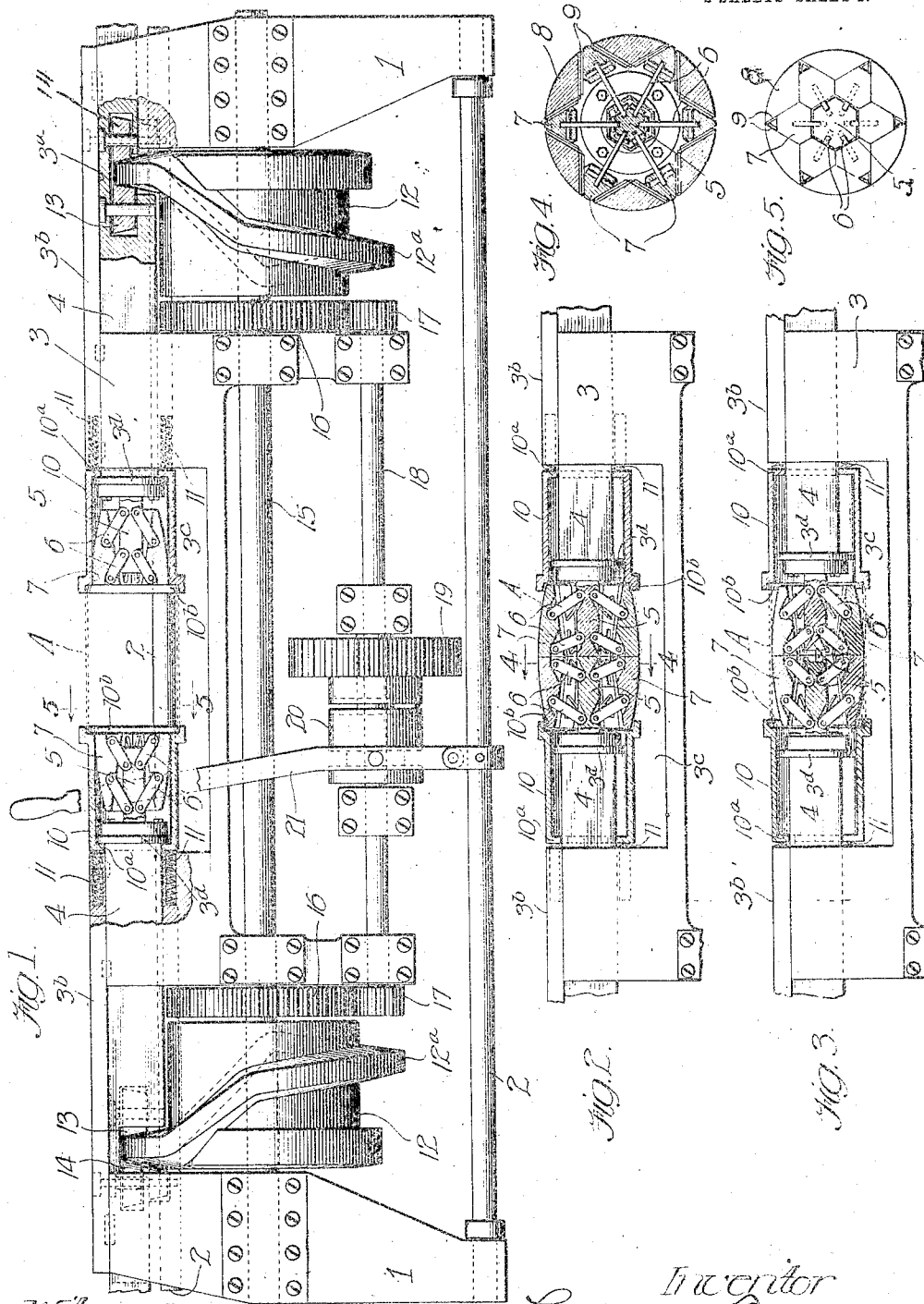


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MACHINE FOR FORMING BARRELS.
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Patented Oct. 1, 1912.

2 SHEETS-SHEET 1.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR FORMING BARRELS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LEONHARD BAUROTH, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Machines for Forming Barrels, of which the following is a specification.

My invention relates to machines for forming the bodies of metallic barrels of bilge form from cylindrical blanks of proper diameter and length, according to the size of the barrel desired, and of suitable material such as sheet steel.

Speaking in general terms my machine comprises a pair of plungers movable toward and away from each other and carrying at their outer ends a pair of expansible heads composed of die members which are outwardly and radially expansible by pressure of contact with each other, the die being expanded outwardly against the inner surface of the barrel blank which is thereby shaped to the same form as the outer surface of the die members when thus expanded. By preference, and as herein shown, the expansible heads are so constructed that they initially contact and grip the barrel blank midway of its length after which the pressure is applied progressively outwardly toward opposite ends.

My machine embodies other novel and advantageous features of construction including barrel holders, which will be made apparent from the description hereinafter given.

In the drawings Figure 1 is a plan view of one embodiment of my invention; Fig. 2 a detail plan view of the plungers and expansible heads in their relative positions at the completion of the formation of the barrel body; Fig. 3 a view similar to Fig. 2 but illustrating the position of the plungers and heads at the initial contacting of the barrel blank by the heads; Fig. 4 a section on the line 4—4 of Fig. 2; Fig. 5 a section on the line 5—5 of Fig. 1; Fig. 6 an end elevation of the machine of Fig. 1, said elevation being a view of the left-hand end thereof; and Fig. 7 an enlarged sectional detail view on the line 7—7 of Fig. 6 but on a larger scale.

Referring to the present embodiment of

my invention as herein illustrated, the main portion of the machine comprises end frames 1, 1, connected by tie rods 2, 2, and a bed plate 3. This bed plate is provided with guides 3^a in which slide plungers 4 which are movable toward and away from each other in suitable manner as by the particular means hereinafter described. These guides are closed at their outer sides by means of the longitudinal plates 3^b, thereby confining the plungers within the guides. The intermediate portion of the bed plate at one side thereof as at 3^c is cut away so as to provide a space for the operation of the expansible heads now to be described. Each plunger carries at its outer end an expansible head comprising essentially a core or supporting member and a series of outer and intermediate die members. As shown the supporting member 5 of each head is secured rigidly to the outer end of its plunger and the same has connected to it by pivotal means such as the links 6, a series of intermediate die members 7. These links are arranged to act in parallel relationship and are connected at their outer ends with the supporting member and intermediate die members respectively, each of said die members being individually connected with the supporting member by its own pair of links. The inner side of each of these die members is slotted or recessed so as to permit of the proper and sufficient relative movements of the die members and links with respect to the supporting member. The outer series of die members 8 are the same in number as the inner or intermediate series and surround the same. They are mounted to slide upon the intermediate members and have a tongue and groove connection therewith as indicated at 9, the tongues and grooves extending transversely of the faces of said members. The construction and arrangement of the parts is such that when, in the inward movement of the plungers the outer adjacent faces of the two heads contact and are thereby arrested, the pressure causes a radial expansion of the die members against the cylindrical barrel blank indicated at A, the plungers and the central support 5 continuing to move inwardly toward each other after the die members have begun to co-

operate with the barrel blank. In the described expanding operation the intermediate members are expanded radially and act as wedges upon the outer die members, as will be clearly apparent from an inspection of Fig. 4. The die members are of such shape that when they are fully expanded they conform to the desired shape of the bilge of the barrel. Moreover, these die members are so formed that they increase in cross section from their inner to their outer ends in order that when expanded their outer ends shall contact the blank first, as just explained.

Upon the outer ends of the plungers are mounted the work holders, each comprising a hollow cylinder or shell 10 having an inturned annular flange 10^a at its inner end adapted to cooperate with a flange 3^a on its plunger. The outer end of each holder is flanged and outwardly flared to form a socket 10^b to receive an end of the barrel blank. When the expansible heads are retracted they are located within these hollow work holders as illustrated in Fig. 1, but upon the movement of the plungers toward each other the heads are forced out of the holders as illustrated in Figs. 2 and 3. The two holders are held projected toward each other and against the ends of the barrel blank with a yielding pressure as by means of the coiled springs 11 located in spring chambers in the bed plate 3 and cover plate 3^b. When the plungers are retracted to their fullest extent they slightly withdraw or retract the holders by reason of the engagement of the shoulders 3^a and 10^a, it being understood that after the barrel blank has been inserted and the plungers have started to approach each other the work holders will advance slightly and be held in engagement with the ends of the blank by reason of the pressure of said springs. The holders 10 apply pressure to the ends of the barrel blank and keep pressing against such ends in the contracting movement of the latter incident to the formation of the bilged barrel body from such blank.

As stated, any suitable mechanism may be employed for properly reciprocating the plungers, and the particular driving mechanism herein shown represents one means which may be used. As shown, the plungers are acted upon by a pair of drum cams each having a cam rib 12^a adapted to cooperate with rollers 13 and 14 journaled within the plungers toward one end. By a single rotation of the cam drums the plungers are given a complete reciprocation. These cam drums are secured to a shaft journaled in the end frames 1 of the machine and driven through the medium of the gear 16 thereon, pinions 17 on a drive shaft 18, a drive gear 19 loosely mounted on the drive shaft and adapted to be placed into

engagement therewith by means of the clutch 20 secured to the drive shaft and operated by the clutch shifter 21. The gear 19 is operated in any suitable manner and by operating the shifter 21 the drive shaft 18 is caused to be rotated and likewise the cam drums and plungers are actuated.

By the means above described I am enabled to form bilged barrel bodies from sheet metal with great rapidity and economy and to obtain uniformity and perfection in the product. Moreover, in the particular mechanism described, the barrel bodies are formed without the employment of an outer or hollow die.

I claim:

1. In a machine for forming barrels from cylindrical blanks, an expansible die and means cooperating therewith to initially engage the die with the middle portion of the blank and expand the same, thereafter progressively applying expanding pressure toward the opposite ends.

2. In a machine for forming barrels from cylindrical blanks, an expansible die structure adapted to be placed within a blank and comprising a series of die members which are of greater width at that portion presented to the blank midway of its length, and means for causing said members to expand, whereby the die initially applies pressure to the blank midway of its length and progressively outwardly toward the end thereof.

3. In a machine for forming barrels from cylindrical blanks, an expansible die structure adapted to be placed within a blank and comprising a series of die members which are of decreasing cross sections from that portion presented to the blank midway of its length, and means for causing said members to expand, whereby the die initially applies pressure to the blank midway of its length and progressively outwardly toward the ends thereof to form the body of a bilged barrel.

4. In a machine for forming barrels from cylindrical blanks, an expansible die structure adapted to be placed within a blank and comprising a series of inner and outer die members which, when expanded, correspond with the interior of the body of a bilged barrel, said die members being of a form to contact with the interior of the blank midway of its length upon the initial expansion and to apply pressure to such blank progressively toward the ends thereof, and means for expanding the die members.

5. In a machine for forming barrels from cylindrical blanks, an expansible die structure adapted to be placed within a blank and comprising a series of inner and outer die members which, when expanded, correspond with the interior of the body of a bilged barrel, said die members being of

greatest cross section at that portion presented to the blank midway of its length, and means for causing said members to expand, whereby the die initially applies pressure to the blank midway of its length and progressively, outwardly toward the end thereof.

6. In a machine for forming barrels from cylindrical blanks, an expansible die structure adapted to be placed within a blank and comprising a series of die members adapted to initially contact the blank midway of its length, a central support for said members, and means for moving said support to cause expansion and contraction of the members.

7. In a machine for forming barrels from cylindrical blanks, an expansible die structure adapted to be placed within a blank and comprising a series of die members adapted to initially contact the blank midway of its length, a central support for said members, pivoted links between said support and members, and means for moving said support to cause expansion and contraction of the members.

8. In a machine for forming bilged barrels from cylindrical blanks, an expansible die structure adapted to be placed within a blank and including an outwardly movable portion constructed and arranged, in act of expanding, to initially grip and hold and to apply pressure to the blank midway of its length and to apply pressure progressively toward opposite ends thereof, and means for applying pressure to an end of the blank.

9. In a machine for forming bilged barrels from cylindrical blanks, an expansible die structure adapted to be placed within a blank and including an outwardly movable portion constructed and arranged, in act of expanding, to initially grip and hold and to apply pressure to the blank midway of its length and to apply pressure progressively toward opposite ends thereof, and means for applying pressure to both ends of the blank.

10. In a machine for forming bilged barrels from cylindrical blanks, an expansible die structure adapted to be placed within a blank and including an outwardly movable portion constructed and arranged, in act of expanding, to initially grip and hold and to apply pressure to the blank midway of its length and to apply pressure progressively toward opposite ends thereof, and holders for engaging the ends of the blank and following them up in their contracting movement resultant upon the formation of the bilge.

11. In a machine for forming bilged barrels from cylindrical blanks, an expansible die structure adapted to be placed within a blank and constructed and arranged, in act of expanding, to initially grip and hold and to apply pressure to the blank midway

of its length and to apply pressure progressively toward opposite ends thereof, and spring-pressed holders for engaging the ends of the blank with a yielding pressure and arranged to follow them up in their contracting movement resultant upon the formation of the bilge.

12. In a barrel forming machine, a pair of plungers movable toward and away from each other, and diametrically expansible heads carried by the plungers.

13. In a barrel forming machine, a pair of plungers movable toward and away from each other, and diametrically expansible heads carried by the plungers and arranged to be expanded by pressure of each against the other.

14. In a barrel forming machine, a pair of plungers movable toward and away from each other, and expanding heads mounted upon the inner ends of the plungers, each head having expanding die members which are outwardly movable by contact of the heads with each other.

15. In a barrel forming machine, a pair of plungers movable toward and away from each other, and expansible heads carried by the plungers, each head comprising a central support connected with its plunger and a series of die members pivotally connected with such support.

16. In a barrel forming machine, a pair of plungers movable toward and away from each other, and expanding heads mounted upon the inner ends of the plungers, each head having a series of pivoted die members which are outwardly movable by contact of the heads with each other.

17. In a barrel forming machine, a pair of heads movable toward and away from each other and having expanding die members which are of greater width at their outer ends in order to initially contact the barrel blank midway of its length.

18. In a barrel forming machine, a pair of heads movable toward and away from each other and having expanding die members which are of greater width at their outer ends and are inclined from such ends inwardly toward their central longitudinal axis in order to initially contact the barrel blank midway of its length.

19. In a barrel forming machine, a pair of heads movable toward and away from each other, each head comprising a central support and a series of die members connected therewith and of increasing cross section from their inner to their outer ends in order that when expanded their outer ends shall contact the blank first.

20. In a barrel forming machine, an expanding head consisting of a central support, a series of die members each connected thereto by a pair of pivoted links and extending beyond the central support when in

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collapsed position and adapted to be swung outward by pressure upon their projecting ends.

21. In a barrel forming machine, an expanding head consisting of a central support, a series of intermediate die members mounted upon and movable toward and away from the same, and also in a direction longitudinally thereof, and an outer series of die members surrounding and mounted upon the intermediate members and movable relatively thereto.

22. In a barrel forming machine, an expanding head consisting of a central support, a series of intermediate die members mounted upon and movable toward and away from the same, and an outer series of die members surrounding and mounted upon the intermediate members and movable relatively thereto both radially and longitudinally thereof, the outer faces of both the outer and intermediate members being shaped to conform to the desired form of barrel.

23. In a barrel forming machine, the combination of a pair of plungers movable toward and away from each other, diametrically expansible heads carried by the plungers, and holders for engaging the ends of the barrel blank.

24. In a barrel forming machine, the combination of a pair of plungers movable toward and away from each other, diametrically expansible heads carried by the plungers, and holders for engaging the ends of the barrel blank, said holders being hollow and arranged to surround the heads when retracted.

25. In a barrel forming machine, the combination of a pair of plungers movable toward and away from each other, diametrically expansible heads carried by the plungers, and holders for engaging the ends of the barrel blank and mounted upon the plungers respectively.

26. In a barrel forming machine, the combination of a pair of plungers movable toward and away from each other, diametrically expansible heads carried by the plungers, holders for engaging the ends of the

barrel blank, and means for pressing the holders toward each other with a yielding pressure.

27. In a barrel forming machine, the combination of a pair of plungers movable toward and away from each other, diametrically expansible heads carried by the plungers, and holders for engaging the ends of the barrel blank, and springs acting upon the holders for pressing them toward each other with a yielding pressure.

28. In a barrel forming machine, the combination of a pair of plungers movable toward and away from each other, diametrically expansible heads carried by the plungers, and holders for engaging the ends of the barrel blank, said holders being mounted upon the plungers respectively and being arranged to be slightly retracted thereby when the latter are retracted.

29. In a barrel forming machine, the combination of a pair of plungers, movable toward and away from each other, diametrically expansible heads carried by the plungers, and holders mounted upon the plungers respectively and having circular sockets to engage the ends of the barrel blank.

30. In a barrel forming machine, the combination of a pair of plungers movable toward and away from each other, diametrically expansible heads carried by the plungers, and hollow holders surrounding the heads when retracted and mounted upon the plungers, said holders and plungers having cooperating flanges whereby the holders are slightly retracted with the plungers and heads.

31. In a barrel forming machine, the combination of a pair of plungers movable toward and away from each other, diametrically expansible heads carried by the plungers, holders for engaging the ends of the barrel blank, a bed plate having guides for said plungers and also having spring chambers, and springs therein acting upon the holders.

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