May 17, 1938. C. B. LANGSTROTH 2,117,435

MACHINE FOR USE IN MANUFACTURING BOILER SHELLS

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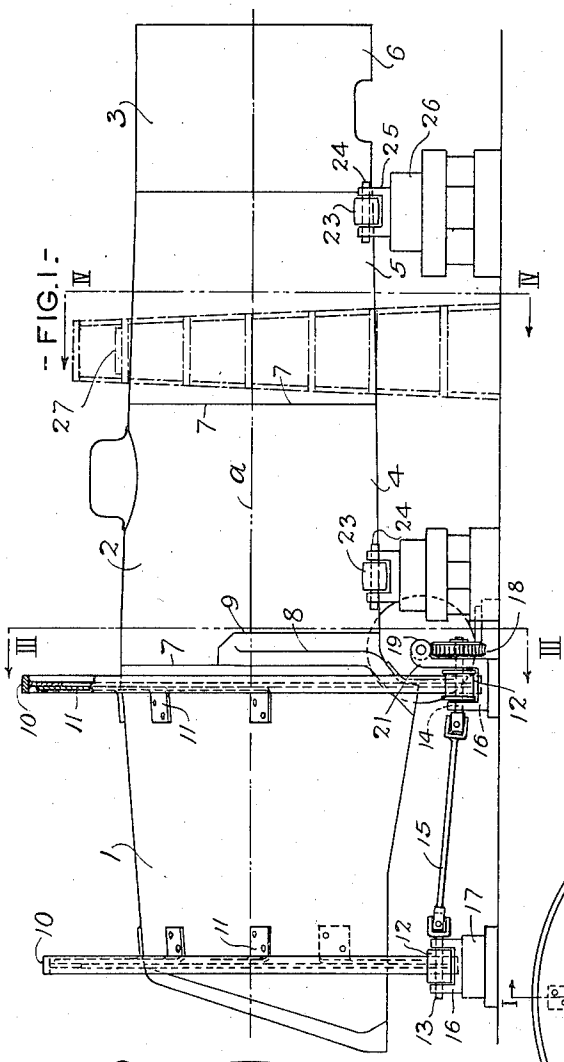


FIG. 1.

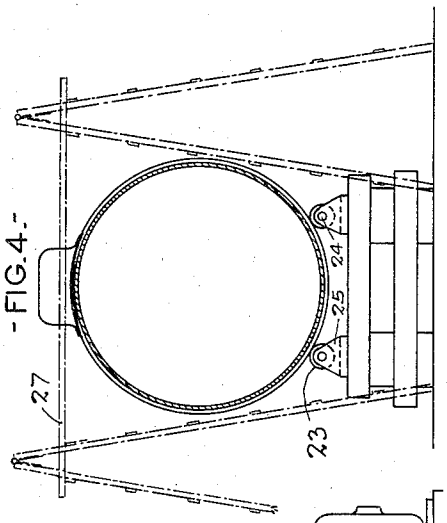


FIG. 4.

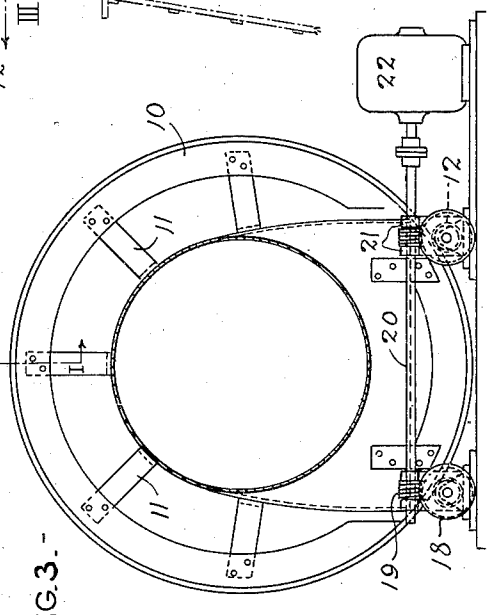


FIG. 3.

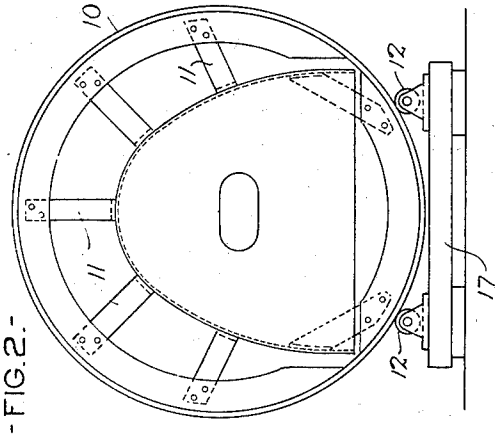


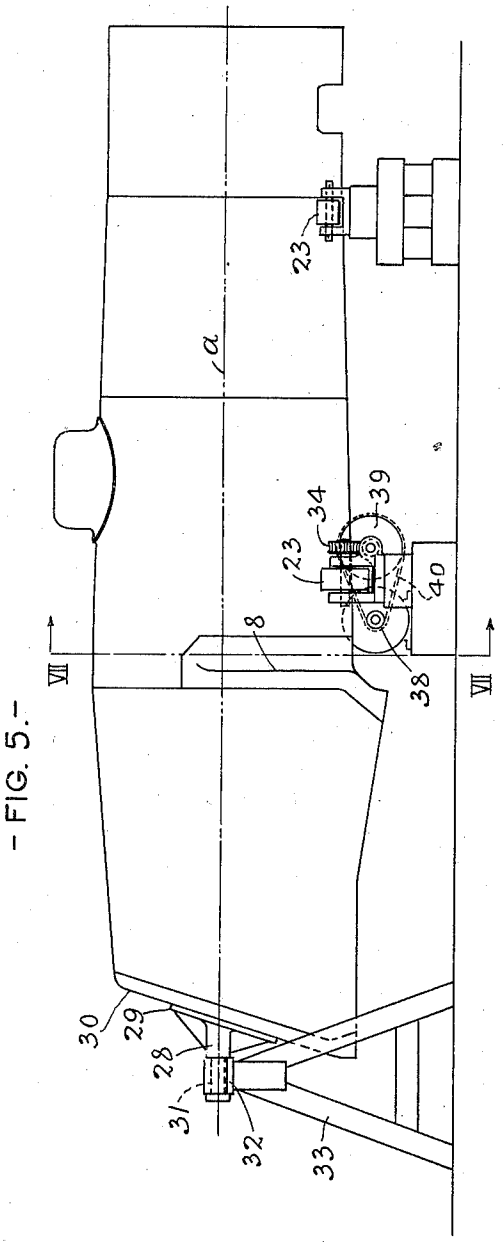
FIG. 2.

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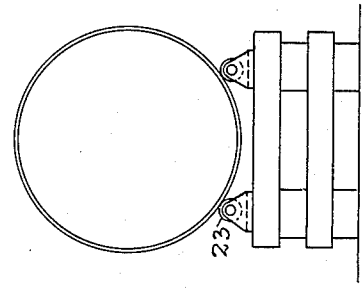
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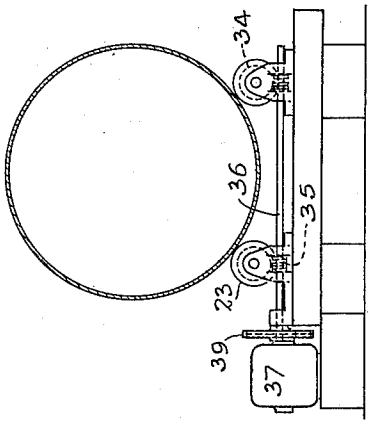
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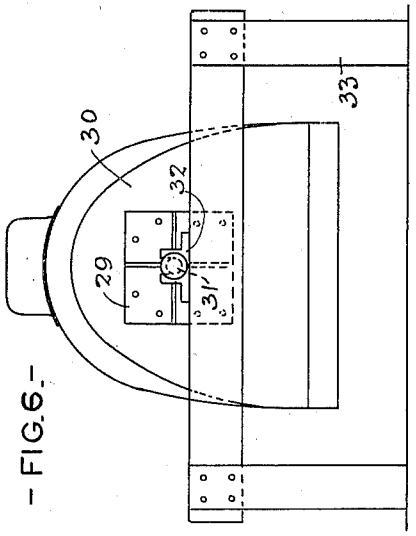
- FIG. 5. -



- FIG. 8. -



- FIG. 7. -



- FIG. 6. -

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UNITED STATES PATENT OFFICE

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MACHINE FOR USE IN MANUFACTURING BOILER SHELLS

Clifford B. Langstroth, Plainfield, N. J.

Application May 20, 1937, Serial No. 143,677

2 Claims. (Cl. 113—99)

This invention relates to improvements in machines for use in manufacturing boiler shells.

The invention has for its object the devising of a machine for use in the manufacture of boiler shells of sectional formation comprising circular and non-circular parts, the machine being for use during the welding of transverse seams of the shell, to the end that such a boiler shell may be constructed at a much less cost than heretofore.

Referring to the drawings, Figure 1 is a side elevation of the machine of the present invention showing a boiler shell supported thereby; Fig. 2 is an end view of the machine and boiler shell shown in Fig. 1, viewed from the left thereof; Fig. 3 is a section on the line III—III of Fig. 1; Fig. 4 is a section on the line IV—IV of Fig. 1; Fig. 5 is a view similar to Fig. 1 showing a modification of the machine; Fig. 6 is an end view of the machine and boiler shell shown in Fig. 5, viewed from the left thereof; Fig. 7 is a section on the line VII—VII of Fig. 5; and Fig. 8 is an end view of the machine and boiler shell shown in Fig. 5, viewed from the right thereof.

The type of boiler shell with which the present invention is concerned is that having a portion substantially circular in cross section and a portion non-circular in cross section. The boiler herein exemplified is of the firebox-fire-tube type in which the shell portion for the firebox is non-circular in cross section and the shell portion for the fire tubes is circular in cross section. The boiler may, as in usual practice, be constructed with or without a combustion chamber, as desired. Accordingly the boiler shell comprises a firebox section or portion 1 (which may or may not include a combustion chamber, as desired) non-circular in cross section, and a portion 2, substantially circular in cross section, enclosing the fire tubes and at the end 3 providing the confining walls for the smokebox which may or may not be circular in cross section, as desired. The boiler shown is of the locomotive type but the invention is not limited in this respect. It will be understood that the shell shown is complete only insofar as is necessary as involving the present invention.

The portion 2 is formed of separate sections varying in number as desired. In the present instance the portion 2 is formed of three sections 4, 5 and 6. These sections are formed of the usual boiler plate material and may be secured together at their longitudinal seams (not shown) in any desired manner but preferably by welding. The firebox portion 1 is constructed in any well-known or preferred manner. Likewise the longitudinal seams of this section (not shown) are preferably welded together. After the sections have been formed they are assembled in their proper relation and their adjacent edges 7 sufficiently spot welded to temporarily hold the sections in place to form the shell. While spot welding is preferred, any suitable temporary fastening means may be employed.

In the present embodiment the shell is provided with a throat sheet 8 of usual construction which is likewise spot welded along its edges 9 although if desired it may be completely welded to one of the sections 1 or 4 before the sections are assembled.

Having completed this part of the manufacture of the shell, the shell is placed in the machine preparatory to further welding which effects a permanent welding of the edges together, as will later more fully appear.

Referring to Figs. 1 to 4 of the drawings, the machine of this embodiment comprises one or more rings 10, two being used in the present instance, through which the non-circular firebox section 1 extends, this section, as before remarked, including a combustion chamber when desired. The rings are connected to the shell by supports 11, the supports being bolted to the shell to render the shell easily detachable therefrom. The supports are of suitable lengths, taking into consideration the part of the shell to which they are respectively bolted, to maintain concentricity between the rings.

The rings are supported on rollers 12, each ring being supported on two rollers positioned one at each side of the vertical longitudinal center plane. The rollers of the outer ring are secured on shafts 13 and those of the inner ring upon shafts 14. The shafts 13 are connected together, as are also the shafts 14, by a flexible shaft 15 so that a drive may be provided for positively driving each roller. The shafts of the rollers are mounted in bearing blocks 16 secured to base blocks 17. The shafts 14 are extended and on their extended ends are secured worm wheels 18 engaging worms 19 secured on a shaft 20 journalled in bearings 21 formed on the bearing blocks 16 for the shafts 14. An electric motor 22 is coupled with the shaft 20 providing thereby a positive drive for all the rollers supporting the rings 10.

The portion 2 of the shell is supported on a plurality of rollers 23, two pairs of such rollers being employed in the present instance, one pair disposed near the throat sheet 8 and the other pair near the smokebox end. The rollers 23 are mounted on shafts 24 journalled in bearing blocks

25 mounted on base blocks 26. These rollers 23 are vertically disposed in relation to the rings 10 and the shell supported thereby so that they will support their portions of the weight of the shell in a manner to permit the shell to be freely rotated about an axis longitudinally thereof, or more strictly about the longitudinal axis of the sections of the portion 2 substantially circular in cross section, indicated at *a*.

A portable platform 27 is provided which may be moved to positions near the respective adjacent edges to be welded and serves as a station for the welder and welding apparatus (not shown) to which the adjacent edges to be permanently welded will gradually approach, and the speed of the motor 22 will be regulated so that sufficient time will be given the welder to apply the welding material to the edges as they approach the station while revolving about the axis *a*.

The adjacent edges 7 and 9 are shown in the same plane to provide a butt weld joint and they may be shaped and juxtaposed in any well-known manner to provide a welding groove. The adjacent edges, instead of being butted together, may be lapped and permanently secured together by fillet welds. And in any case the welding may be carried on to any desired extent on the inside of the shell, it being understood that the invention is not confined to any particular kind of welding.

Figs. 5 to 8 show a modification of the machine, the boiler shell and method of welding not differing from that previously described. In this modification the rings 10 and associated parts are replaced by a device 28 comprising a plate 29 detachably secured by bolts to the end 30 of the shell, this end being assembled when the firebox is being constructed as a separate section to provide means for securing the plate 29 to the shell. It is not essential but preferable to likewise assemble the end of the firebox when employing the machine of Figs. 1 to 4.

The device 28 is provided with a shaft 31 connected rigidly to the plate 29. The shaft is journalled in a bearing block 32 supported on a base 33. One pair of the supporting rollers 23 is positively driven. The pair adjacent the throat sheet 8 is chosen for the positive drive as it is more centrally located and therefore better adapted for this purpose. The driving means is, generally speaking, similar to that shown in Figs. 1 and 3. It comprises a worm gear 34 secured upon each of the extended ends of the shafts of the rollers 23 of the chosen pair, a worm 35 engaging each of the worm gears 34, a shaft 36 upon which the worms are secured and an electric motor 37. In this instance the motor and shaft 36 are provided with sprocket wheels 38, 39 respectively which are connected by a chain 40.

The rollers 23 are vertically disposed in relation to the shaft 31 and the shell supported thereby so that they will support their portions of the weight of the shell in a manner to permit the shell to be freely rotated about the axis *a*.

Similar to the machine of Figs. 1 to 4 it will be understood that a portable platform serving as a station is employed. While the station is shown as being above the shell, this being the more desirable location, it will be understood that it may be located wherever desired, suitable for effecting the permanent welding of the adjacent edges together as they are presented by the rotation of the shell to the welding station.

While it has been stated that the plate 29 and the supports 11 are bolted to the shell, it will be understood that other means may be employed for easy detachment of the plate and supports, as for instance spot welding, and that the claims are to be construed broadly accordingly.

While there have been hereinbefore described an approved embodiment of this invention and a modified form of the machine it will be understood that many and various changes may be made without departing from the spirit of the invention and that all such changes as fall within the scope of the appended claims are contemplated as a part of this invention.

The invention claimed as new and desired to be secured by Letters Patent is:

1. A machine for supporting a boiler shell of part circular cross-sectional and part non-circular cross-sectional formation, to facilitate welding of transverse seams thereof, comprising a circular ring adapted to encircle said non-circular cross-sectional part with the axis of said circular cross-sectional part coinciding with the axis of said ring; a plurality of spaced fasteners secured to said ring and adapted to be detachably secured to said non-circular cross-sectional part; means for detachably securing said fasteners to said non-circular cross-sectional part whereby said ring will be carried by said shell; a pair of rollers supportingly engaging said ring disposed one at each side of and beneath said axis of said ring; and a pair of rollers adapted to engage said circular cross-sectional part for support thereof, disposed one at each side of and beneath said axis of said ring, whereby said shell can be rotated about said axis of said ring during said welding.

2. A machine for supporting a boiler shell of part circular cross-sectional and part non-circular cross-sectional formation, to facilitate welding of transverse seams thereof, comprising revolvable means having a fixed horizontal axis of revolution; means for detachably securing said non-circular part to said revolvable means with the axis of said circular part coincident with the axis of said revolvable means; a plurality of rollers; and means for adjusting said rollers to dispose same in supporting relation with said circular part beneath said axis, one of said rollers being at one side and another of said rollers being at the opposite side of said axis.

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