft thus being supported by some suitable means which will not interfere with the withdrawal of the printing-form. I generally employ the apparatus shown in application filed by me June 13, 1895, Serial No. 552,641, renewed July 12, 1898, Serial No. 685,764. The method of mounting a printing-tube on the support 5 is substantially the reverse of the method of withdrawing it.

Various changes in the form and arrangement of parts which will be readily understood by any one skilled in the art, may be made without departing from the scope of my invention. For example, the inking and dampening frame may be omitted and the development of the printing-form takes place apart from the machine herein shown and described. Moreover, either the setting-up plate or the printing-form may be curved or cylindrical and rotate and reciprocate the one over the other. For this purpose the printing-form may be flat and be supported on the bed 4 and the setting-up plate may be curved or cylindrical and supported on the cylinder 5.

The transfer-base may be made of any suitable material and may be made to carry the

designs to be imparted to the printing-surface in any suitable way, but preferably removable transfer-sheets bearing the designs and adapted to be turned over upon the printing-form will be stuck up on the transfer-base, which is non-expandible and non-contractible. The printing-form is preferably planographic when it receives the design, but may be developed into a printing-surface of any character desired whether planographic, relief, intaglio, &c.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for making printing-surfaces, the combination of a suitable non-expandible and non-contractible transfer-base having a design fixed thereto so that the design is rendered non-expandible and non-contractible with a curved rotating reciprocating planographic-printing form adapted to be developed into a printing-surface of the character desired; arranged to be brought together in firm rolling contact whereby a planographic impression of the design of the transfer-base may be imparted to the printing-form.

2. In a machine for making printing-surfaces, the combination of a suitable non-expandible and non-contractible transfer-base having a design fixed thereto so that the design is rendered non-expandible and non-contractible, with a cylindrical rotating reciprocating planographic-printing form adapted to be developed into a printing-surface of the character desired; arranged to be brought together in firm rolling contact whereby a planographic impression of the design of the transfer-base may be imparted to the printing-form.

3. In a machine for making printing-surfaces, the combination of a transfer-base, with a curved rotating reciprocating form, arranged to be brought together in firm rolling contact whereby the design of the transfer-base may be imparted to the printing-form, and inking and water rollers for rolling up or developing said printing-form.

4. In a machine for making printing-surfaces, the combination of a suitable non-expandible and non-contractible transfer-base having a design fixed thereto so that the design is rendered non-expandible and non-contractible, with a curved rotating reciprocating planographic-printing form adapted to be developed into a printing-surface of the character desired and carried in bearings, said bodies being arranged to be brought together in firm rolling contact whereby a planographic impression of the design of the transfer-base may be imparted to the printing-form, and means for applying pressure to said contact.

5. In a machine for making printing-surfaces, the combination of a suitable non-expandible and non-contractible transfer-base having a transfer-sheet bearing a design fixed thereto so that the design is rendered non-expandible and non-contractible, with a



curved rotating reciprocating printing-form carried in bearings, said bodies being arranged to be brought together in firm rolling contact whereby a transfer-sheet may be

5 turned over from the transfer-base upon the printing-form, and means for moving the transfer-base to and from the printing-form and thereby applying pressure to said contact as desired.

10 6. In a machine for making printing-surfaces, the combination of a non-expansible and non-contractible transfer-base having a design fixed thereto so that the design is non-expansible and non-contractible, with a

15 curved rotating reciprocating planographic-printing form adapted to be developed into a printing-surface of the character desired, said bodies being arranged to be brought together in firm rolling contact whereby a planographic impression of the design of the transfer-base may be imparted to the printing-form, bearings for the printing-form, and slides in which the bearings reciprocate.

20 7. In a machine for making printing-surfaces, the combination of a non-expansible and non-contractible transfer-base having a design fixed thereto so that the design is non-expansible and non-contractible, with a

25 curved rotating reciprocating planographic-printing form adapted to be developed into a printing-surface of the character desired, said bodies being arranged to be brought together in firm rolling contact whereby a transfer may be turned over from the transfer-

30 base upon the printing-form, bearings for the printing-form and slides in which the bearings reciprocate, and means for moving the transfer-base to and from the printing-form and thereby applying pressure to said contact as desired.

35 8. In a machine for making printing-surfaces, the combination of a suitable non-expansible and non-contractible transfer-base having a design fixed thereto so that the design is rendered non-expansible and non-contractible with a planographic-printing form adapted to be developed into a printing-surface of the character desired, one of which

40 bodies is constituted to reciprocate and rotate in firm rolling contact over the other whereby a planographic impression of the design of the transfer-base may be imparted to the printing-form.

45 9. In a machine for making printing-surfaces, the combination of a support for a transfer-base, with a support for a printing-form, one of which is constructed to rotate and reciprocate in bearings over the other so as to bring the transfer-base and printing-form together in firm rolling contact, and a removable and replaceable transfer-base and a removable and replaceable tubular printing-form carried by their respective supports.

50 10. In a machine for making printing-surfaces, the combination of a support for a transfer-base, with a support for a printing-surface, one of which is constructed to rotate

and reciprocate over the other so as to bring the transfer-base and printing-form together in firm rolling contact, and a suitable non-expansible and non-contractible transfer-base having a design fixed thereto so that the design is rendered non-expansible and non-contractible and a planographic-printing form adapted to be developed into a printing-surface of the character desired, said bodies being carried by their respective supports and removable therefrom.

70 11. In a machine for making printing-surfaces, the combination of a support for a transfer-base, with a support for a printing-form, one of which is constructed to rotate and reciprocate over the other so as to bring the transfer-base and printing-form together in firm rolling contact, and a transfer-base and a printing-form carried by their respective supports, and inking and water rollers for rolling up or developing the printing-form.

80 12. In a machine for making printing-surfaces, the combination of a support for a transfer-base, with a support for a printing-form, one of which is constructed to rotate and reciprocate over the other so as to bring the transfer-base and printing-form together in firm rolling contact, and a suitable non-expansible and non-contractible transfer-base having a design fixed thereto so that the design is rendered non-expansible and non-contractible and a removable tubular printing-surface carried by their respective supports.

85 13. In a machine for making printing-surfaces, the combination of a support for a transfer-base, with a support for a printing-form, one of which is constructed to rotate and reciprocate over the other so as to bring the transfer-base and printing-form together in firm rolling contact, and a transfer-base, and a printing-form carried by their respective supports, guiding means with reference to which the transfer-base and printing-form may be brought into accurate predetermined coöperating relation both longitudinally and transversely whereby accuracy of register may be attained in the operation of transferring.

90 14. In a machine for making printing-surfaces, the combination of a transfer-base with a shell-like rotating reciprocating printing-form, arranged to be brought together in firm rolling contact whereby the design of the transfer-base may be imparted to the printing-surface, guiding means with reference to which the transfer-base and printing-form may be brought into accurate predetermined coöperating relation both longitudinally and transversely, and means for moving the transfer-base to and from the printing-form to apply pressure to said contact.

95 15. In a machine for making printing-surfaces, the combination of a transfer-base, with a tubular rotating reciprocating printing-form, arranged to be brought together in firm rolling contact and guiding means with reference to which the transfer-base and



printing-form may be brought into accurate predetermined cooperating relation both longitudinally and transversely whereby a transfer may be turned over from the transfer-base upon the printing-form, and means for applying pressure to said contact.

16. In a machine for making printing-surfaces, the combination of a suitable non-expansible and non-contractible transfer-base having a design fixed thereto so that the design is rendered non-expansible and non-contractible, with a cylindrical rotating reciprocating printing-form, arranged to be brought together in firm rolling contact whereby a transfer may be turned over from the transfer-base upon the printing-form, and guiding means with reference to which the transfer-base and printing-form may be brought into accurate predetermined cooperating relation both longitudinally and transversely and means for moving the transfer-base to and from the printing-form and thereby applying pressure to said contact as desired.

17. In a machine for making printing-surfaces, the combination of a transfer-base, with a continuous cylindrical tubular rotating reciprocating printing-form, arranged to be brought together in firm rolling contact whereby the design of the transfer-base may be imparted to the printing-form, and means for positively rotating the printing-form when in contact with the transfer-base.

18. In a machine for making printing-surfaces, the combination of a transfer-base with a cylindrical rotating reciprocating printing-form, arranged to be brought together in firm rolling contact whereby a transfer may be turned over from the transfer-base upon the printing-form, inking and water rollers for rolling up or developing the printing-form, and means for positively rotating the printing-form when in contact with the transfer-base and when in contact with said rollers.

19. In a machine for making printing-surfaces, the combination of a transfer-base with a curved rotating reciprocating printing-form arranged to be brought together in firm rolling contact whereby the design of the transfer-base may be imparted to the printing-form, and inking and water rollers for rolling up or developing said printing-form, and means for moving the transfer-base to and from the printing-form and thereby applying pressure to said contact as desired.

20. In a machine for making printing-surfaces, the combination of a transfer-base, with a curved rotating reciprocating printing-form arranged to be brought together in firm rolling contact, whereby a transfer may be turned over from the transfer-base upon the printing-form, and means for moving the transfer-base to and from the printing-form and thereby applying pressure to said contact as desired, preestablished guides with reference to which the transfer-base and printing-form may be brought into accurate predetermined cooperating

rotation both longitudinally and transversely and means for positively rotating the printing-form when in contact with the transfer-base.

21. In a machine for making printing-surfaces, the combination of a support for a transfer-base, with a support for a printing-form, one of which is constructed to rotate and reciprocate over the other so as to bring the transfer-base and printing-form together in firm rolling contact, and a transfer-base and a curved, shell-like printing-form carried by their respective supports and removable therefrom.

22. In a machine for making printing-surfaces, the combination of a support for a transfer-base, with a support for a printing-form, one of which is constructed to rotate and reciprocate over the other so as to bring the transfer-base and printing-form together in firm rolling contact, and a suitable non-expansible and non-contractible transfer-base having a design fixed thereto so that the design is rendered non-expansible and non-contractible and a curved, shell-like printing-form carried by their respective supports, and guiding means with reference to which the transfer-base and printing-form may be brought into accurate predetermined cooperating relation both longitudinally and transversely so as to insure that they shall always cooperate in precisely the same relative position with respect to each other, whereby accuracy of register may be attained in the operation of transferring.

23. In a machine for making printing-surfaces, the combination of a support for a transfer-base, with a support for a printing-form, one of which is constructed to rotate and reciprocate over the other so as to bring the transfer-base and printing-form together in firm rolling contact, and a suitable non-expansible and non-contractible transfer-base having a design fixed thereto so that the design is rendered non-expansible and non-contractible and a curved, shell-like printing-form carried by their respective supports and removable therefrom, and guiding means with reference to which the transfer-base and printing-form may be brought into accurate predetermined cooperating relation both longitudinally and transversely so as to insure that they shall always cooperate in precisely the same relative position with respect to each other, whereby accuracy of register may be attained in the operation of transferring.

24. In a machine for making printing-surfaces, the combination with a bed arranged to carry a suitable non-expansible and non-contractible transfer-base having a design fixed thereto so that the design is rendered non-expansible and non-contractible provided with a rack, of a curved rotating reciprocating planographic printing-form adapted to be developed into a printing-surface of the character desired and means for moving the bed



to and from the printing-form, whereby a transfer may be turned over from the transfer-base upon the printing-form.

25. In a machine for making printing-surfaces, the combination with a bed arranged to carry a transfer-base, of a curved rotating reciprocating printing-form, preestablished guides with reference to which the transfer-base and printing-form may be brought into accurate predetermined cooperating relation both longitudinally and transversely, and toggles for moving the bed to and from the printing-form, whereby the design of the transfer-base may be imparted to the printing-form.

26. In a machine for making printing-surfaces, the combination with a transfer-base and a bed therefor, of a tubular rotating printing-form and a support therefor, means for reciprocating the printing-form in firm rolling contact over the transfer-base, and toggles for moving the bed for the transfer-base to and from the printing-form.

27. In a machine for making printing-surfaces, the combination with a transfer-base and a bed therefor, of a removable tubular rotating printing-form and a support therefor carried in bearings, means for reciprocating the printing-form in firm rolling contact over the transfer-base, and toggles for moving the bed for the transfer-base to and from the printing-form.

28. In a machine for making printing-surfaces, the combination with a transfer-base and a bed therefor, of a tubular rotating printing-form and a support therefor, means for reciprocating the printing-form in firm rolling contact over the transfer-base, and four toggles connected with the corners of said bed, and means for operating the toggles to move the bed to and from the printing-form.

29. In a machine for making printing-surfaces, the combination with a transfer-base and a bed therefor, of a curved rotating printing-form and a support therefor, means for reciprocating the printing-form in firm rolling contact over the transfer-base, and four toggles connected with the corners of said bed and means for operating the toggles comprising a worm and worm-wheel suitably connected therewith whereby the bed may be moved to and from the printing-form.

30. In a machine for making printing-surfaces, the combination with a transfer-base and a bed therefor, of a curved rotating printing-form and a support therefor, means for reciprocating the printing-form in firm rolling contact over the transfer-base, four toggles connected with the corners of the bed, two secondary toggles connected with said four toggles, and a crank-shaft for operating the secondary toggles whereby the bed may be moved to and from the printing-form.

31. In a machine for making printing-surfaces, the combination with a bed arranged to carry a transfer-base, of a curved rotating printing-form, a pair of arms for reciprocating the printing-form over the transfer-base,

preestablished guides with reference to which the transfer-base and printing-form may be brought into accurate predetermined cooperating relation both longitudinally and transversely and means for moving the bed to and from the printing-surface, whereby a transfer may be turned over from the transfer-base upon the printing-form.

32. In a machine for making printing-surfaces, the combination with a bed arranged to carry a transfer-base, of a curved rotating reciprocating printing-form, guiding means with reference to which the transfer-base and printing-form may be brought into accurate predetermined relation both longitudinally and transversely, and means for moving the bed to and from the printing-surface, whereby the design of the transfer-base may be imparted to the printing-surface.

33. In a machine for making printing-surfaces, the combination with a bed arranged to carry a transfer-base, of a curved rotating printing-form, a pair of crank-arms for reciprocating the printing-surface over the transfer-base and means for moving the bed to and from the printing-surface whereby a transfer may be turned over from the transfer-base upon the printing-surface, and swinging frames carrying inking and water rollers for rolling up or developing the printing-surface.

34. In a machine for making printing-surfaces, the combination of a horizontal stationary bed adapted to support a transfer-base, a curved or rounded printing-form support, boxes for said support adapted to move back and forth in slideways parallel with and above said bed, arms for reciprocating said boxes, guiding means with reference to which said supports may be brought into accurate predetermined cooperating relation and means for moving said bed to and from the printing-form support, whereby a curved or rounded printing-form may be rolled over a transfer-base under pressure and the design of the transfer-base may be imparted to the printing-form.

35. In a machine for making printing-surfaces, the combination of a horizontal stationary bed adapted to support a transfer-base, a curved or rounded printing-form support, boxes for said support adapted to move back and forth in slideways parallel with and above said bed, crank-arms for reciprocating said boxes, guiding means with reference to which said supports may be brought into accurate predetermined cooperating relation and means for moving said bed to and from the printing-form support, whereby a curved or rounded printing-form may be rolled over a transfer-base under pressure and transfers turned over from the transfer-base upon the printing-form.

36. In a machine for making printing-surfaces, the combination of a support for a transfer-base, a transfer-base carried on said support and removable therefrom, a support for a curved or cylindrical printing-form and a



curved or cylindrical rotating and reciprocating printing-form carried on said support and removable therefrom, said supports being provided with devices to insure that the transfer-base or successive transfer-bases and the printing-form or successive printing-forms shall be mounted in their respective supports in the same identical positions, whereby accuracy of register may be obtained in transferring.

37. In a machine for making printing-surfaces, the combination of a support for a transfer-base, a transfer-base carried on said support and removable therefrom, a support for a curved or cylindrical printing-form and a curved or cylindrical rotating and reciprocating printing-form carried on said support and removable therefrom, said supports being pro-

vided with devices to insure that the transfer-base or successive transfer-bases and the printing-form or successive printing-forms shall be mounted in their respective supports in the same identical positions and guiding means with reference to which the transfer-base and printing-form may be brought into accurate predetermined cooperating relation both longitudinally and transversely, whereby accuracy of register is obtained in transferring.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD HETT.

Witnesses:

EDWIN SEGER,  
GEO. W. MILLS, Jr.