Mar. 27, 1923. 1,449,427

H. McCABE

FLANGING MACHINE

Filed June 2, 1920

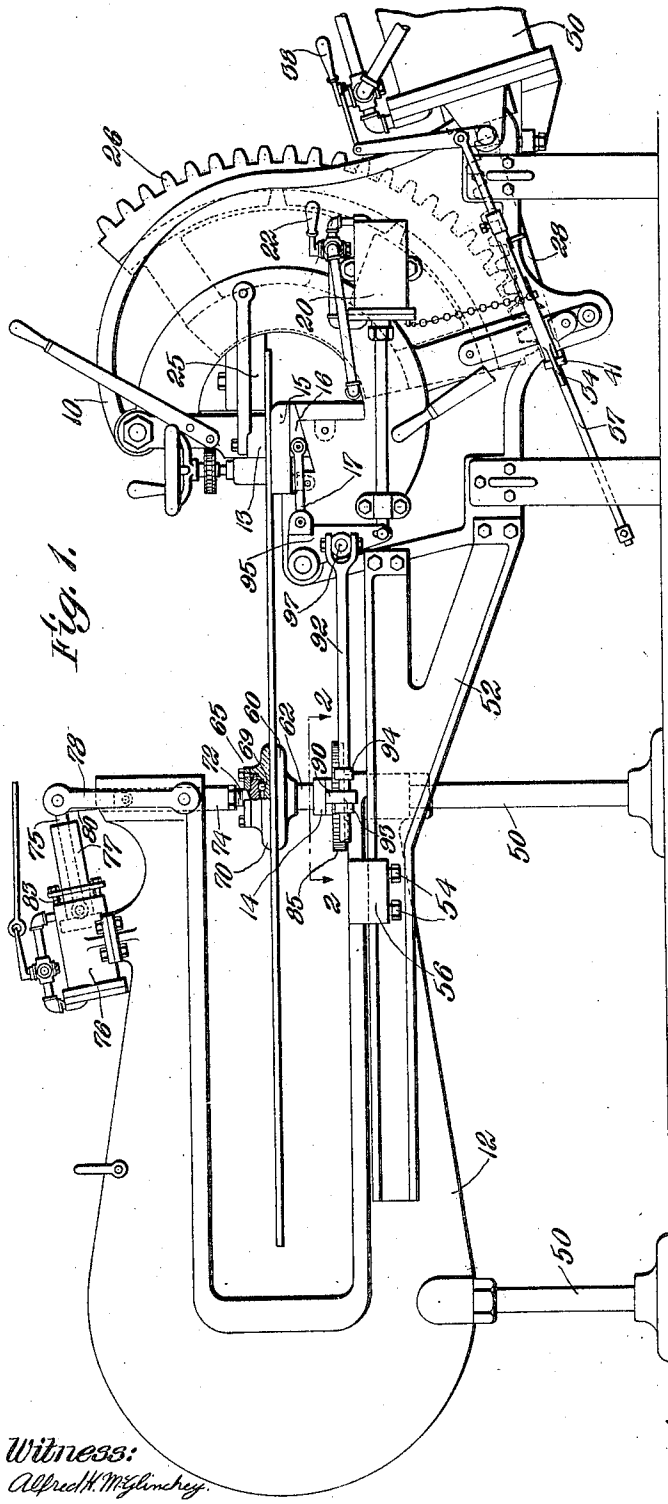


Fig. 1.

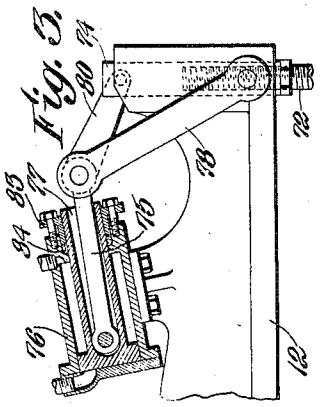


Fig. 3.

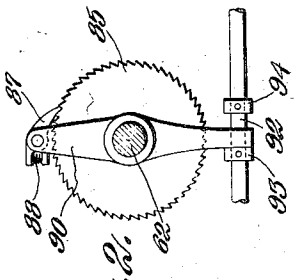


Fig. 2.

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UNITED STATES PATENT OFFICE.

HUGH McCABE, OF LAWRENCE, MASSACHUSETTS.

FLANGING MACHINE.

Application filed June 2, 1920. Serial No. 385,884.

To all whom it may concern:

Be it known that I, HUGH McCABE, a citizen of the United States, residing at Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Flanging Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a flanging machine and more particularly to a flanging machine of the type disclosed in the patent to Hugh McCabe No. 1,006,861, dated October 24, 1911, upon which the present invention is an improvement.

The object of the invention is to provide a flanging machine adapted to support the work to be flanged in an operative position and to automatically move it to present successive unflanged portions to a position to be flanged during the normal operation of the flanging machine.

To this end the invention consists in the flanging machine hereinafter described and claimed.

In the drawing illustrating the preferred embodiment of the invention, Figure 1 is a side elevation of the flanging machine; Fig. 2 is a sectional detail on line 2—2 Fig. 1; and Fig. 3 is an enlarged detail of the pneumatically operated work clamp.

Referring to the drawing, the improved flanging machine comprises a flanging machine of the McCabe type illustrated by the general reference 10, a frame 12 for supporting the body portion of the work during the flanging operation, and a mechanism 14 operated automatically during the operation of the flanging machine 10 to present successive unflanged portions of the work to a position to be flanged. In the embodiment of the invention illustrated in the drawing, the frame 12 and mechanism 14 are illustrated as adapted for supporting and feeding circular plates.

The flanging machine 10 is provided with an edge clamp for clamping the work near the portion to be flanged, comprising top and bottom plates 13, 15 and a wedge 16 actuated from a pneumatic cylinder 20 through a linkage 17. The bottom plate 15 is lifted by the wedge 16 to clamp the work against the top plate 13. The operation of the pneumatic cylinder is controlled by a handle 22. The portion of the work to be flanged is engaged by a bender 25 carried upon a bender segment 26 actuated by a rack 28. The rack 28 is reciprocated by a pneumatic cylinder 30 and is capable of being disengaged from the bender segment in order to reposition it so as to progressively advance the bender. The bender is normally oscillated through an arc of approximately 40°, and provision is made for positioning the normal arc of oscillation of the bender so that the flange is advanced through successive arcs of approximately 40°, 30° and 30°. The mechanism for positioning the normal arc of oscillation of the bender includes a rotary pawl 34, mounted upon a rod 37 connected to a handle 38 which controls the operation of the pneumatic cylinder 30. The pawl 34 is constructed and arranged to engage a stop lug 41 on the rack in certain instances, as is fully disclosed and claimed in my co-pending application Serial No. 385,885 filed on even date herewith.

The general construction and mode of operation of flanging machines of the McCabe type are well known and are described in Patent No. 1,006,861 to which reference may be had.

The frame 12 for supporting the body portion of the work is mounted upon standards 50, and is secured in an adjusted position with relation to the flanging machine 10, by two heavy brackets 52, bolted to opposite sides of the frame of the flanging machine 10, and adjustably secured to the frame 12 by set screws 54 in a guard 56 extended from the side of the lower portion of the frame 12 and under the webs of the brackets 52.

The work is supported upon a supporting plate 60 mounted upon the upper end of a shaft 62 rotatably supported in the lower portion of the frame 12. Provision is made for clamping the work against the plate 60, and for this purpose the frame 12 is provided with a pneumatically operated work clamp 65. The work clamp 65 comprises a clamping plate 70 rotatably supported upon ball bearings 69 interposed between the plate 70 and the lower end of a shaft 72 adjustably secured to a reciprocating plunger 74 mounted in the upper portion of the frame 12. The plunger 74 is reciprocated by a pneumatic cylinder 76 through a connecting rod 75, one end of which is received within a hollow piston rod 77 and is pivoted

thereto, and the other end of which is pivoted to the upper end of an arm 78. The lower end of the arm 78 is pivoted to the frame 12. The opposite ends of a second and shorter arm 80 are pivotally secured to the connecting rod 75 and to the upper end of the movable plunger 74 respectively. By reference to Figs. 1 and 3, and from the description thus far, it will be observed that as the piston of the pneumatic cylinder 76 is moved to the right upon its forward stroke, the arms 78 and 80 are moved from the position shown in Fig. 3 to that shown in Fig. 1, with the result that the plunger 74 is depressed. When the parts are in the position shown in Fig. 1, with the arms 78 and 80 in alinement, the work is firmly clamped against the supporting plate 60 and is retained in its clamped position until the arms are moved from alinement upon the return stroke of the piston to the left, Fig. 1. The hollow piston rod 77 permits movement of the end of the connecting rod 75 in the arc of a circle about the pivot point of the lower end of the arm 78, and at the same time permits an air-tight joint to be maintained between the piston rod and the pneumatic cylinder by a stuffing box 83 and packing 84 of well known construction.

In order to rotate the work to present successive unflanged portions to a position to be operated upon by the bender 25, the shaft 62 is provided with a ratchet wheel 85 and with a pawl 87 normally held in engagement with the teeth of the ratchet wheel by a spring 88. The pawl 87 is mounted upon one end of an oscillatory arm 90 loosely mounted upon the shaft 62 and the end of the arm remote from the pawl is provided with a hole through which a rod 92 passes. The rod 92 is provided with stop collars 93, 94 adapted to successively engage the end of the oscillatory arm 90 and to actuate the pawl in opposite directions. The position of the stop collars 93, 94 upon the rod determines the extent of lost motion between the movements of the rod and the pawl. The end of the rod 92 is connected to a bell crank 95 of the linkage 17, which operates the wedge 16 to clamp the work at a point near the flange. A swivel connection 97 is provided between the rod 92 and bell crank 95 in order to permit swinging movements of the rod as the pawl 87 is oscillated.

From the description thus far, it will be apparent that when the wedge 16 is moved to unclamp the work at a point near the flange, the movements of the wedge 16 are accompanied by movements of the bell crank 95 to the left, viewing Fig. 1. This causes movement of the rod 92 and the stop collars 93, 94 to the left. The position of the stop collar 94 upon the rod is such that it does not engage the oscillatory arm 90 until after the wedge 16 has receded a certain amount in order that the work may be unclamped and be free to move when the stop collar 94 engages the arm and actuates the pawl to rotate the work. The continued movement of the rod 92 as the wedge 16 recedes operates to rotate the shaft 62, supporting plate 60, and work clamp 65 together with the work. The extent of movement of the wedge 16 and of the rod 92 and stop collar 94 is sufficient to cause rotation of the ratchet wheel to move the work so as to present an unflanged portion to a position to be flanged by the bender. As the wedge is again operated by the linkage 17 to clamp the work, the second stop collar 93 engages the oscillating arm 90 as the rod 92 is moved to the right, viewing Fig. 1, and withdraws the pawl to its initial position. In this manner, each time that the work is unclamped by the wedge, a fresh unflanged portion is automatically moved into a position to be engaged by the bender and to be flanged.

While the invention has been illustrated and described as embodied in a machine adapted to support and move circular plates so as to present unflanged portions to a position to be flanged, it will be understood that the invention may be embodied in other forms adapted to support and move other shapes of plates.

Having thus described the invention, what is claimed is:

1. A flanging machine having, in combination, means for clamping the plate near the portion of the work to be flanged, means for forming the flange, means for supporting the body portion of the work, and means operative when the work is unclamped near the flange, for automatically moving the work to present an unflanged portion to a position to be flanged.

2. A flanging machine having, in combination, means for clamping the work near the portion to be flanged, means for forming the flange, a movable clamp for supporting and clamping the body portion of the work, and means operative when the work is unclamped near the flange, for moving the clamp and work to present an unflanged portion of the work to a position to be flanged.

3. A flanging machine having, in combination, means for clamping the work near the portion to be flanged, means for forming the flange, means for supporting the body portion of the work, and means actuated by said clamping means when the work is unclamped near the flange, for moving the work to present an unflanged portion thereof to a position to be flanged.

4. A flanging machine having, in combination, incremental flange forming means, clamping means for clamping the work near the portion to be flanged, a support for the work, and automatic feeding means for

feeding the work between successive flanging operations.

5. A flanging machine having, in combination, an edge clamp for holding the work near the portion to be flanged, means for forming the flange and pneumatically operated means for clamping the body portion of the work in an operative position and pneumatically operated means for rotating the work after the latter has been released by the edge clamp to present an unflanged portion to a position to be flanged.

6. A flanging machine having, in combination, an edge clamp for holding the work near the flange, actuating means therefor, means for forming the flange and a rotatable device for supporting and clamping the body portion of the work in an operative position, and means actuated by the edge clamp actuating means when the edge clamp is released for rotating the work to present an unflanged portion to a position to be flanged.

7. A flanging machine having, in combination, an edge clamp for clamping the work near the portion to be flanged, means for flanging the work, a rotatable clamp for supporting and holding the body portion of the work in an operative position, and means for turning the rotatable clamp to move an unflanged portion of the work to a position to be flanged, said rotatable clamp including a frame, a supporting plate rotatably mounted in the frame, and a pneumatically operated member for holding the work against the supporting plate.

8. A flanging machine having, in combination, an edge clamp for clamping the work near the portion to be flanged, means for flanging the work, a rotatable clamp for supporting and holding the body portion of the work in an operative position, and means for turning the rotatable clamp to move an unflanged portion of the work to a position to be flanged, said means including a ratchet wheel, a pawl and connections between the pawl and the edge clamp having provision whereby actuation of the pawl to cause movement of the work is deferred until the edge clamp has released the work.

9. A flanging machine having, in combination, an edge clamp for clamping the work near the portion to be flanged, means for actuating the edge clamp, means for flanging the work, a rotatable clamp adapted to support and hold the body portion of the work in an operative position, and means for turning the rotatable clamp to move an unflanged portion of the work to a position to be flanged, said means including a ratchet and pawl, a link connecting the pawl with the edge clamp actuating means, and adjustable blocks on the link adapted to permit lost motion between movements of the link and the pawl.

10. A flanging machine having, in combination, an edge clamp for clamping the work near the portion to be flanged, means for flanging the work, a rotatable clamp for supporting and holding the body portion of the work in an operative position, and means for turning the rotatable clamp to move an unflanged portion of the work to a position to be flanged, said clamp including a frame, a supporting plate rotatably mounted therein, and a pneumatically operated mechanism for holding the work against the supporting plate, comprising a work engaging plate, a plunger reciprocatingly mounted in the frame, a pneumatic piston, and connections between the piston and plunger, said work engaging plate having provision for permitting rotation thereof upon the plunger while the work is being clamped.

11. A flanging machine having, in combination, an edge clamp for clamping the work near the portion to be flanged, means for flanging the work, a rotatable clamp for supporting and holding the body portion of the work in an operative position, and means for turning the rotatable clamp to move an unflanged portion of the work to a position to be flanged, said rotatable clamp including a frame, a supporting plate rotatably mounted in the frame, and a pneumatically operated mechanism for holding the work against the supporting plate, said means for rotating the rotatable clamp comprising a ratchet wheel operatively connected with the supporting plate, a pawl, and connections between the pawl and the edge clamp actuating means having provision for permitting lost motion between the operation of the edge clamp and the actuation of the pawl.

12. A flanging machine having, in combination, work supporting means, means for forming the flange, and pneumatically operated means for clamping the body portion of the work in an operative position and for rotating the work after the flange has been formed.

13. A flanging machine having, in combination, a work support, means for clamping the work thereon, incremental flange forming means, means for holding the work from movement during each operation of the flange forming means, feeding means and connections between the feeding means and means for holding the work operating after each release of the holding means to bend the work to present a new increment of work to the flange forming means.

HUGH McCABE.