Oct. 15, 1929. J. H. FOX 1,732,042

APPARATUS FOR ROLLING GLASS

Filed June 25, 1928 4 Sheets-Sheet 1

Fig. 1.

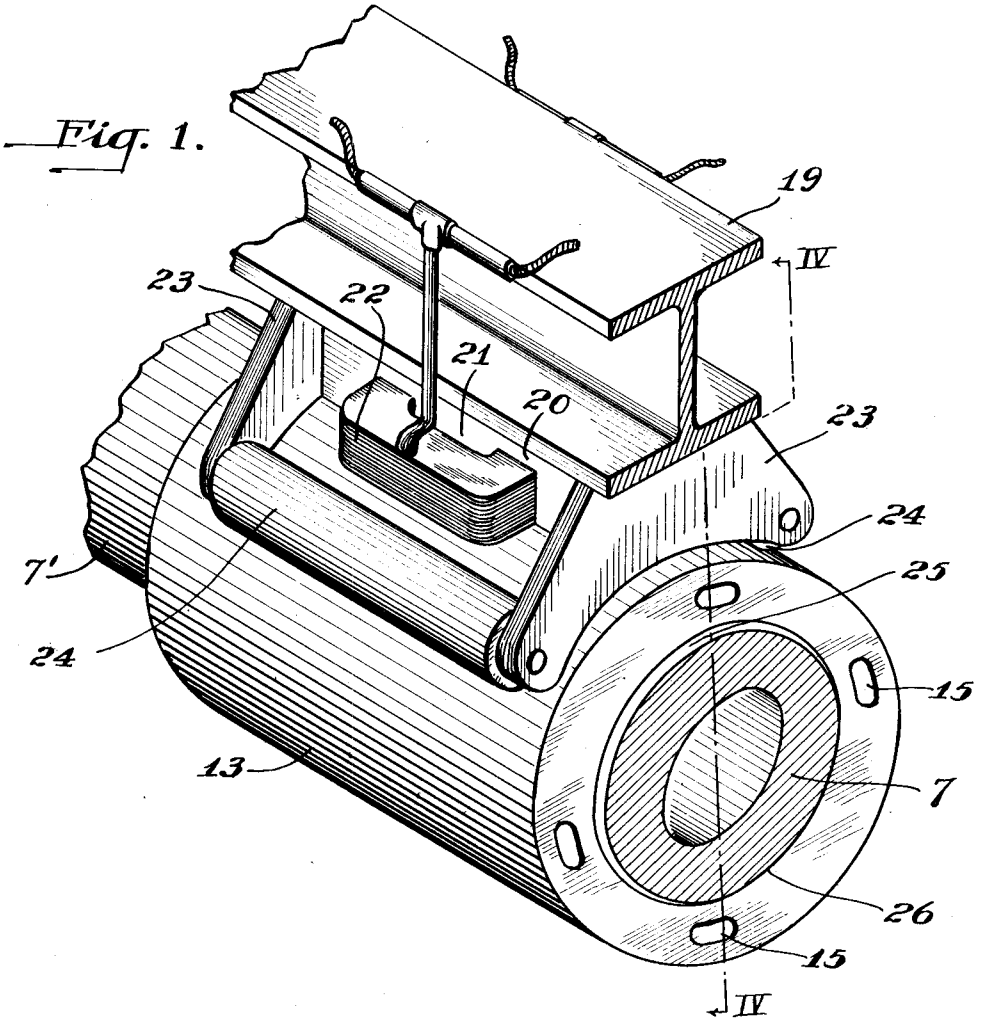
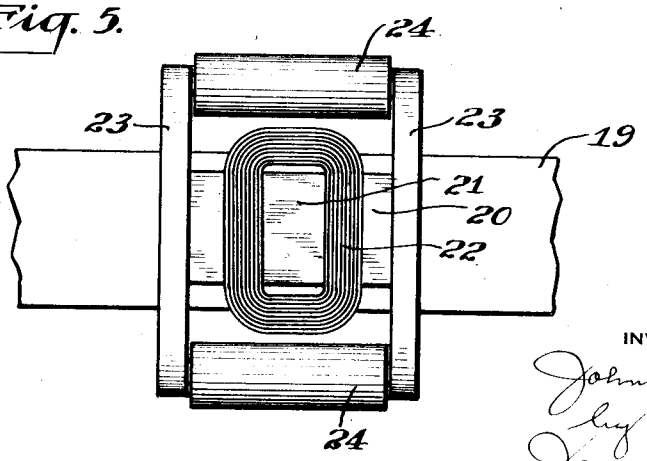


Fig. 5.



INVENTOR

John H. Fox

by

James C. Bradley

Atty

Oct. 15, 1929. J. H. FOX 1,732,042

APPARATUS FOR ROLLING GLASS

Filed June 25, 1928 4 Sheets-Sheet 2

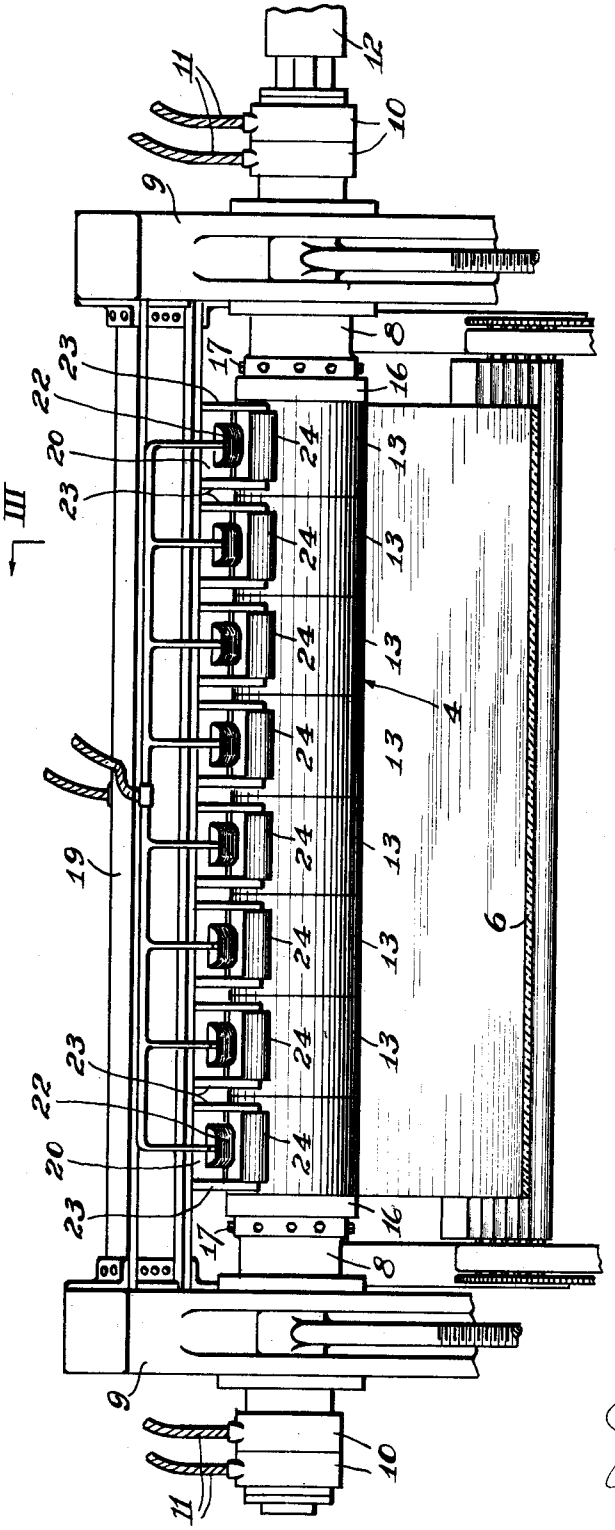


Fig. 2.

INVENTOR

John H. Fox

by James C. Bradley

atty

Oct. 15, 1929. J. H. FOX 1,732,042

APPARATUS FOR ROLLING GLASS

Filed June 25, 1928 4 Sheets-Sheet 3

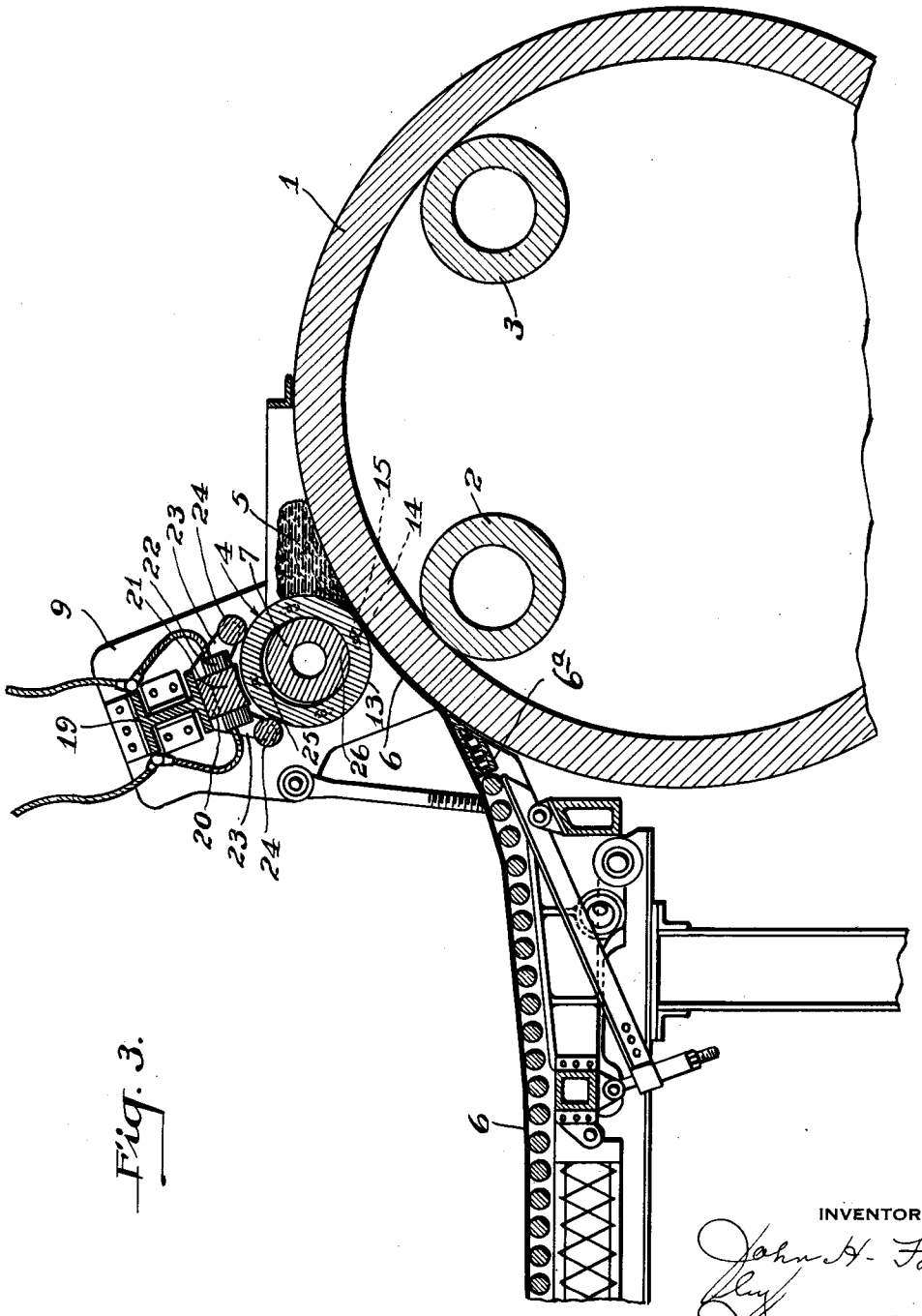


Fig. 3.

INVENTOR

John H. Fox

by

James C. Bradley

atty

Oct. 15, 1929. J. H. FOX 1,732,042

APPARATUS FOR ROLLING GLASS

Filed June 25, 1928 4 Sheets-Sheet 4

Fig. 4.

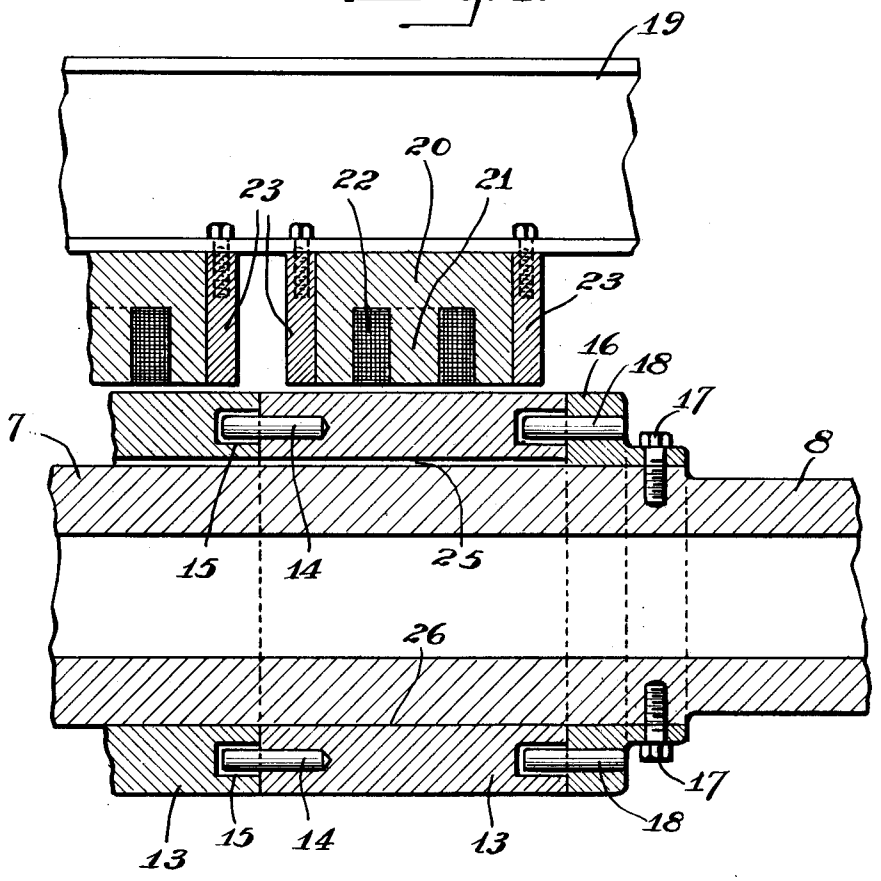
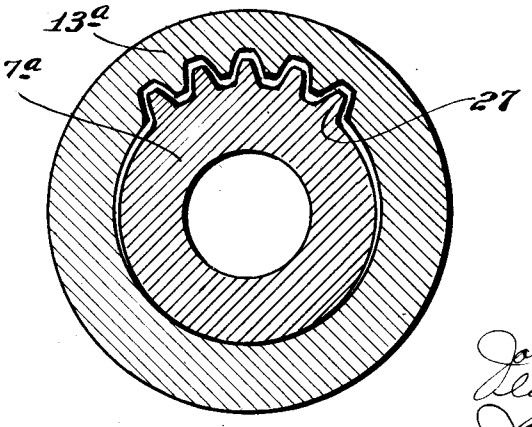


Fig 6



INVENTOR

John H. Fox

Alex

James C. Bradley

atty

Patented Oct. 15, 1929 1,732,042

UNITED STATES PATENT OFFICE

JOHN H. FOX, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO PITTSBURGH PLATE GLASS COMPANY, A CORPORATION OF PENNSYLVANIA

APPARATUS FOR ROLLING GLASS

Application filed June 25, 1928. Serial No. 288,254.

The invention relates to apparatus for rolling glass into sheets preliminary to grinding and polishing in the manufacture of plate glass. In such an operation, the upper or sizing roll is liable to uneven heating due to the fact that the body of molten glass to be formed into a sheet rests against one side of the roll, rapidly raising the temperature of the metal on that side of the roll as compared with that of the metal not in contact with the glass. As a result, the roll bows or warps slightly so that, in rotating, its periphery is closer the roll beneath at one position of its rotation than at another. This produces a sheet of varying thickness requiring more grinding than would be the case if the sheet were of uniform thickness throughout. The present invention is designed to overcome this difficulty by reducing the amount of warping to a minimum. Certain embodiments of the invention are illustrated in the accompanying drawings, wherein:

Figure 1 is a perspective view of a section of the sizing roll. Fig. 2 is a front elevation of the apparatus. Fig. 3 is a section on the line III—III of Fig. 2. Fig. 4 is a section on the line IV—IV of Fig. 1. Fig. 5 is a bottom plan view of one of the electro-magnets. And Fig. 6 is a section through a modified sizing roll construction.

Referring to the drawings, 1 is a roll of relatively large diameter ordinarily referred to as the casting roll and supported upon the driven rolls 2 and 3, and 4 is the smaller of the two rolls positioned as indicated in Fig. 3 and ordinarily referred to as the sizing roll. In forming the sheet, a body of glass 5 is teemed across the space to the rear of the roll 4 and is formed into the sheet 6 which passes over the roller apron 6ª and into the leer, which is not shown.

The roll 4 comprises a hollow casing 7 having the bearing portions 8 at its ends journalled in the housings 9, 9. This casing is water cooled from the swivels 10, 10 at its ends provided with the usual pipes 11, 11 by means of which a circulation of water through the roll is secured. The roll is rotated from the tumbler shaft 12 which in turn is driven from suitable operating mechanism, not shown. The hollow casing 7 is surrounded by a glass engaging jacket made up of the collars 13, 13, etc. placed end to end as indicated in Fig. 2, eight of these collars being shown, but it will be understood that the number may be varied depending upon the length of the roll. As indicated in Figs. 1 and 4, these collars are mounted relatively loosely on the casing 7, but are arranged so that they all rotate together in unison with the casing. The collars are connected at their ends by the means shown in Fig. 4, such means comprising the pins 14 secured at one end in one collar and fitted loosely in sockets 15 in the next collar. The end collars are secured to the casing 7 so that they rotate therewith by the means shown in Fig. 4, such means comprising a collar 16 secured to the casing 7 by means of the bolts 17 and the pins 18 mounted in the collar and having their inner ends projecting into sockets in the collar 13.

Extending transversely of the top of the sizing roll is a bridge 19 preferably in the form of a casting of I-cross section, such bridge being rigidly secured at its ends to the housing members 9, 9. This bridge carries upon its under side a series of eight electro-magnets, one for each collar 13. Each magnet comprises a core member 20 having a pole 21 around which extends the winding 22. These core members are bolted to the lower side of the bridge 19. Each core member has along its two sides the arms 23, 23 carrying the rollers 24, 24, such arms being bolted to the lower side of the bridge 19. These rollers bear upon the collars 13 and steady them and prevent the collars from being moved upward so that they can engage the pole pieces of the magnets.

In operation and during the rolling of the glass sheet 6, current is supplied to the windings 22 of the electro-magnets so that these magnets are energized and the collars are held in the position shown in Fig. 1, with all the clearance space 25 above the periphery of the casing 7, the periphery of the casing at the lower side thereof being in contact with the inner surfaces of the collars. The effect secured is the same in so far as the sizing of the glass is concerned as would be the case if

the collars 13 were tight upon the casing 7 and at the same time the area of contact between the casing 7 and the collars 13 is reduced to a minimum. Any heating of the collars is, therefore, transmitted less readily to the casing 7 than would be the case if the collars were tight upon the casing and any deformation of the casing 7 due to overheating on one side is thus reduced to a minimum. The casing 7, therefore, remains perfectly true and straight throughout the casting operation and a glass sheet of uniform thickness results. The collars 13 are, of course, slightly deformed by the action of the heat, but each collar is independent of the next one so that the effect of the deformation is not cumulative as is the case where a conduction one-piece jacket is employed or where a roll is used which has no jacket. The rolls 24, 24 serve to steady the collars and tend to prevent any oscillation, such as would be liable to occur if the collars were free to oscillate in a horizontal direction about the horizontal line of contact 26 (Fig. 1) between the casing 7 and the collars.

Various expedients may be employed for causing the relatively loose collars to turn with the casing 7, one of such expedients being illustrated in Fig. 6, wherein the teeth 27 are provided between the opposing surfaces of the two members 7^a and 13^a.

What I claim is:

1. The combination with a glass casting roll, of a sizing roll thereabove comprising a cylindrical casing, a glass engaging jacket mounted on the casing consisting of a series of collars placed end to end and each having a loose fit on the casing, and means for holding the collars so that their interior surfaces are out of contact with the periphery of the casing along the portion thereof most remote from the periphery of the casting roll.

2. The combination with a glass casting roll, of a sizing roll thereabove comprising a cylindrical casing, a glass engaging jacket mounted on the casing consisting of a series of collars placed end to end and each having a loose fit on the casing, and electro-magnetic means above the sizing roll for applying a lifting force to the collars.

3. In combination in a roll, a cylindrical casing, means for circulating a cooling fluid through the casing, a jacket mounted on the casing and comprising a series of collars placed end to end and having a loose fit on the casing, and means for causing the collars to rotate with the casing.

4. The combination with a glass casting roll, of a sizing roll thereabove comprising a cylindrical casing, a glass engaging jacket mounted on the casing consisting of a series of collars placed end to end and each having a loose fit on the casing, means for causing the collars to rotate with the casing, and means for holding the collars so that their interior surfaces are out of contact with the periphery of the casing along the portion thereof most remote from the periphery of the casting roll.

5. The combination with a glass casting roll, of a sizing roll thereabove comprising a cylindrical casing, a glass engaging jacket mounted on the casing consisting of a series of collars placed end to end and each having a loose fit on the casing, means for causing the collars to rotate with the casing, and electro-magnetic means above the sizing roll for applying a lifting force to the collars.

6. The combination with a glass casting roll, of a sizing roll thereabove comprising a cylindrical casing, a glass engaging jacket mounted on the casing consisting of a series of collars placed end to end and each having a loose fit on the casing, and a series of electro-magnets above the sizing roll for holding the collars so that their interior surfaces contact with the periphery of the casing along the portion thereof approaching most nearly to the periphery of the casting roll.

7. The combination with a glass casting roll, of a sizing roll thereabove comprising a cylindrical casing, a glass engaging jacket mounted on the casing consisting of a series of collars placed end to end and each having a loose fit on the casing, electro-magnetic means above the sizing roll for applying a lifting force thereto, and roller means engaging the peripheries of the collars and limiting their upward movement.

In testimony whereof, I have hereunto subscribed my name this 1st day of June, 1928.

JOHN H. FOX.