W. B. GODDARD.

SHEET METAL BILGE BARREL FORMING MACHINE.

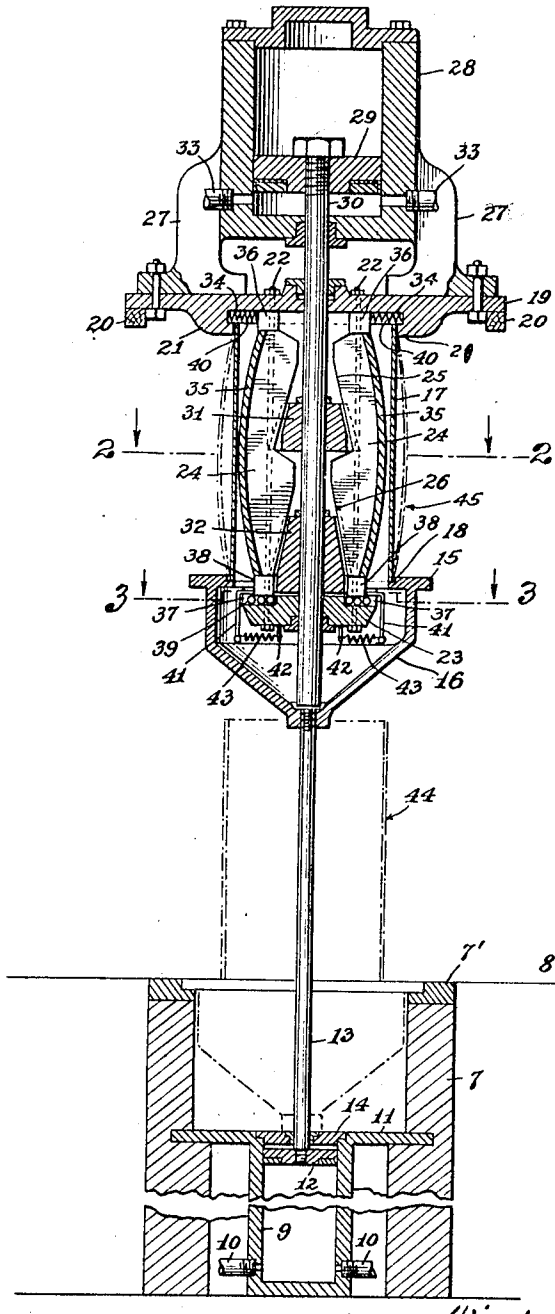
APPLICATION FILED JUNE 3, 1918.

1,285,982.

Patented Nov. 26, 1918.

2 SHEETS—SHEET 1.

Fig. 1.



Inventor

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2 SHEETS—SHEET 2.

Fig. 2.

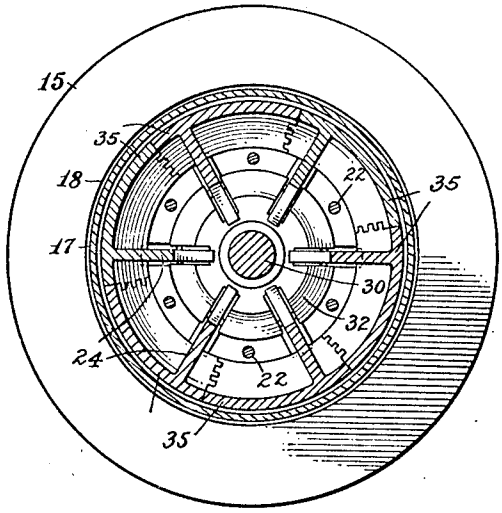
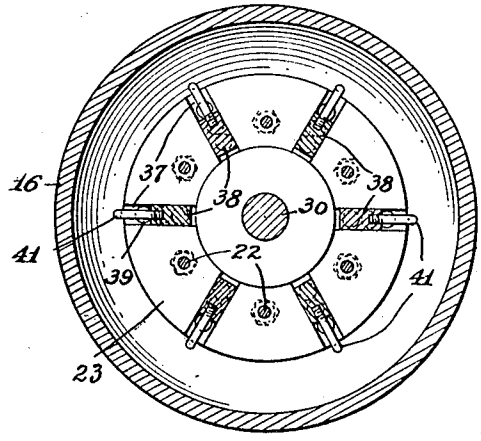


Fig. 3.



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UNITED STATES PATENT OFFICE.

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SHEET-METAL-BILGE-BARREL-FORMING MACHINE.

1,285,982. Specification of Letters Patent. Patented Nov. 26, 1918.

Application filed June 3, 1918. Serial No. 237,854.

To all whom it may concern:

Be it known that I, WILLIAM B. GODDARD, a citizen of the United States, and a resident of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Sheet-Metal-Bilge-Barrel-Forming Machines, of which the following is a specification.

This invention relates generally to machines for forming the body portions of sheet-metal bilge-barrels from cylindrical blanks, with more particular reference to means for facilitating and expediting the entire forming operation, including the positioning and adjusting of the blank, manipulation of the expanding dies and the removal of the formed barrel-body. In the present invention, the principles underlying the expanding operation *per se* do not differ greatly from those underlying the invention a practical and convenient embodiment of which was shown and described in a prior Patent, No. 1,058,669, granted to me April 8, 1913, although I believe that I have improved upon the formerly-disclosed means for retracting the expanding dies after completion of the expanding operation and otherwise simplified the mechanism with a view to insuring greater accuracy, speed and dependability. The machine embodying my former invention, however, while undoubtedly capable of performing eminently satisfactory—not to say the very best—results in so far as is concerned the character and condition of the product thereof, as well as other bilge-barrel forming machines known to me, are so generally constructed as to unnecessarily limit the output capacity thereof, due to a large extent, at least, to the time required to position and adjust the blank in the forming mechanism and remove the formed barrel-body therefrom.

The principal object of the present invention, therefore, may be said to be the utilization of the principles of the invention of my earlier patent aforesaid in a machine which not only may be charged and discharged with the utmost rapidity, but in which the means for carrying out said principles are materially simplified and improved. Incidental to the above, I have in view a construction which is generally durable, dependable, not likely to get out of order or adjustment, and the parts of which are readily accessible at any time for repair or replacement.

My invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a certain sectional elevation of a practical and convenient embodiment of my invention;

Fig. 2 is a horizontal section taken substantially on the line 2—2 of Fig. 1, and

Fig. 3 is a horizontal section taken substantially on the line 3—3 of Fig. 1.

Referring now to the drawings in detail, numeral 7 designates the side wall of a preferably circular or cylindrical pit or chamber located below the floor-line (8) of the workroom, the upper edge of said wall being flush with said floor-line. Within this pit or chamber is mounted the metal cylinder 9 which forms the ram-chamber of an hydraulic pump or jack with the supply and discharge ducts 10 10, one of which may be said to lead into the bottom of the ram-chamber from any suitable or usual source of supply of liquid under pressure, and the other out of said ram-chamber and back to said source of supply. These ducts 10 10 are provided with cock-controlled valves whereby an operative may quickly and readily control the flow of liquid into and out of the ram-chamber. As this is a common and well-known expedient, adapted to be carried out in any number of common and well-known ways, and forms no part of this invention, the control cocks are not shown in the drawings. The side wall 7 of the pit or chamber will generally be constructed of concrete, or possibly of bricks, and in either case the cylinder 9 may be—and for stability I prefer should be—supported by means of the plate 11 suitably secured to—but preferably, as shown, forming a flange on—the upper end of said cylinder and set into said side wall.

Within the ram-cylinder 9 is mounted to reciprocate in the usual manner the piston-head 12 at the lower end of the piston-rod 13 which has the usual slide bearings in the plate or cap 14 which seals the upper end of the ram-chamber. At the upper end of the rod 13 is mounted what may be generally termed an annular platform 15 which preferably forms a combined external and internal flange at the top of the conico-cylindrical bracing support or carrier 16. The reasons for the particular construction and configuration of this platform and its sup-

porting or carrying means will subsequently be made clear, although it may be best stated here that the portion of the platform 15 which constitutes the external flange to which I have referred is provided in order that the same may be received within a corresponding groove or channel in the preferably metal ring 7′ which I have shown as capping the side wall 7 of the pit, whereby when said platform is in its lowermost position it is firmly supported with its upper face flush with the floor-line, as indicated by the broken lines in Fig. 1. The cylindrical blank from which the barrel-body is to be formed is placed upon the platform and the formed barrel-body is removed therefrom when said platform is in this depressed or lowermost position, and it will be apparent that these operations are facilitated by eliminating all obstructions to the even sliding of the blank from floor to platform and of the formed barrel-body from platform to floor. The upper edge of the upper face of the circular platform 15 is chamfered to provide a seat for the lower end of the cylindrical blank 17 and a retaining shoulder 18 which prevents lateral movement of this end of the blank under action of the expanding dies as hereinafter described.

Rigidly supported at a suitable distance above the floor-line is the heavy and preferably circular plate 19. It will be apparent that this plate may be suspended from the ceiling of the room, or it may be mounted upon cross-beams 20 20, properly spaced apart, as shown. On the under side of this plate is an annular rib 21 shaped to form an internal annular shoulder providing a circular pocket or recess for the reception of the upper end of the cylindrical blank 17 which fits reasonably snugly therein, whereby the upper end of the blank is held against lateral movement under action of the forming dies. Suspended from the plate 19 by means of a plurality of rods 22 22, having suitable retaining nuts at both ends thereof, is the heavy metal supporting disk 23.

Between the disk 23 and the plate 19 is mounted an expander, made up, of a plurality (I have shown six) of expanding dies 35 35. Exteriorly, these dies are substantially identical with those shown and described in detail in my prior Patent No. 1,058,669, aforesaid. Each die proper comprises a plate or web curved to correspond with the desired curvature of the corresponding area of the bilge-barrel body, and the side edges of the dies are provided with interfitting mortises and tenons, or dovetailed, constituting fingers which bridge the space which would otherwise be left between two adjacent dies when the expander is in its expanded condition, as indicated in Fig. 2 and as shown and described in detail in my prior patent aforesaid. Interiorly, however, the radially-disposed wing 24 of each die, instead of presenting an edge which includes oppositely-disposed inclined planes to the wedge-blocks (hereinafter described), as was the case in the machine of my prior patent aforesaid, presents an edge which includes the inclined planes 25 and 26, correspondingly disposed, as shown.

Bolted to the upper face of the plate 19 are arms 27 27 which carry the ram-cylinder 28 within which reciprocates the piston 29. Suitably secured to and depending from the piston 29 is the piston-rod 30 which passes through suitable slide bearings in the plate 19 and the disk 23. Fixed upon this rod 30 are the wedge-blocks 31 and 32, the former being located to coöperate with the inclined planes 25 25 of the die-wings 24 24 and the latter being located to coöperate with the inclined planes 26 26 of said wings, whereby upward movement of said rod will with great power effect outward movement of said dies and uniform expansion of the expander as a whole. The ram-cylinder 28 is provided with the ducts 33 33 which correspond in all respects with the ducts 10 10 of the cylinder 9, have the same functions and are similarly controlled.

In the lower face of the plate 19 and within the recess provided by the annular rib 21, are provided radially-disposed grooves or channels 34 34, and each of the dies 35 has at its upper end a block 36 slidable in one of said grooves or channels. Similarly, the upper face of the disk 23 is correspondingly provided with grooves or channels 37 37 which receive the blocks 38 38 at the lower ends of the dies 35 35. In this manner, expanding and contracting movements of the dies are guided and controlled. I prefer to interpose rollers 39 39 between the lower blocks 38 38 and the bases of the grooves 37 37 to overcome the friction which would otherwise be generated by the weight of the dies and tend to prevent or impair perfectly uniform expansion of the expander as a whole.

To restore the expander to its normally contracted condition after an expanding operation, to permit of the removal of the formed barrel body and the positioning of another blank, I have shown a compression spring 40 interposed in each of the grooves 34 between the block 36 therein and the end of said groove, while each of the lower blocks 38 is provided with a bent rod 41 which clears the edge of the disk 23 and between the lower end of which and a suitable pin or post 42 on the lower face of said disk is interposed the tension spring 43. There being no load to overcome during the contracting movement of these dies, these springs will effect contraction of the expander as a whole upon withdrawal of the

wedge-blocks 31 and 32 through downward movement of the piston-rod 30.

Initially, the platform 15 is in its most depressed and seated position, as hereinbefore described, and when said platform is in this position a blank 44 (see dotted lines in Fig. 1) is placed thereon and seated in the recess provided by the retaining shoulder 18. Liquid under pressure is then admitted to the ram-cylinder underneath the piston 12 in the ram-cylinder 9 through one of the ducts 10, which operates to raise the platform 15 until the upper end of the blank is received by and seated within the recess provided by the shoulder 22 of the annular rib 21 on the plate 19. While the blank is being withheld in this position, liquid under pressure is admitted to the ram-chamber within the cylinder 28 below the piston 29, which operates in the manner described to raise the wedge-blocks 31 and 32 and force outwardly the dies 35 35 and form the bilge-barrel body 45 (see dotted lines in Fig. 1). It is well known that sheet steel, even of the very best quality, is not absolutely homogeneous, and unless the cylindrical blank is held against lateral movement the weaker portions of the metal would be the first to yield under action of the expanding dies and the expansion would not be uniform. Therefore, I provide the retaining shoulders 18 and 22 which firmly hold the blank against lateral and insure uniform expansion.

Upon completion of the expanding or forming operation, the liquid is released from the ram-chamber within the cylinder 28, and the piston 29 with its rod 30 is lowered by gravity (or is otherwise restored by conventional means) to its initially depressed position, depressing the wedge-blocks 31 and 32 and thereby permitting contraction of the expander under action of the springs 40 and 43 in the manner described. The liquid in the ram-chamber within the cylinder 9 is then discharged through the other duct 10, and the platform 15 with the formed bilge-barrel body thereon descends to its initial position, the formed barrel body is removed, and another blank is positioned for a repetition of the forming operation.

It is thought to be apparent that the device of the present invention retains all of the advantages and improvements set forth in connection with the device of my prior patent aforesaid—possibly even to a more marked degree—and in addition substantially and materially increases the output capacity of the machine. Furthermore, it will be noted that by suspending the expander well above the floor line, the scale which peels off the sheet steel during the expanding operation and the dirt and refuse matter will fall or may be brushed upon the floor.

Many modifications of minor details of my improved sheet-metal bilge-barrel forming machine will doubtless readily suggest themselves to those skilled in the art to which it appertains, and I therefore do not desire to limit my invention to this specific construction herein shown and described.

I claim as new and desire to secure by Letters Patent:

1. The combination, with relatively elevated means for expanding a cylindrical sheet-metal blank to bilge shape, said means including means adapted to receive the upper end of the blank and hold the same against lateral movement, of a vertically reciprocable platform adapted to raise a blank to and position the same in said expanding means, said platform being provided with means adapted to receive the lower end of the blank and hold the same against lateral movement during the expanding operation.

2. The combination, with a relatively elevated expander adapted to form a bilge-barrel body from a cylindrical sheet-metal blank, and means associated with said expander adapted to receive the upper end of the blank and hold the same against lateral movement, of a vertically reciprocable platform adapted to raise a blank to said expander and support the same during the expanding operation, said platform being provided with means adapted to receive the lower end of the blank and hold the same against lateral movement.

3. The combination, with a relatively elevated expander adapted to form a bilge-barrel body from a cylindrical sheet-metal blank, and means associated with said expander adapted to receive the upper end of the blank and hold the same against lateral movement, of a vertically reciprocable platform adapted to raise a blank to said expander and support the same during the expanding operation, said platform being provided with means adapted to receive the lower end of the blank and hold the same against lateral movement, and means for contracting said expander after the expanding operation to permit withdrawal of the formed barrel body with said platform when the latter is lowered.

4. The combination, with a relatively elevated expander adapted to form a bilge-barrel body from a cylindrical sheet-metal blank, and means associated with said expander adapted to receive the upper end of the blank and hold the same against lateral movement, of a vertically reciprocable platform adapted to raise a blank to said expander and support the same during the expanding operation, said platform being provided with means adapted to receive the lower end of the blank and hold the same against lateral movement, and means for automatically contracting the expander after each expanding operation to permit

withdrawal of the formed barrel body with said platform when the latter is lowered.

5. In a machine for forming bilge-barrel bodies from cylindrical sheet-metal blanks, the combination, with a relatively elevated former comprising separable segments adapted to be moved radially to have the effect of expanding said former, and means associated with said former adapted to receive the upper end of the blank and hold the same against lateral movement under action of the former-segments, of a vertically reciprocable platform adapted to raise a blank to said former and support said blank during the forming operation, said platform being provided with means adapted to receive the lower end of the blank and hold the same against lateral movement.

6. In a machine for forming bilge-barrel bodies from cylindrical sheet-metal blanks, the combination, with a relatively elevated former comprising separable segments adapted to be moved radially to have the effect of expanding said former, and means associated with said former adapted to receive the upper end of the blank and hold the same against lateral movement under action of the former-segments, of a vertically reciprocable platform adapted to raise a blank to said former and support the same during the forming operation, said former being provided with means adapted to receive the lower end of the blank and hold the same against lateral movement, and means for returning said segments to their initial relative positions to have the effect of contracting said former and permit withdrawal of the formed barrel body with said platform when the latter is lowered.

7. In a machine for forming bilge-barrel bodies from cylindrical sheet-metal blanks, the combination, with a relatively elevated former comprising separable segments adapted to be moved radially to have the effect of expanding said former, and means associated with said former adapted to receive the upper end of the blank and hold the same against lateral movement under action of the former-segments, of a vertically reciprocable platform adapted to raise a blank to said former and support the same during the forming operation, said former being provided with means adapted to receive the lower end of the blank and hold the same against lateral movement, and means for automatically returning said segments to their initial relative positions to have the effect of contracting said former and permit withdrawal of the formed barrel body with said platform when the latter is lowered.

8. In a machine for forming bilge-barrel bodies from cylindrical sheet-metal blanks, the combination, and means for holding the extreme ends only of said blank against lateral movement, of a former comprising a plurality of separate segments adapted to be moved radially to have the effect of expanding said former, the segmental former when expanded being exteriorly of substantially the size and shape of the desired bilge-barrel body, each of said segments being provided interiorly with correspondingly disposed inclined faces, wedge-blocks between and common to all of said segments and acting against said inclined faces to move said segments radially to have the effect of expanding said former, and means common to all of said wedge-blocks to actuate the same.

9. In a machine for forming bilge-barrel bodies from cylindrical sheet-metal blanks, the combination, and means for holding the extreme ends only of said blank against lateral movement, of a former comprising a plurality of separate segments adapted to be moved radially to have the effect of expanding said former, the segmental former when expanded being exteriorly of substantially the size and shape of the desired bilge-barrel body, each of said segments being provided interiorly with correspondingly disposed inclined faces, wedge-blocks between and common to all of said segments and acting against said inclined faces to move said segments radially to have the effect of expanding said former, said wedge-blocks being fixed upon a rod adapted to move the same longitudinally of said inclined faces, and means for reciprocating said rod.

10. In a machine for forming bilge-barrel bodies from cylindrical sheet-metal blanks, the combination, and means for holding the extreme ends only of said blank against lateral movement, of a former comprising a plurality of separate segments adapted to be moved radially to have the effect of expanding said former, the segmental former when expanded being exteriorly of substantially the size and shape of the desired bilge-barrel body, each of said segments being provided interiorly with a radially disposed wing having correspondingly inclined faces on its edge, wedge-blocks between and common to all of said segments and acting against said inclined faces to move said segments radially to have the effect of expanding said former, and means common to all of said wedge-blocks to actuate the same.

11. In a machine for forming bilge-barrel bodies from cylindrical sheet-metal blanks, the combination, and means for holding the extreme ends only of said blank against lateral movement, of a former comprising a plurality of separate segments adapted to be moved radially to have the effect of expanding said former, the segmental former when expanded being exteriorly of substantially

the size and shape of the desired bilge-barrel body, each of said segments being provided interiorly with correspondingly disposed inclined faces, wedge-blocks between and common to all of said segments and acting against said inclined faces to move said segments radially to have the effect of expanding said former, means for reciprocating said wedge-blocks, and springs associated with said segments and adapted to return the latter to initial positions upon withdrawal of said wedge-blocks to have the effect of contracting said former.

In testimony of the foregoing, I have hereunto set my hand in the presence of two witnesses.

WILLIAM B. GODDARD.

Witnesses:
EMILIE P. GODDARD,
MABEL GODDARD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."