March 10, 1942. J. L. BLACKLEY 2,276,012

PLATE FORMING MACHINE

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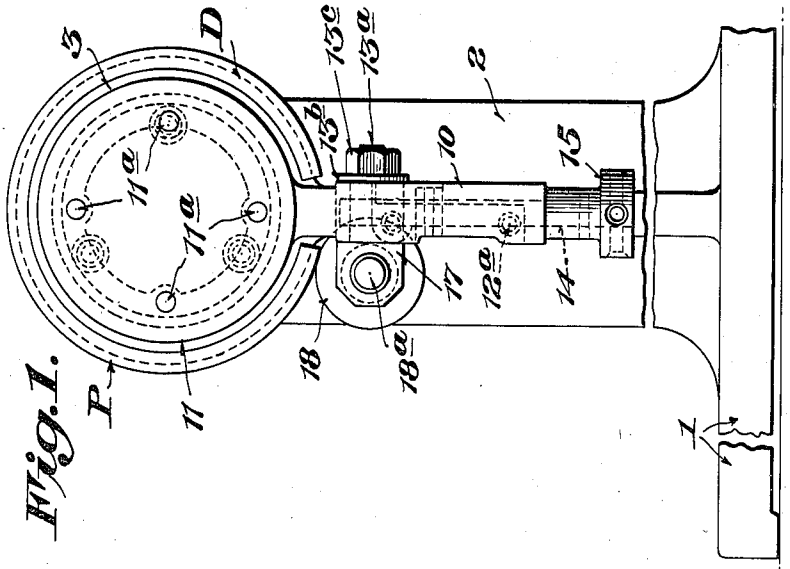


Fig. 1.

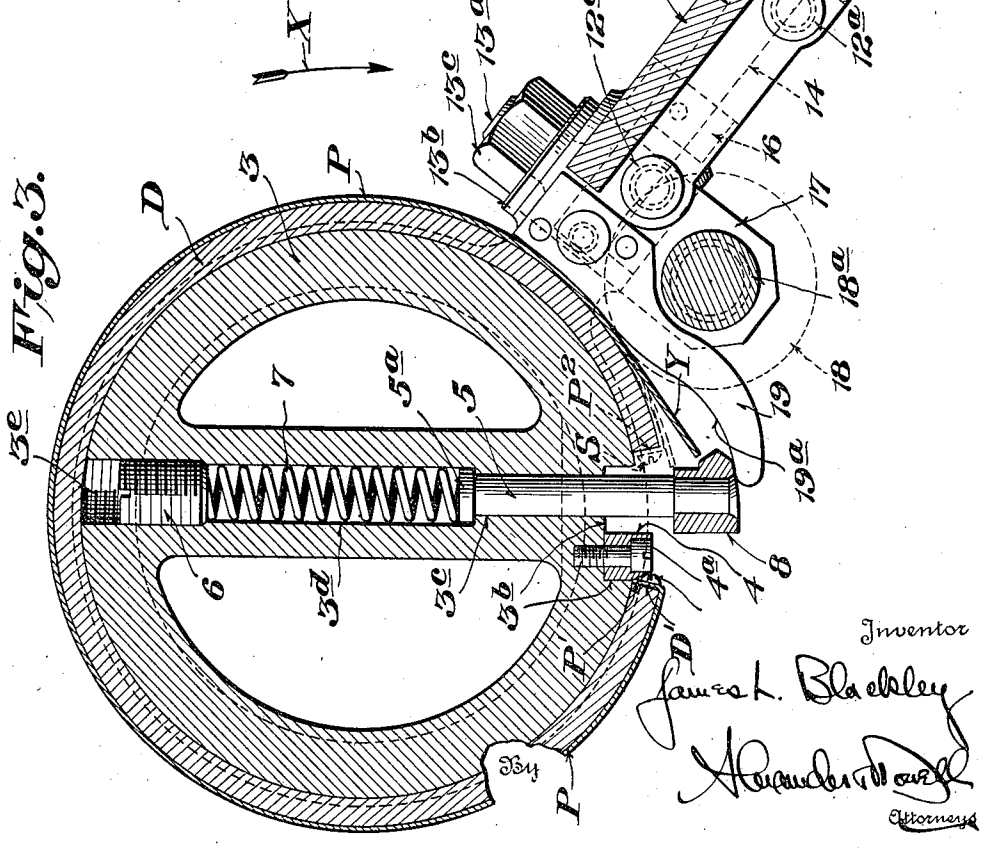


Fig. 3.

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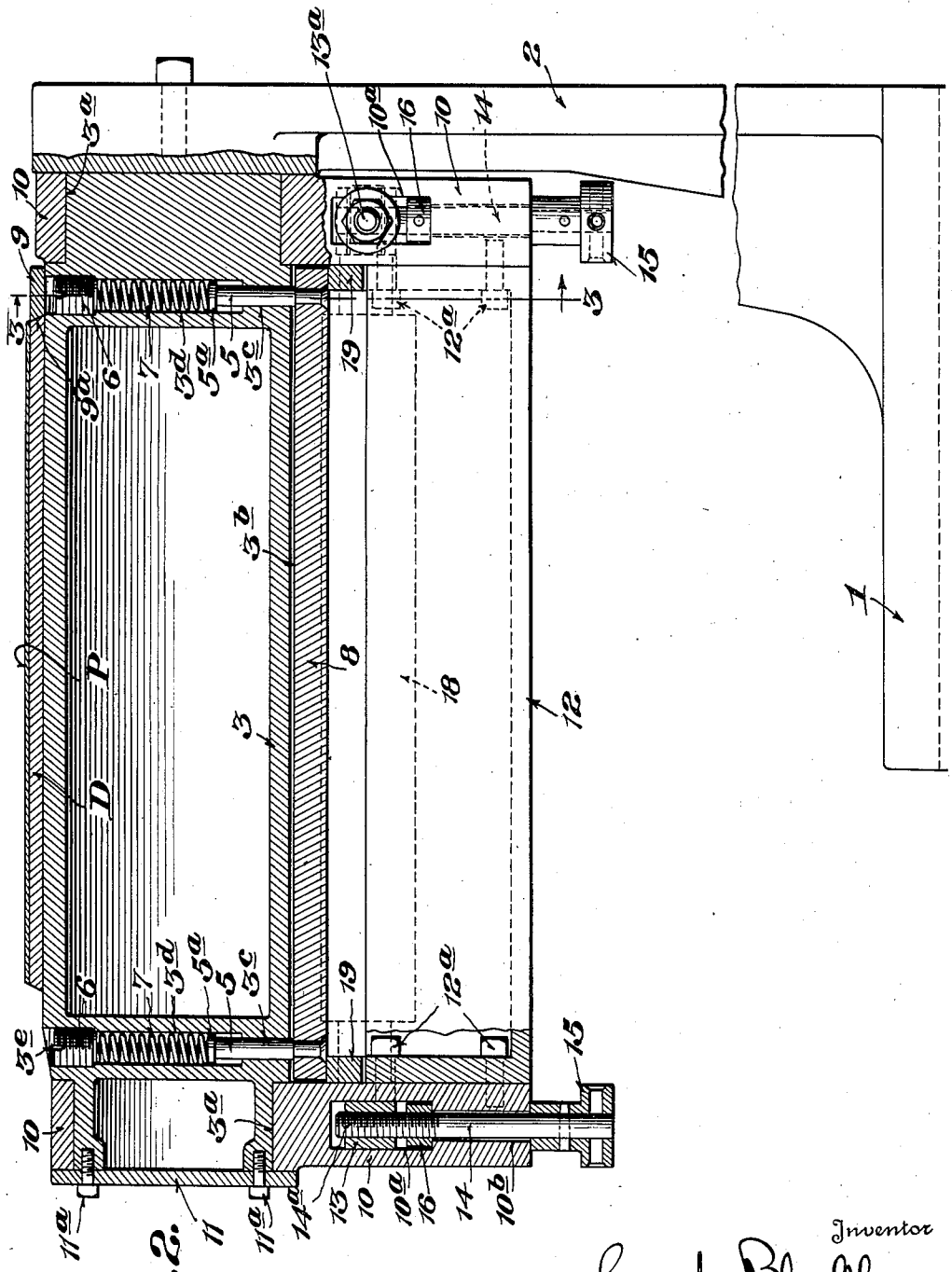


Fig. 2.

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PLATE FORMING MACHINE

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Application August 14, 1940, Serial No. 352,595

18 Claims. (Cl. 153—46)

This invention is a novel portable machine for bending and mounting flexible engraved printing plates usually of thin sheet zinc or the like, upon arcuate or cylindrical dummy plates to form a composite printing member in which the combined thicknesses of the printing plate and dummy plate is equal to the thickness of the usual stereotype cast printing plate, and which composite printing member may be used interchangeably with cast stereotype plates now generally used in printing presses.

The principal object of my invention is to provide a portable machine in which a cylindrical dummy plate having a gap may be mounted, and in which one end of the flexible printing plate may be clamped against one side wall of said gap in the dummy plate, and the flexible plate then rolled around the exterior of the dummy plate, means being provided for automatically bending the trailing end of the rolled plate into the gap of the dummy plate and into contact with the opposite side wall of the gap, thereby completing the bending of the flexible printing plate in one continuous operation, so that the bent ends of the printing plate in the gap may be secured by screws or the like to the side walls of the gap in the dummy plate while the dummy plate is still in the machine.

Other minor objects of the invention will be hereinafter set forth.

I will explain the invention with reference to the accompanying drawings, which illustrate one practical embodiment thereof to enable others familiar with the art to adopt and use the same; and will summarize in the claims, the novel features of construction, and novel combinations of parts, for which protection is desired.

In said drawings:

Fig. 1 is an end elevation of my novel machine, the pedestal broken away and foreshortened.

Fig. 2 is an enlarged longitudinal vertical section through the machine.

Fig. 3 is a transverse section on the line 3—3, Fig. 2.

As shown, the machine preferably comprises a base 1 having a pedestal or upright 2 to the upper end of which is bolted or otherwise secured a fixed drum 3, of external diameter to suit the internal diameter of a dummy plate D which is to be mounted thereon, and of length somewhat greater than the dummy plate.

Cylinder 3 is provided at each end with reduced bearing portions 3*a* adapted to form journals for the revolvable roller-carrying frame hereinafter described. Around the drum 3 adjacent the inner end thereof is an annular guide or ring 9 having an undercut outer edge 9*a* adapted to receive the correspondingly beveled inner edge of dummy plate D, to locate or position said dummy plate on drum 3. Preferably guide or ring 9 is longitudinally adjustable on drum 3 so that the drum may be used to support dummy plates of various lengths up to the maximum for which the machine is designed. Guide or ring 9 can be fixed in adjusted position by any desired means, and the dummy plate held in contact therewith by a pin or the like (not shown).

In the periphery of drum 3, at the bottom thereof, is a longitudinal gap 3*b* extending the full length of the drum between the reduced bearing portions 3*a*, said gap registering with and substantially corresponding in width with the gap D' (Fig. 3) in dummy plate D, which dummy plate is mounted on drum 3 as shown in Fig. 3 with one side wall of gap 3*b* flush with the corresponding side wall of gap D' in the dummy plate.

Seated in the gap 3*b* at the side thereof adjacent the above mentioned flush walls is a clamping bar 4 of width preferably less than half the width of drum gap 3*b*, and of thickness somewhat less than the combined depths of the gaps D' and 3*b*, said bar 4 being retained in said gap 3*b* by means of removable bolts 4*a* or the like. Bar 4 is adapted to clamp the flanged end P' of the flexible printing plate P between the side of bar 4 and the adjacent wall of the gap D', as shown in Fig. 3, prior to the operation of rolling the flexible plate P around dummy plate D, as hereinafter described; and bolts 4*a* may be loosened to permit insertion of the end P' of flexible plate P between the bar 4 and the wall of gap D' and then tightened again to hold said end P' firmly clamped in such position.

Extending through drum gap 3*b* adjacent each end thereof, and beside the bar 4 are plungers 5 mounted in diametrical bores 3*c* (Fig. 3) in the drum, which bores are provided with enlargements 3*d* at their upper portions which open through the top of the drum, said bores 3*d* being tapped as at 3*e* at their upper ends for the reception of threaded plugs 6 which are screwed thereinto and lie below the top surface of drum 3. Plungers 5 are provided with heads 5*a* at their inner ends adapted to engage the shoulders formed between the bore portions 3*c*—3*d* to limit the outward movements of the plungers. Within the enlarged portions 3*d* of the bores are compressed springs 7 interposed between

the plunger heads 5a and the plugs 6, and normally urging the plungers downwardly into the position shown in Fig. 3. Plungers 5 carry on their lower ends a crimping bar 8 adapted when the plungers are forced upwardly to fill the gap between clamping bar 4 and the opposite side wall of drum gap 3b, the outer side face of crimping bar 8 being so shaped that as crimping bar 8 is moved radially upwardly the trailing end P2 of the flexible plate will be bent upwardly around and into engagement with the adjacent side wall of gap D' in dummy plate D, as indicated by dotted lines in Fig. 3.

Rotatably mounted upon the bearing portions 3a of drum 3 are arms 10, the inner arm being disposed between the face of the upright 2 and the main body portion of drum 3, while the outer arm is maintained on its bearing 3a by means of a plate 11 secured to the end of drum 3 by bolts 11a. Connecting the outer ends of arms 10 is a rigid cross member 12 secured by bolts 12a to the inner faces of arms 10, whereby the arms 10 and member 12 will form a rigid frame freely revolvable around and around the drum 3.

In each arm 10 is a longitudinal guide slot 10a in which is mounted a slide 13 (Fig. 2) having a tapped bore receiving the threaded end 14a of an adjustment screw 14 which extends through a bore 10b in the outer end of arm 10, said screw 14 having a knob 15 on its outer end whereby the same may be manually rotated. A nut 16 (Figs. 2 and 3) is fixedly mounted on the threaded portion of screw 14 and engages the inner end of bore 10b to prevent axial movement of screw 14 in said bore.

Each slide 13 carries a lateral extension 17 in which is journaled one end of a shaft 18a of a roller 18 preferably formed of hard rubber, or covered with hard rubber, so as to prevent injury to the flexible plate P with which roller 18 contacts directly, the use of the rubber or rubber covered roll 18 obviating the necessity of using a blanket between the roll 18 and printing plate P. By rotating the knobs 15, the roller 18 can be adjusted radially of the drum 3 to vary the pressure of roller 18 on printing plate P. The inner ends of extensions 17 slidably engage one face of their respective arms 10 adjacent slots 10a, and slides 13 are provided with studs 13a projecting through the slots 10a opposite from the extensions 17, said studs 13a carrying washers 13b and nuts 13c so that when the nuts are tightened the slides 13 will be clamped to the arms 10 and thereby relieve the screw shafts 14 from excessive bending strains caused by engagement of roller 18 with the plate P.

On the side of each arm 10 is fixedly mounted a cam finger 19 (Figs. 2 and 3) having a curved inner edge 19a adapted when the frame 10—12 is revolved into position shown in Fig. 3 to engage the outer face of crimping bar 8 whereby upon further rotation of the frame towards bar 8 the cams 19 will force crimping bar 8 upwardly against the action of springs 7 and into gap 3b in order to flange or bend the trailing end of printing plate P around and against the adjacent side wall of gap D' in dummy plate D.

In operation, dummy plate D is mounted on the drum 3 as shown in Fig. 3, the thickness of arm 10 being such that the arm will pass through the gap D' of the dummy plate D as the plate D is slipped onto the end of drum 3. One end of the flexible printing plate P is then positioned between the clamping bar 4 and the adjacent wall of gap D', and roller 18 which is carried by frame 10—12 is moved around cylinder 3 in the direction of the arrow X in Fig. 3. When roller 18 has nearly completed said revolution, roller 18 arrives at the position shown in Fig. 3 in which the free edge of the zinc plate P is in the position shown at Y. Upon continuing the rotation of frame 10—12, the fingers 19 will contact crimping bar 8 pressing same upwardly against the action of springs 7, and bar 8 will complete the flanging of the trailing end of plate P in one continuous operation holding same against the adjacent side wall of gap D' in dummy plate D, as shown in dotted lines at P2, in Fig. 3. The inner face of bar 4 will be engaged by the adjacent face of crimping bar 8 when the latter is forced upwardly, thereby eliminating any tendency of the plungers 5 to bend while the outer or opposite face of crimping bar 8 is flanging the trailing end P2 of plate P against the adjacent wall of the gap D' in dummy plate D.

A slight further rotation of frame 10—12 in the direction of arrow X will permit the insertion of the screws S in the flanged ends of plate P to secure said ends to the side walls of gap D'. Dummy plate D with its printing plate P is now ready for removal from the machine, and it is noted that it has not been necessary to remove printing plate P from the machine once it has been clamped at one end to the dummy D as the bending is completed in one continuous operation. My machine is arranged to take a multiplicity of plate lengths due to the fact that ring 9 can be located to suit any desired length of dummy up to the maximum for which the machine is designed.

I do not limit my invention to the exact form shown in the drawings, for obviously changes may be made therein within the scope of the claims.

I claim:

1. A machine for bending flexible printing plates around cylindrical dummy plates having longitudinal gaps; comprising a fixed member adapted to hold the dummy plate; a frame mounted coaxially of the dummy plate and adapted to rotate around the same; a presser roll freely rotatable in said frame and adapted to contact with said dummy plate; means for holding one end of a flexible printing plate against one side wall of the gap in the dummy plate whereby as the frame is revolved the printing plate will be rolled around the periphery of the dummy plate; and means for automatically bending the other end of the printing plate into contact with the other side wall of said gap as the frame completes its revolution around the dummy plate.

2. In a machine as set forth in claim 1, said frame comprising arms journaled on said fixed member and connected together at their ends; and one of said arms being of less thickness than the width of the gap in the dummy plate, whereby the dummy plate may be slipped over the end of the drum by passing the arm through the gap.

3. In a machine as set forth in claim 1, bearing blocks mounted on the frame in which the ends of the presser roll are journaled; means for adjusting the blocks; and means for clamping the blocks in adjusted position.

4. In a machine as set forth in claim 1, means on the fixed member for holding the dummy plate in different positions axially thereof.

5. In a machine as set forth in claim 1, said

automatic bending means comprising a reciprocable crimping bar having a face conforming with the opposite wall of the gap of the dummy plate; means for yieldably projecting the crimping bar out of the gap to permit the other end of the printing plate to enter between the bar and dummy plate; and means carried by the frame for engaging the bar and shifting the same into the said gap towards the end of the revolution of the frame.

6. A machine for bending flexible printing plates around cylindrical dummy plates having longitudinal gaps; comprising a fixed drum adapted to fit within and support the dummy plate; a frame mounted coaxially of the drum and adapted to rotate around the dummy plate; a presser roll freely journaled on said frame opposite the drum; means for clamping one end of a flexible printing plate to one side wall of the gap in the dummy plate whereby as the frame is revolved the printing plate will be rolled around the periphery of the dummy plate; and means operable by the frame as same completes its revolution around the drum for automatically bending the other end of the printing plate into contact with the other side of the gap.

7. In a machine as set forth in claim 6, said drum having bearings at its ends, and said frame comprising arms journaled on said bearings; a member connecting the outer ends of the arms to form a rigid structure; and one of said arms being of less thickness than the width of the gap in the dummy plate whereby the dummy plate may be slipped over the end of the drum by passing the said arm through the gap.

8. In a machine as set forth in claim 6, bearing blocks mounted on the frame in which the ends of the presser roll are journaled; means for adjusting the blocks; and means for clamping the blocks in adjusted position.

9. In a machine as set forth in claim 6, an annular member adjustably mounted on one end of the drum adapted to be engaged by the end of the dummy plate to hold the dummy plate in different positions thereon.

10. In a machine as set forth in claim 6, said drum having a longitudinal gap opposite that of the dummy plate; and said clamping means comprising a bar removably mounted at one side of said drum gap and adapted to clamp one end of the flexible plate between the bar and the wall of the gap of the dummy plate.

11. In a machine as set forth in claim 6, said automatic bending means comprising a reciprocable crimping bar adapted to enter the drum gap and having a face adjacent to and conforming with the opposite wall of the gap of the dummy plate; means for yieldably projecting the crimping bar out of the drum gap to permit the other end of the printing plate to enter between the bar and the dummy plate; and means carried by the frame for engaging the bar and shifting the same into the drum gap towards the end of the revolution of the frame.

12. In a machine as set forth in claim 6, said automatic means comprising a yieldable crimping bar adapted to enter the drum gap and having a face adjacent to and conforming with the opposite wall of the gap of the dummy plate; spring pressed plungers extending through the drum gap and carrying the crimping bar; transverse bores in said drum receiving said plungers; means on the plungers cooperating with the bores to limit the outward movement of the plungers while normally projecting the crimping bar out of the drum gap to permit the other end of the printing plate to enter between the bar and the dummy plate; and means carried by the frame for engaging the bar and shifting the same into the drum gap towards the end of the revolution of the frame.

13. A portable machine for bending flexible printing plates around cylindrical dummy plates having longitudinal gaps; comprising a base; a fixed drum on the base adapted to fit within and support the dummy plate; said drum having a longitudinal gap opposite that of the dummy plate; a frame mounted coaxially of the drum and adapted to rotate around the dummy plate; a presser roll freely journaled on said frame opposite the drum; a removable clamping bar in the drum gap for clamping one end of a flexible printing plate to one side wall of the gap in the dummy plate whereby as the frame is revolved the printing plate will be rolled around the periphery of the dummy plate; a yieldable crimping bar adapted to enter the drum gap and having a face adjacent to and conforming with the opposite wall of the gap of the dummy plate; means for normally projecting the crimping bar out of the drum gap to permit the other end of the printing plate to enter between the bar and the dummy plate; and means operable by the frame for engaging the bar and shifting the same into the drum gap towards the end of the revolution of the frame to automatically bend the trailing edge of the printing plate into contact with the other side wall of the gap.

14. In a machine as set forth in claim 13, said drum having bearings at its ends, and said frame comprising arms journaled on said bearings; a member connecting the outer ends of the arms to form a rigid structure; and one of said arms being of less thickness than the width of the gap in the dummy plate whereby the dummy plate may be slipped over the end of the drum by passing the said arm through the gap.

15. In a machine as set forth in claim 13, bearing blocks mounted on the arms in which the ends of the presser roll are journaled; means for adjusting the blocks; and means for clamping the blocks in adjusted position.

16. In a machine as set forth in claim 13, an annular member adjustably mounted on one end of the drum adapted to be engaged by the end of the dummy plate to hold the dummy plate in different positions thereon.

17. In a machine as set forth in claim 13, said projecting means comprising spring pressed plungers extending through the drum gap and carrying the crimping bar; bores in said drum receiving said plungers; and means on the plungers cooperating with the bores to limit the outward movement of the plungers.

18. In a machine as set forth in claim 13, said means operable by the frame for shifting the crimping bar, comprising cam fingers on the frame adapted to engage the outer face of the projected crimping bar adjacent the end of the revolution of the frame and upon further rotation of the frame to force the crimping bar at the other end of the printing plate into the drum gap and against the opposite side wall of the gap in the dummy plate.

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