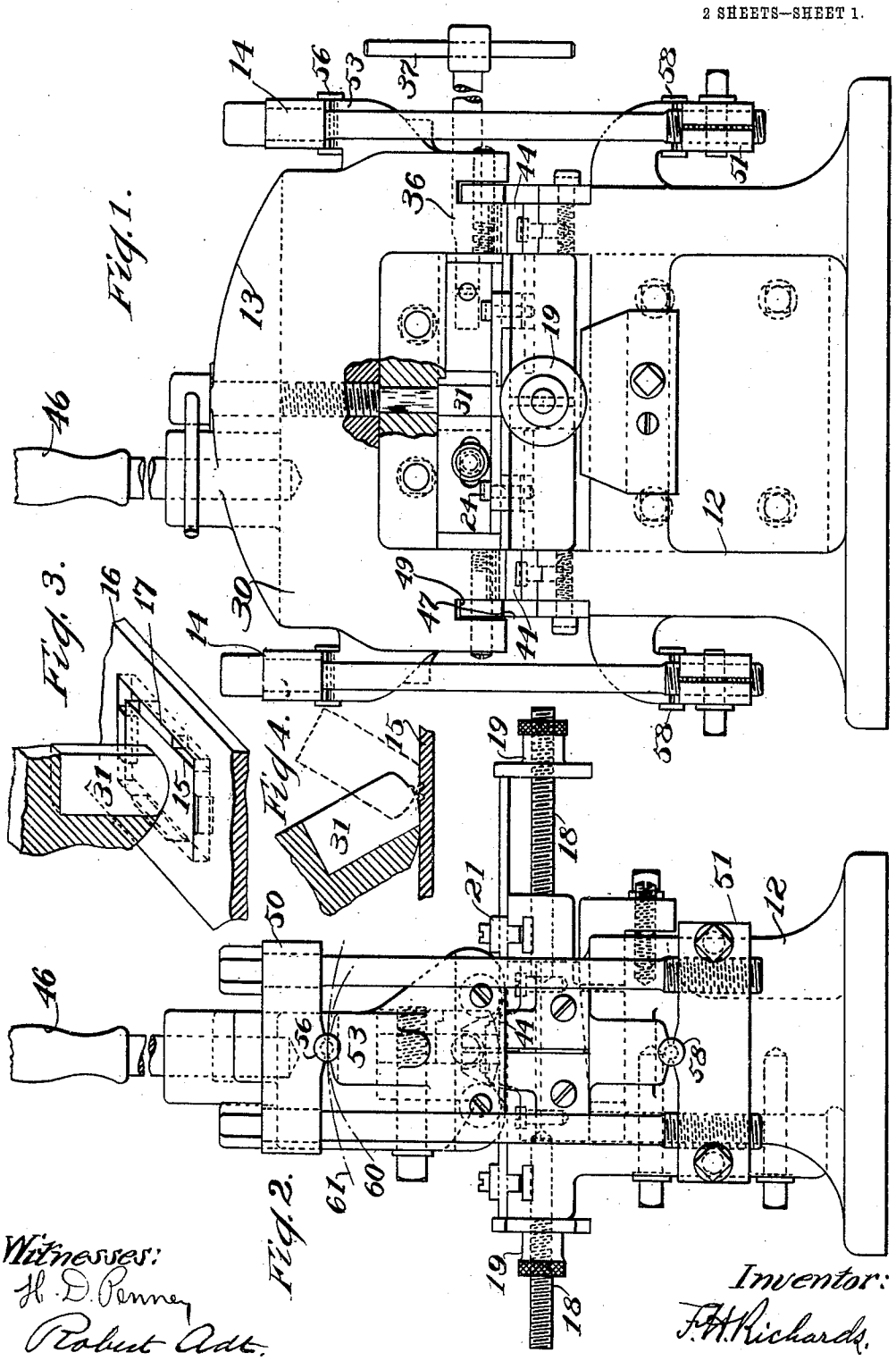
No. 830,006. PATENTED SEPT. 4, 1906.

F. H. RICHARDS.

ROLLING PRESS.

APPLICATION FILED OCT. 26, 1905.

2 SHEETS—SHEET 1.



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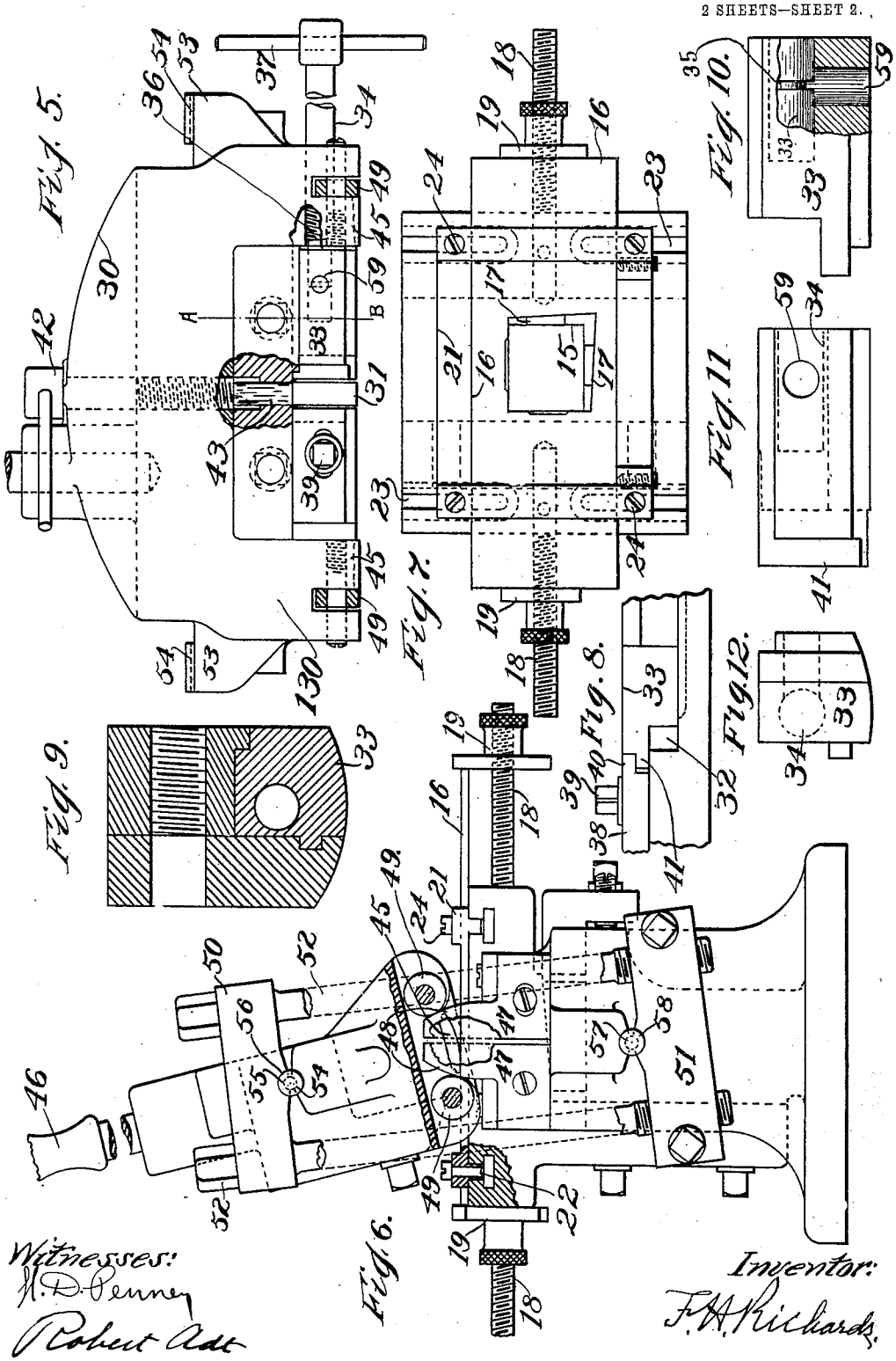

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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

ROLLING-PRESS.

No. 830,006. Specification of Letters Patent. Patented Sept. 4, 1906.

Application filed October 26, 1905. Serial No. 284,424.

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Rolling-Presses, of which the following is a specification.

This invention has reference to an apparatus for forming letters or characters on dies by the operation of giving a die-blank a rolling movement on a matrix. The matrix being hardened and the die-blank comparatively soft, the engaging portion of the die-blank will be compressed by the matrix, which will obviously produce on the edge of the die-blank a raised character corresponding to that on the matrix.

One of the objects of the invention is to provide a form of press in which a die-blank will be given a true rolling motion over the face of the matrix and which will prevent any slip or displacement from such rolling movement, so that upon passing the die-blank back and forth a number of times it will always engage the matrix character at the same portion.

A further object of the invention is to provide means for advancing the die-blank toward the matrix as its engaging face or edge is compressed to form the character thereon in relief.

A further object of the invention is to provide means for causing the blank-carrying member to have a true rolling or cycloidal movement over the matrix-surface and to provide means in combination therewith for pressing the die member and matrix-supporting member very strongly together at the portion of the swinging movement when the blank is engaging the matrix character, while permitting a slight recession of said members when the die-carrying member moves to either side of such position.

In the drawings representing an embodiment of the present invention, Figure 1 shows a front elevation. Fig. 2 is an end elevation. Figs. 3 and 4 are fragmentary views showing the rolling engagement of the die-blank with the matrix. Fig. 5 is a front elevation of the working member. Fig. 6 is an end elevation similar to Fig. 2 with the working member swung to one side and certain parts being broken away to illustrate certain details. Fig. 7 is a plan view of the table supporting the matrix. Fig. 8 is a bottom plan view of the middle portion of the working member, showing the blank-clamping members. Fig. 9 is a section on the line A B of Fig. 5, taken through the clamping members. Fig. 10 is a plan view of the movable jaw member. Fig. 11 is a side elevation of the same member, and Fig. 12 shows this jaw member in end elevation.

The apparatus consists, mainly, of four essential parts, a table or base 12, a working member 13 for carrying the die-blank having a rolling engagement with the table, and a pressing member comprising two frames 14 14, one at each end of the apparatus and pivotally connected with the table and working member.

On the table is supported a matrix 15, that may be provided with any suitable means for adjusting it in two directions laterally and also provided with means for vertical adjustment, whereby its top surface may be made flush with the surface of the table. In the drawings the matrix 15 is shown as inserted in an opening in an adjustable plate 16 and secured therein by wedges 17, that are locked between two inclined sides of the opening and the edges of the matrix. The plate 16 is adjusted laterally in one direction by means of threaded rods 18, projecting from opposite sides of the table in alinement. Adjusting-nuts 19 on these rods engage opposite edges or end portions of the plate 16 and serve to move it longitudinally and lock it in adjusted position. The movement of the plate 16 is effected between strips 22 of a movable plate 21. The latter strips 22 project downward into suitable slots 23 in the table, and adjusting-bolts 24, passing through the strips 22, have their heads engaging enlarged portions at the bottom of such slots, the bolts serving to clamp the plate 21 in adjusted positions. The lateral movement of the plate 21 being at right angles with that of the plate 16, the matrix can be moved laterally in any direction to bring its character into position to engage with the die-blank.

The working member comprises a body portion 30, having along its lower part at an intermediate portion suitable means for clamping a die-blank 31. The blank is inserted in an opening 32 (shown in Fig. 8) and is clamped against the transverse side thereof by the movable jaw member 33, that has a swivel connection with the ends of a screw-rod 34, as indicated in Figs. 5 and 10. The end of such rod has an annular groove

35, into which projects a feather on the end of a pin 59, set in one of the jaw members. The screw-rod 34 operates in a threaded bore 36 in the body portion 30, as shown in Fig. 5, and may be provided with a handle portion 37 for its operation. The jaw member 33 is prevented from lateral displacement by a guide member 38, adjustably secured to the working member by a bolt 39 and having a projecting portion 40, between which and side of the fixed portion of the jaw operates a projecting portion 41 of the jaw member 33. The overhang portion 40 will obviously prevent movement of the jaw member away from its engaging part.

The working member 30 is also provided with means whereby to adjust the die-blank 31 toward the table or matrix, which means may comprise an adjusting-screw 42, working in a threaded aperture in the body portion 30 and whose end member engages a small block 43 and by advancing the latter the movement of the screw will move the blank outward toward the matrix.

The table on each side of the matrix-supporting means is provided with a hardened plane bearing-surface 44, and the working member 13 is provided with curved portions correspondingly disposed to engage and roll on these bearing-surfaces of the table, all other portions of the working member being sufficiently removed from the table to not interfere with such movement, whereby the working member may swing through a short arc, as indicated in Fig. 6. These two pairs of engaging portions are preferably made of very hard metal to prevent wear and insure accurate movement. These portions of the working member may comprise hardened pieces 45, suitably set in the body portion 30. The bearing portions 45 are located on opposite sides of the blank-clamping means of the working member, as indicated in Fig. 5, and upon adjusting the blank, which may have an end surface curved somewhat similar to that of the bearing-blocks 45, so that its surface is in substantial alinement with these curved surfaces, the blank may be caused to have a rolling engagement with the matrix 15. A suitable handle 46 extends upward from the working member 13 for rocking the same.

Upon the die-blank and matrix being relatively adjusted to bring an engraved character in the matrix to register and engage with the intermediate portion of the blank, and thereupon rolling the blank over the matrix and properly feeding it downward to engage the matrix the character engraved in the matrix will be reproduced in relief on the engaging surface of the blank; but to produce this effect it is practically necessary to roll the blank a number of times back and forth across the matrix, and means should be provided to insure the blank always returning to the same position relatively to the matrix and to prevent any shifting of the blank-carrying member. If the curved face of the bearing-blocks 45 are circular—that is, are sectors of circles—the movement of the working member will be cycloidal. One means of producing such a movement of the working member is to provide guiding members or surfaces, one of them or one set of them being secured to the table, and the other one or set to coöperate therewith being fast on the working member. In the present instance a pair of members 47 are provided having cycloidal faces 48, and suitable guide members are provided on the working member, having surfaces for engaging therewith, whose position is fixed relative to the working member; but in order to reduce friction to a minimum these guide-surfaces on the working member may be formed by rollers 49, arranged to engage the faces 48 of the guide-teeth of the guide members 47, respectively. One set of such guiding means is shown in Fig. 6; but this arrangement is duplicated at the other end of the apparatus, as indicated in Figs. 1 and 5.

The feeding or advancement of the die-blank would have a tendency to raise the working member, so that the engaging blocks 45 would not properly operate on their supporting-surfaces on the table and would further tend to separate the cycloidal guiding means. To overcome this objection, suitable pressing means are provided in order to press or retain the working member in its proper path of movement or at least to insure its being in such position at the middle part of its rocking movement when the die-blank is registering with the character of the matrix. It is, however, desirable that the working member may be allowed a small amount of play or movement from the table at one or both sides of said intermediate position for the purpose of permitting an advancement or feeding downward of the die-blank from time to time as its end is compressed by the matrix to form the character on the blank in relief. The pressing member in the present instance is shown as comprising two frames, one at each end of the apparatus. Each frame may comprise cross members 50 and 51, that are connected by tie rods or bolts 52, passing through apertures at the ends of the said members and which may be adjustable therein to compensate for wear and to facilitate adjustment. At each end of the body portion 30 of the working member is an extension 53, in the upper face of which is formed a cylindrical groove or channel 54, which channels of the two members are in alinement and extend parallel with the rocking surfaces 45. On the bottom face of each of the cross-pieces 50 is arranged a similar cylindrical groove 55, which grooves are symmetrically arranged on these members. Pins 56 of a size to fit the cylindrical

grooves 54 are placed therein, and thereupon the frames are placed with the grooves 55 resting on the upper portion of these pins 56. The adjacent portions of the grooved members are sufficiently cut away to permit of a swinging movement of the frames, as shown in Figs. 2 and 6. A similar swinging connection is provided between the lower cross-places 51 of the frames and the table, suitable pins 58 being arranged between similarly located grooves 57, whereby when the working member is rocked, causing the frames to swing upward, movement of the frames upward is prevented beyond that of the arc swung from the axis of the pin 58 and passing through the axis of the pin 56. These frames are so designed that the axis of the pins 56 is located in a circle of which the curved faces of the bearing-blocks 45 are a portion—that is, this axis is removed from the said curved face for the distance of a diameter of a circle coinciding with the said curved faces, and the axis of the pins 58 is preferably arranged at substantially the same distance—that is, equal to said diameter—below the said curved faces when the working member is in its intermediate or upright position.

The cross-pieces 50 are so adjusted that when the working member is in the intermediate upright position of Fig. 2 the frames will cause the working member to press very strongly against the bearing-faces 46, and consequently will force the die-blank when properly adjusted into intimate engagement with the matrix; but when the working member is rocked by means of the handle 46 to either side of said position this engagement of the working member with the table is somewhat lessened. It will be seen that the axis of the upper pin 56 will describe a circular curve or arc whose center is that of the pin 58—that is, it would describe such a curve if the pressing members were pivotally supported on the pins 58. Now the pins 56 if considered as a fixed part of the working member 13 would lie in a circle with which the rolling faces of the members 45 coincide and would move through a path that is a true cycloid, which curve is indicated in Fig. 1 by the broken line 60, while the arc, whose center would be that of the pin 58, considered as fast to the table, is indicated by broken line 61. The cycloid and the circular curve by the above arrangement practically coincide in the axis of the pins 56 when the working member is in the upright position; but when this member is swung to either side, since these two curves diverge a short distance beyond said position and since the cycloidal path is above the circular path, the pins 56 will be permitted to approach nearer to the pins 58, and therefore provide a slight amount of play or lost motion between these pivotal connections of the frames. By reason of this construction when the working members swing to one side the die-blank can be advanced a slight distance, which will tend to slightly separate the working member from the matrix and table and produce tension in the pressing-frames; but upon the working member being swung to the upright position this tension will increase by reason of the coincidence of the two curved paths just described, and the die member will be compressed until its surface engaging that of the matrix will be in alinement with the engaging surfaces of the bearing-blocks 45. It is found desirable to previously give a curve to the matrix-engaging end of the die-blank of smaller radius than that of the bearing-blocks 45, so that the blanks will have practically no engagement or compression beyond a short distance each side of its character-receiving portion.

Having thus described this invention, I claim—

1. In a rolling-press, the combination of a member arranged to support a matrix thereon, a member arranged to carry a die-blank, guiding means arranged to cause the die-blank to have a rolling movement over the matrix when one of said members is swung relative to the other member, and a pressing means pivotally connected to both said members and arranged to press the die-blank against the matrix.

2. In a rolling-press, the combination of a member arranged to support a matrix thereon, a member arranged to carry a die-blank, guiding means arranged to cause the die-blank to have a rolling movement over the matrix when one of said members is swung relative to the other member, and a pressing means pivotally connected to both said members and arranged to press the die-blank against the matrix at the intermediate part of said movement.

3. In a rolling-press, the combination of a member arranged to support a matrix thereon, a member arranged to carry a die-blank, guiding means arranged to cause the die-blank to have a cycloidal movement over the matrix when one of said members is swung relative to the other member, and a pressing means pivotally connected to both said members and arranged to press the die-blank against the matrix.

4. In a rolling-press, the combination of a member arranged to support a matrix thereon, a member arranged to carry a die-blank, guiding means arranged to cause the die-blank to have a cycloidal movement over the matrix when one of said members is swung relative to the other member, and a pressing means pivotally connected to both said members and arranged to press the die-blank against the matrix at the intermediate part of said movement.

5. In a rolling-press, the combination of a member arranged to support a matrix there-

on, a member arranged to carry a die-blank, guiding means arranged to cause the die-blank to have a rolling movement over the matrix when one of said members is swung relative to the other member, a pressing means pivotally connected to both said members and arranged to press the die-blank against the matrix, and means for adjusting the die-blank in the die member toward the matrix.

6. In a rolling-press, the combination of a table arranged to support a matrix thereon, a working member arranged to carry a die-blank, guiding means arranged to cause the die-blank to have a rolling movement over the matrix when the working member is swung relative to the table, and a pressing member pivotally connected to the working member and to the table and arranged to press the die-blank against the matrix at one portion of the movement of the working member.

7. In a rolling-press, the combination of a table arranged to support a matrix thereon, a working member arranged to carry a die-blank, guiding means arranged to cause the die-blank to have a rolling movement over the matrix when the working member is swung relative to the table, and a pressing member pivotally connected to the working member and to the table and arranged to press the die-blank against the matrix at the intermediate part of the movement of the working member.

8. In a roller-press, the combination of a table arranged to support a matrix, a working member arranged to carry a die-blank, guiding means connecting the table and working member and arranged to cause the die-blank when the working member is swung to have a cycloidal movement on the matrix, and a pressing member pivotally connected to the working member and to the table and arranged to press the die-blank against the matrix at one portion of the movement of the working member.

9. In a roller-press, the combination of a table arranged to support a matrix, a working member arranged to carry a die-blank, guiding means connecting the table and working member and arranged to cause the die-blank when the working member is swung to have a cycloidal movement on the matrix, and a pressing member pivotally connected to the table and to the working member and arranged to press the die-blank against the matrix at the intermediate part of the movement of the die member.

10. In a roller-press, the combination of a table arranged to support a matrix, a working member arranged to carry a die-blank, means arranged to cause the die-blank to have a rolling movement on the matrix, a member having a swinging connection with the working member on one side of the matrix, and having a swinging connection with the table on the opposite side of the matrix, the latter member being arranged to press the die-blank when swung against the matrix.

11. In a roller-press, the combination of a table arranged to support a matrix, a working member arranged to carry a die-blank, means arranged to cause the die-blank to have a cycloidal movement on the matrix, a member having a swinging connection with the working member on one side of the matrix, and having a swinging connection with the table on the opposite side of the matrix, the latter member being arranged to press the die-blank when swung against the matrix.

12. In a roller-press, the combination of a table arranged to support a matrix, a working member arranged to carry a die-blank, means arranged to cause the die-blank to have a rolling movement on the matrix, a member having a swinging connection with the working member above the table and having swinging connection with the table below the matrix, the latter member being arranged to press the die-blank when swung against the matrix for a part only of the movement of the working member.

13. In a roller-press, the combination of a table having a bearing-surface and arranged to support a matrix flush with its said surface, a working member having a curved surface arranged to engage the bearing-surface of the table, means for causing the working member when swung to have a rolling movement on said bearing-surface on the table, means for securing a die-blank to the working member to have a rolling engagement with the matrix, and a pressing member having a swinging connection with the working member on one side of the matrix, and having a swinging connection with the table on the opposite side of the matrix for pressing the working member against the table.

14. In a roller-press, the combination of a table having a bearing-surface and arranged to support a matrix flush with its said surface, a working member having a curved surface arranged to engage the said surface of the table, means for causing the working member when swung to have a rolling movement on said bearing-surface on the table, means for securing a die-blank to the working member to have a rolling engagement with the matrix, and a pressing member having a swinging connection with the working member and also a swinging connection with the table below the matrix for pressing the working member against the table.

15. In a roller-press, the combination of a table having a plane top and arranged to support a matrix flush with its top surface, a working member having a curved surface arranged to engage the plane surface of the

table, means for causing the working member when swung to have a cycloidal movement on said plane surface on the table, means for securing a die-blank to the working member to have a cycloidal engagement with the matrix, and a pressing member having a swinging connection with the working member on one side of the table, and also having a swinging connection with the table on the opposite side of the matrix, for pressing the working member against the table.

16. In a roller-press, the combination of a table having a plane top and arranged to support a matrix flush with its top surface, a working member having a curved surface arranged to engage the plane surface of the table, means for causing the working member when swung to have a cycloidal movement on said plane surface on the table, means for securing a die-blank to the working member to have a cycloidal engagement with the matrix, and a pressing member having a swinging connection with the working member on one side of the table, and having a swinging connection with the table on the opposite side of the matrix for pressing the working member against the table at the intermediate part of its movement.

17. In a roller-press, the combination of a table having a plane top and arranged to support a matrix flush with its top surface, a working member having a curved surface arranged to engage the plane surface of the table, means for causing the working member when swung to have a cycloidal movement on said plane surface on the table, means for securing a die-blank to the working member to have a cycloidal engagement with the matrix, and a pressing member having a swinging connection with the working member and also a swinging connection with the table below the matrix for pressing the working member against the table.

18. In a roller-press, the combination of a table having a plane top and arranged to support a matrix flush with its top surface, a working member having a curved surface arranged to engage the plane surface of the table, means for causing the working member when swung to have a cycloidal movement on said plane surface on the table, means for securing a die-blank to the working member to have a cycloidal engagement with the matrix, and a pressing member having a swinging connection with the working member and also a swinging connection with the table below the matrix for pressing the working member against the table at the intermediate part only of its movement.

19. In a rolling-press, the combination of a table having a bearing-surface at two portions and provided with means for supporting a matrix intermediate of said portions and flush with their surfaces, a working member having a curved surface at two portions arranged to engage the said bearing-surfaces respectively of the table, the working member having means for carrying a die-blank intermediate of said surfaces to engage said matrix, a pressing member comprising two frames arranged at opposite portions of the machine, the frames having a swinging connection with the working member at their upper parts on a common axis located on one side of the table, the frames also having a swinging connection with the table on a common axis located on the other side of the table.

20. In a rolling-press, the combination of a table having a bearing-surface at two portions and provided with means for supporting a matrix intermediate of said portions and flush with their surfaces, a working member having a curved surface at two portions arranged to engage the said bearing-surfaces respectively of the table, the working member having means for carrying a die-blank intermediate of said surfaces to engage said matrix, a pressing member comprising two frames arranged at opposite portions of the machine, the frames having a swinging connection with the working member at their upper parts on a common axis located above the table, the frames also having a swinging connection with the table on a common axis located below the table.

21. In a rolling-press, the combination of a table having a plane surface at two portions and provided with means for supporting a matrix intermediate of said portions and flush with their surfaces, a working member having a curved surface at two portions arranged to engage the said plane surfaces respectively of the table, the working member having means for carrying a die-blank intermediate of said surfaces to engage said matrix, a pressing member comprising two frames arranged at opposite portions of the machine, the frames having a swinging connection with the working member at their upper parts on a common axis located on one side of the table, the frames also having a swinging connection with the table on a common axis located on the other side of the table.

22. In a rolling-press, the combination of a table having a plane surface at two portions and provided with means for supporting a matrix intermediate of said portions and flush with their surfaces, a working member having a curved surface at two portions arranged to engage the said plane surfaces respectively of the table, the working member having means for carrying a die-blank intermediate of said surfaces to engage said matrix, a pressing member comprising two frames arranged at opposite portions of the machine, the frames having a swinging connection with the working member at their upper parts on a common axis located above the curved portion, the frames also having a swinging con-

nection with the table on a common axis located below the matrix.

23. In a rolling-press, the combination of a table having a bearing-surface at two portions, and provided with means for supporting a matrix intermediate of said portions and flush with their surfaces, a working member having a curved surface at two portions arranged to engage the said bearing-surfaces of the table respectively, the working member having means for carrying a die-blank intermediate of said surfaces to engage said matrix, a pressing member comprising two frames arranged at opposite portions of the machine, the frames having a swinging connection with the working member at their upper parts on a common axis located on one side of the table, the frames also having a swinging connection with the table on a common axis located on the other side of the table, said swinging connections being arranged to press the working member and table together at one part of their swinging movement and permitting separation of such members, at another part of their movement.

24. In a rolling-press, the combination of a table having a plane surface at two portions, and provided with means for supporting a matrix intermediate of said portions and flush with their surfaces, a working member having a curved surface at two portions arranged to engage the said plane surfaces respectively of the table, the working member having means for carrying a die intermediate of said surfaces to engage said matrix, a pressing member comprising two frames arranged at opposite portions of the machine, the frames having a swinging connection with the working member at their upper parts on a common axis located above the curved portion, the frames also having a swinging connection with the table on a common axis located below the matrix, said swinging connections being arranged to press the working member and table together at one part of their swinging movement and permitting separation of such members, at another part of their movement.

25. In a rolling-press, the combination of a table arranged to support a matrix flush with its top surface, a working member arranged to carry a die-blank and having a circularly-curved top surface arranged to engage the plane surface of the table, and a pressing member having a swinging connection with the working member at a distance above said curved surface substantially equal to the diameter of the curve, the pressing member also having a swinging connection with the table below the matrix at a distance substantially equal to said diameter.

Signed at 9 to 15 Murray street, New York city, this 21st day of October, 1905.

FRANCIS H. RICHARDS.

Witnesses:
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