Oct. 26, 1926. 1,604,345

C. C. GROTNES

METAL WORKING MACHINE

Filed Oct. 10, 1922 3 Sheets-Sheet 1

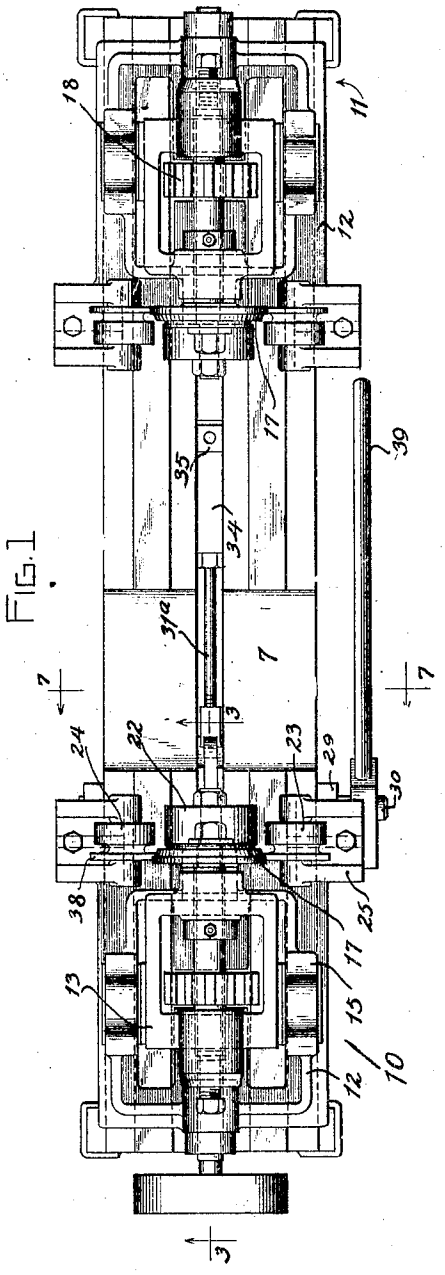


FIG. 1.

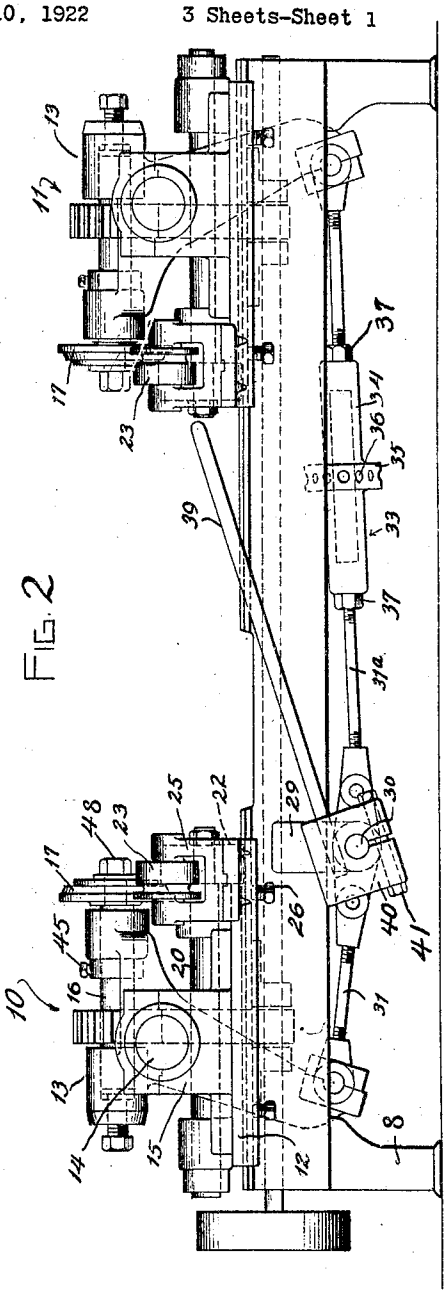


FIG. 2.

INVENTOR
CARL C. GROTNES
By Schmidtchl, Parker & Carlson.
ATTYS.

Oct. 26, 1926. 1,604,345

C. C. GROTNES

METAL WORKING MACHINE

Filed Oct. 10, 1922. 3 Sheets-Sheet 2

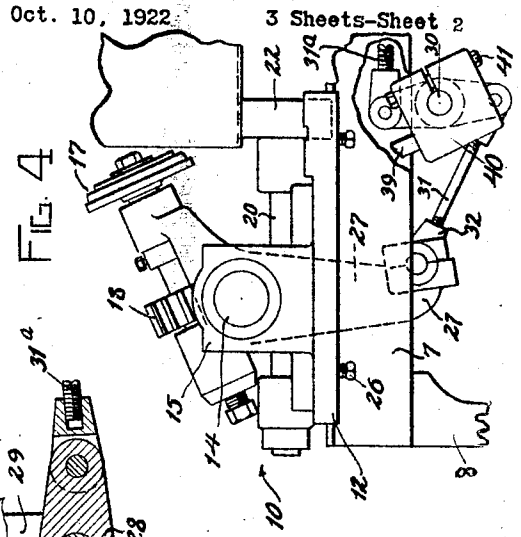


FIG. 4

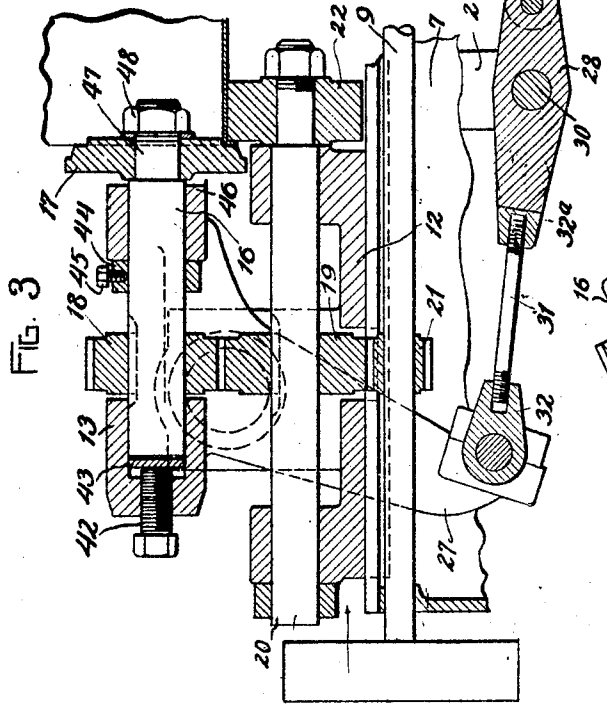


FIG. 3

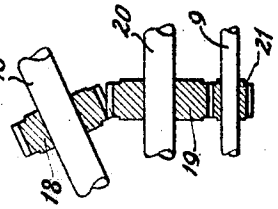


FIG. 6

INVENTOR
CARL C. GROTNES
By Churchill, Parker & Carlson.
ATTYS.

Oct. 26, 1926. 1,604,345

C. C. GROTNES

METAL WORKING MACHINE

Filed Oct. 10, 1922 3 Sheets-Sheet 3

Fig. 5

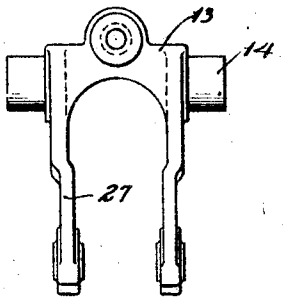
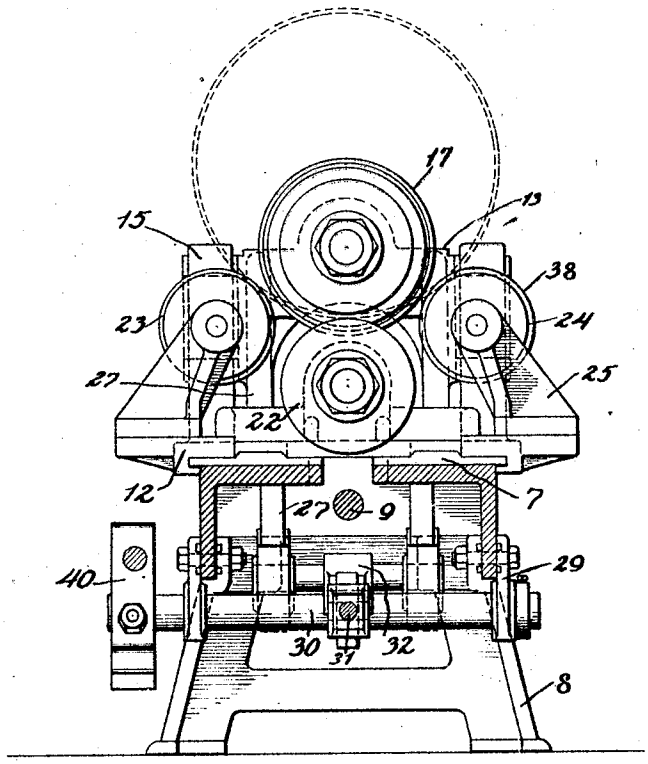


Fig. 7



INVENTOR
CARL C. GROTNES
By Clendahl, Parker & Carlson.
ATTYS.

Patented Oct. 26, 1926. 1,604,345

UNITED STATES PATENT OFFICE.

CARL C. GROTNES, OF CHICAGO, ILLINOIS.

METAL-WORKING MACHINE.

Application filed October 10, 1922. Serial No. 593,506.

The invention relates to the manufacture of metallic barrels and like articles, and has especial reference to a machine for forming or shaping the end portions of a metallic body or cylinder such, for example, as forming flanges in the ends of a cylinder, which are employed in securing the heads in place to form the barrel.

The object of my invention generally stated is to produce a machine of this class which will render possible a substantial decrease in the cost of manufacture of metallic barrels.

In flanging machines of the prior art, the cylinders which are to be flanged are placed endwise into position with respect to the forming rolls, it being necessary for the attendant to position the cylinder specially for each flanging operation, so that when, as is usually the case, the opposite ends of the cylinder are flanged, the handling time is duplicated. In carrying out the object of my invention above set forth, I provide a machine in which both ends of the cylinder may be flanged simultaneously, and in which the cylinders are moved into operative position in the machine by simply rolling the same transversely of the machine bed into position between opposed forming means. This renders it possible to transfer the cylinders quickly and with a minimum expenditure of effort from the machine performing the immediately preceding operation (usually a beading machine) directly to the flanging machine by means of inclined ways, it being only necessary for the operator in positioning a cylinder to guide the same between the two sets of forming rolls.

An important object of the invention is to provide a construction and arrangement of the parts such that the movable forming rolls may be swung readily into an inoperative or open position to permit of the proper positioning of the cylinder in the machine, and without necessitating a stoppage of the machine during the intervals between the successive operations.

A general object of the invention is to provide a construction and arrangement of the parts enabling the manufacture of the machine at a relatively low cost.

In the accompanying drawings, I have shown but one embodiment of my invention. It is contemplated, however, that various changes in the form, construction and arrangement of the parts may be made by those skilled in the art without departing from the spirit and scope of the invention as expressed in the appended claims.

Figure 1 of the drawings is a plan view illustrating a machine constructed in accordance with my invention. Fig. 2 is a side elevational view of the machine. Fig. 3 is a fragmentary longitudinal sectional view taken in the plane of line 3 of Fig. 1 but on an enlarged scale. Fig. 4 is a fragmentary side elevational view showing one of the movable forming rolls in inoperative or open position. Fig. 5 is a view showing the movable roll-carrying head and its swinging arms detached. Fig. 6 is a sectional detail view showing the continuous connection provided between the driving and driven gears for the movable head. Fig. 7 is a vertical sectional view taken in the plane of line 7—7 of Fig. 1.

The machine comprises a bed or frame 7 supported upon legs 8 and having journaled therein a main drive shaft 9. A pair of heads 10 and 11 are mounted upon the bed for relative endwise adjustment. These heads are of generally similar construction, each comprising (Fig. 3) a base portion 12 in the form of a rectangular frame adapted to be clamped to the bed and an upper or swinging portion 13 also in the form of a frame and pivotally mounted upon the base portion on transversely extending trunnions 14 journaled in spaced standards 15 rising from the base portion. The upper swinging portion 13 has mounted therein a longitudinally extending spindle 16 carrying at its inner end a movable forming roll 17. A spur gear 18 fast upon the spindle meshes with a similar gear 19 fast upon a shaft 20 which is journaled in the base portion 12 of the head. The gear 19 in turn meshes with a pinion 21 fast upon the drive shaft 9, and the arrangement is such that the upper portion of the head is swingable upon the lower portion while the teeth of the intermeshing gears 18 and 19 remain interengaged (Fig. 6).

The inner end of the shaft 20 carries a lower or stationary forming roll 22, and auxiliary cylinder-supporting rolls 23 and 24 are mounted upon opposite sides of the roll 22 (Fig. 1). These rolls 23 and 24 are journaled upon laterally adjustable supports 25.

In practice only one of the heads need be adjusted longitudinally of the bed, al-

though both heads are herein shown as being capable of movement, being each provided with gibs adapted to engage with flanges on the longitudinal frame members and provided with clamping screws 26 (Figs. 2 and 4).

The rolls 17, being thus mounted upon the heads 10 and 11 for swinging movement, means is provided for effecting their simultaneous movement with the utmost ease. Such means comprises a pair of arms 27 rigid with the upper portion 13 of each head and depending between the side frame members of the bed for connection with a common lever 28. The latter is pivotally mounted upon a bracket 29 carried by one of the side frame members, being pivoted between its ends to said bracket as at 30. The arms 27 of the head 10 are connected by means of a rod 31 rigid at opposite ends with pivot blocks 32 and 32[a] which are respectively pivoted between the arms 27 and to the lever 28. The arms 27 of the head 11 are similarly connected to the lever 28 by a rod 31[a], which in this instance is sectional in construction having interposed therein an adjusting device 33 whereby the rolls 17 of the two heads may be caused to engage with their coacting rolls 22 at the same time. This adjusting device comprises simply a sleeve 34 into the opposite end of which the sections of the rod 31 are screwed, the rods being provided with right and left hand threads so that rotation of the sleeve will decrease or increase the effective length of the rod in a well known manner. A central collar 35 provided with apertures 36 is rigid with the sleeve, the apertures being adapted to receive a suitable tool for turning the sleeve. Lock nuts 37 may be provided at each end of the sleeve to hold the parts in adjusted relation.

In order to flange the opposite ends of a cylinder of a predetermined length, the heads 10 and 11 are relatively positioned so that when the rolls 17 are in the position shown in Fig. 4 the opposite ends of the cylinder project slightly beyond the roll 22 as shown. This position is determined by flanges 38 upon the supporting rolls 23 and 24 which, it will be remembered, are carried by the heads. These rolls are also adjusted laterally so that they coact with the roll 22 in supporting the cylinder. The lever 28 is now swung upon its pivot 30 whereby to force the arms 27 outwardly and move the rolls 17 downwardly toward the rolls 22 as shown in Fig. 3.

Such swinging movement of the lever 28 may be effected in any suitable way. Herein it is accomplished manually by means of a hand lever 39 carried by a block 40 which is clamped by means of a bolt 41 upon the pivotal shaft 30 of the lever. The arrangement is such that the hand lever is swung from a normal substantially upright position (Fig. 4), approximately into a horizontal position (Fig. 2), in order to swing the rolls 17 downwardly with respect to the rolls 22.

In order to enable the adjustment of the rolls 17 with respect to the rolls 22 to accommodate cylinders constructed from sheet metal of varying thicknesses, the spindles 16 are adjustable longitudinally in the swinging head portions 13 (Fig. 3). To this end each of said portions 13 is provided with an adjusting screw 42 the inner end of which bears against a disk 43 of fibre or the like which contacts the outer end of the spindle. A collar 44 is secured by means of a set screw 45 substantially midway between the ends of the spindle and coacts with the front bearing 46 to prevent forward movement of the spindle in the head. The roll 17 is clamped upon a reduced forward end portion 47 of the spindle by means of a nut 48. As shown in said figure ample clearance is allowed between the inner end of the bearing 46 and the roll to permit of the desired adjustment of the spindle.

It will be observed that the construction which I have provided is relatively simple, and that by reason of the arrangement of the parts the cylinders may be rolled transversely of the machine frame into position upon the rolls 22, 23 and 24 carried by each of the heads 10 and 11. The operation of bringing the rolls into coacting relation to form the flanges may be accomplished with the expenditure of very little effort and with the consumption of very little time; and the further fact that both ends of the cylinder are flanged simultaneously obviously increases very materially the efficiency of the machine. Moreover, the parts are readily adjustable to accommodate cylinders of various sizes and sheet materials of different gages.

I claim as my invention:

1. A metal working machine comprising, in combination, a horizontal frame, heads mounted upon said frame in spaced relation and each comprising a pair of forming rolls one of which is mounted to swing into a position at one end of the other roll so as to permit a cylinder to be placed in position upon such other roll, and means for swinging the movable rolls of the two heads simultaneously into coacting relation with their corresponding stationary rolls.

2. In a machine of the character described, the combination of a pair of stationarily mounted heads each having a roll mounted to turn on a fixed axis and a roll mounted on an axis approximately parallel to the fixed axis and movable in an arcuate path away from the first mentioned roll, and means for swinging the movable rolls in unison into

and out of engagement with the opposite ends of a cylinder resting upon the stationary rolls, said heads being mounted for adjustment to vary their longitudinal spaced relation.

3. A metal working machine comprising a horizontal frame, forming means including two sets of rolls mounted upon the frame in longitudinally spaced relation, each set comprising a roll movable into a position to permit the positioning of a cylinder with respect to the forming means of which it forms a part, means for swinging the movable rolls of the two sets simultaneously into operative engagement with the opposite ends of the cylinder, and means for rotating the movable rolls during their movement into such operative position.

4. In a machine of the character described the combination of a pair of stationarily mounted heads each having a roll mounted to turn on a fixed axis and a roll mounted on an axis approximately parallel to the fixed axis and movable in an arcuate path away from the first mentioned roll, and means operatively connecting said movable rolls to cause them to operate in unison into and out of engagement with the opposite ends of a cylinder resting upon the stationary rolls.

5. In a metal working machine, the combination of a head having a stationary portion, a shaft journaled in said stationary portion and carrying a forming roll thereon, the head also having a movable portion pivotally mounted upon the stationary portion to swing on an axis extending transversely of the head, a spindle journaled in the movable portion of the head having a roll fast thereon and adapted to swing into and out of a cylinder placed upon the first mentioned roll, and means for driving said spindle, adapted to permit of such swinging movements.

6. In a metal working machine, the combination of a head having a stationary portion and a movable portion, the latter being pivotally mounted upon the stationary portion, a driven shaft mounted in the stationary head portion and having a forming roll rigid therewith, a relatively short spindle journaled in the movable head portion and also having a forming roll rigid therewith swingable into and out of a cylinder placed upon the other roll, and a pair of intermeshing spur gears fast upon the shaft and the spindle respectively and adapted to permit swinging movement of the spindle while imparting rotation thereof to the shaft.

7. A machine of the character described comprising a horizontal frame, forming means including two sets of rolls mounted upon the frame in longitudinally spaced relation, each set comprising a roll movable into position to permit the positioning of a cylinder with respect to the forming means of which the said movable roll forms a part, means for swinging the movable rolls of the two sets simultaneously into operative engagement with the opposite ends of the cylinder, and means for rotating at least one roll of each set.

8. A machine of the character described having a horizontal frame, a pair of heads mounted upon the frame, forming means carried by the respective heads and each comprising a pair of rolls one of which is mounted for swinging movement toward and from the other roll, and a common means for controlling the movable rolls of the two heads whereby the opposite ends of a cylinder placed between the heads may be operated upon simultaneously.

9. A machine of the character described having a horizontal frame, a pair of heads mounted upon the frame, forming means carried by the respective heads and each comprising a pair of rolls one of which is mounted for swinging movement toward and from the other roll, and a common means for controlling the movable rolls of the two heads whereby the opposite ends of a cylinder placed between the heads may be operated upon simultaneously, one of said heads being adjustable longitudinally with respect to the other and said common control means being adjustable to compensate for such relative adjustment of the heads.

10. A metal working machine comprising a frame, a pair of heads mounted upon the frame and each having a forming roll mounted for swinging movement thereon, and means for controlling the swinging movements of said rolls comprising a pair of arms pivotally mounted upon the respective heads, a lever pivoted between its ends upon the frame between the heads, and links connecting the opposite ends of said lever with the respective arms.

11. A metal working machine comprising a frame, a pair of heads mounted upon the frame and each having a forming roll mounted for swinging movement thereon, and means for controlling the movements of said rolls comprising a pair of arms pivotally mounted upon the respective heads, a lever pivoted between its ends at a point between the heads, and links connecting the opposite ends of said lever with the respective arms, one of said heads being adjustable relative to the other, and one of said links being adjustable to compensate for the adjustment of the head.

12. In a metal working machine, the combination of a frame, two sets of forming means mounted upon the frame in spaced relation and each comprising a movable roll, and means for controlling the positions of said movable rolls comprising a pair of piv-

oted arms operable to move said rolls, a lever mounted on a fixed axis between said arms, links connecting the arms with the opposite ends of the levers, and a hand lever for swinging the pivoted lever.

13. A machine of the class described comprising, in combination, a frame, rollers mounted on the frame in longitudinally spaced relation and adapted to rotatably support the opposite ends of a cylinder, stationarily mounted forming rolls beneath the ends of the cylinder when thus supported on said rollers, and a pair of forming rolls mounted on axes spaced from the stationary rolls for movement in arcuate paths into opposite ends of the cylinder and downwardly upon the inner periphery thereof into approximately parallel relation to said stationary rolls.

In testimony whereof, I have hereunto affixed my signature.

CARL C. GROTNES.