W. MacGREGOR.

MULTIPLE TAPPING SPOUT.

APPLICATION FILED APR. 21, 1910.

972,885. Patented Oct. 18, 1910.

2 SHEETS—SHEET 1.

Fig. 1

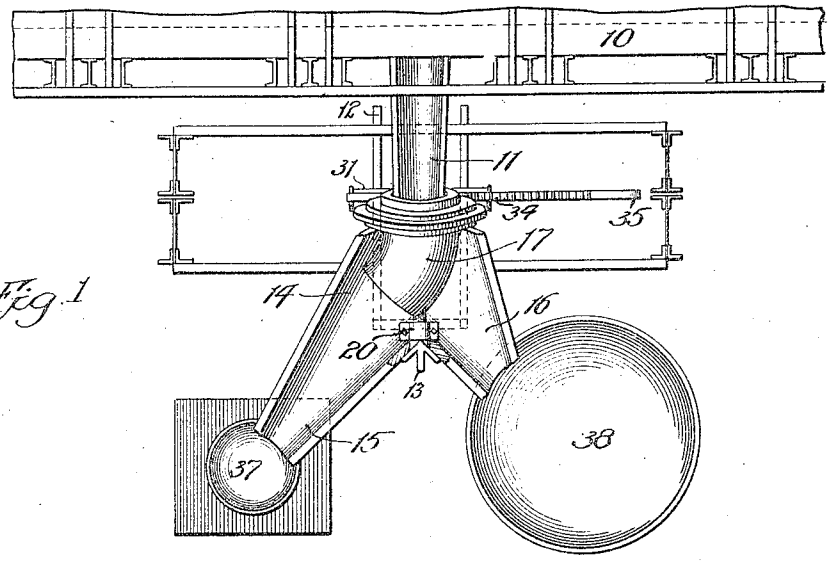
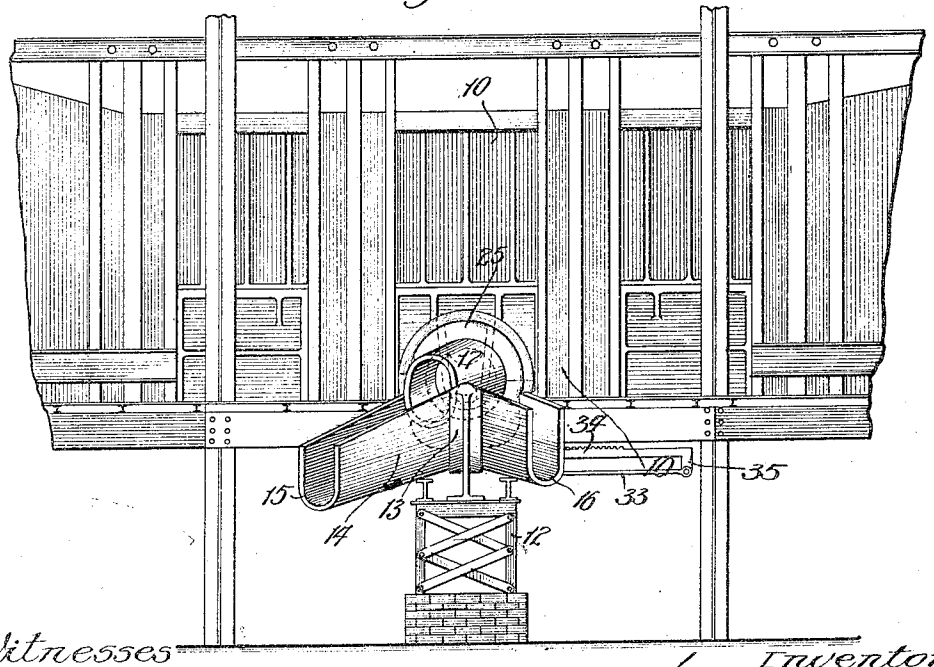


Fig 2



Witnesses

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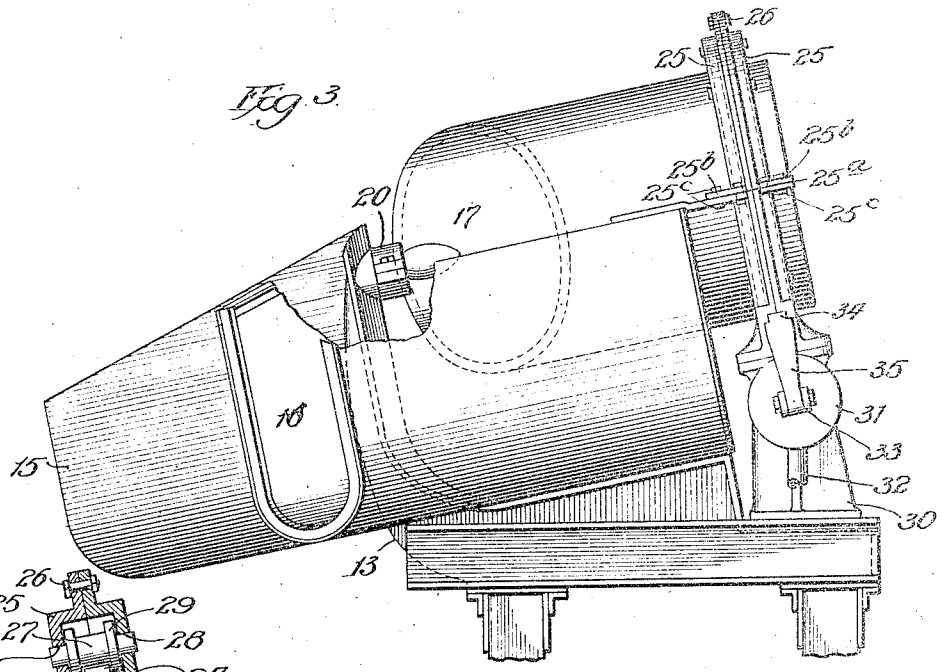
Fig. 3.



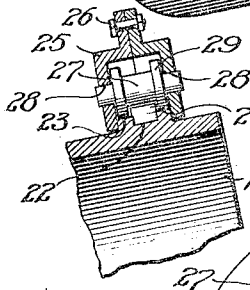


Fig. 6.

Fig. 4

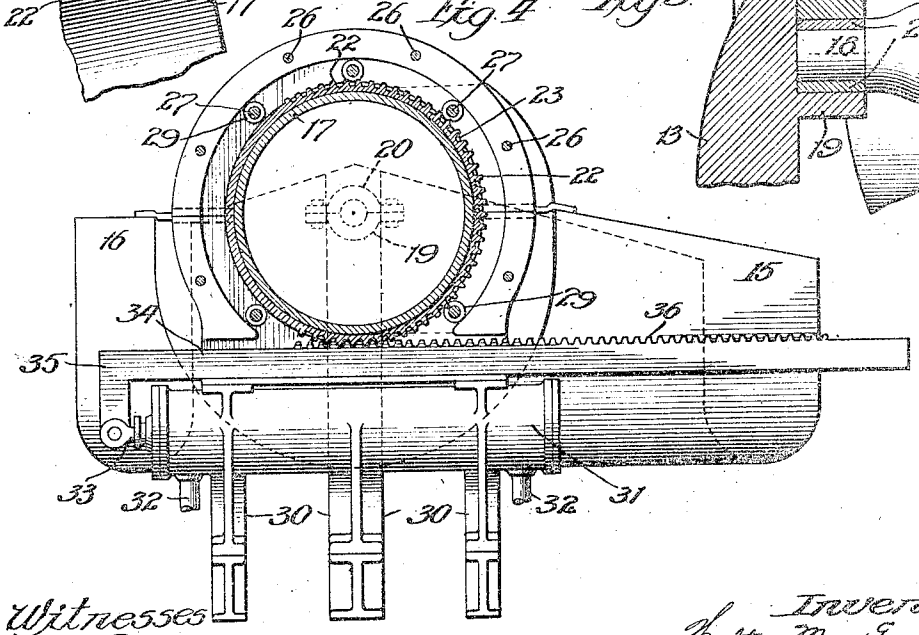


Fig. 5.

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UNITED STATES PATENT OFFICE.

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MULTIPLE TAPPING-SPOUT.

972,885. Specification of Letters Patent. Patented Oct. 18, 1910.

Application filed April 21, 1910. Serial No. 556,852.

To all whom it may concern:

Be it known that I, WALTER MacGREGOR, a citizen of the United States, residing at Indiana Harbor, in the county of Lake and State of Indiana, have invented certain new and useful Improvements in Multiple Tapping-Spouts, of which the following is a specification.

In the operation of furnaces, especially those of the open-hearth type, it is necessary or desirable that when they are once tapped the flow of molten metal shall continue uninterruptedly. In some cases, however, it is desirable to be able to switch the flow from one receiving receptacle to another without stopping or interrupting the discharge of molten metal, and it is the provision of a device of this character which forms the subject matter of this invention, the leading aim and object of the latter being the construction of a multiple tapping spout which will effectively accomplish the desired result, which may be easily operated, and which will be comparatively economical to manufacture.

Referring to the accompanying drawings, which form a part of this specification, it will be readily understood that I have illustrated therein a preferred and desirable embodiment of the invention, and in these drawings—Figure 1 is a plan view of such a multiple tapping spout applied to a furnace, such spout being illustrated in connection with a pair of receptacles to receive the molten metal; Fig. 2 is a front elevation of the spout as applied to a furnace, the receptacles of Fig. 1 being omitted; Fig. 3 is a side elevation of the adjustable multiple spout proper, one portion being broken away to more clearly illustrate the internal construction; Fig. 4 is a partial inner end elevation and partial section of the appliance; Fig. 5 is a section illustrating the bearing for one end of the rotatable connector of the device; and Fig. 6 illustrates a cross section of the roller bearing for the other end of the same part.

The furnace proper is characterized 10 in the drawings, and its discharge spout directly connected therewith is characterized 11. On a suitable frame-work 12, by means of a concave yoke 13, I support a divided or bifurcated discharge spout 14 having in reality two spouts 15 and 16 of different lengths and forming what may be termed an open-top trough having at its inner end a single admission mouth and at its other end a pair of discharge mouths. Between the furnace spout 11 and the bifurcated spout 14, and adapted to convey the molten metal from the former to the latter, I provide a curved connector 17 into one end of which the spout 11 delivers the metal, while the other open end of the same is adapted to be shifted so as to convey the metal to either one of the pair of discharge troughs 15 and 16. In reality this connector 17 constitutes a curved hollow pipe, the purpose of which is to shift the delivery of molten metal from one discharge mouth to the other of the bifurcated tapping spout 14. At its outer end, as indicated perhaps most clearly in Figs. 3 and 5, this connector 17 is supplied with a trunnion 18 fitting in a cylindrical bearing 19 provided on the upper end of the yoke 13, which forms the support for the two spouts 15—16. The bearing 19 has a cap 20 and a brass or other relatively soft metal lining 21. The other end of this connector, that is, the end into which the spout 11 projects, has on its outer surface a gear 22, and on opposite sides of the teeth of the same a pair of cylindrical bearings 23 and 24. This gear and bearings are covered by a divided casing 25, the two parts of which are bolted together at 26 and which carry a number of anti-friction rollers 27 having bearings 28—28 in the two sides of the casing. These rollers, as is clearly indicated in Fig. 6, have two enlarged cylindrical portions 29 which bear on the parts 23 and 24, the section of the roller between such enlarged portions being of reduced diameter so as to escape contact with the gear 22. This gear casing 25 is also divided transversely, as at 25^a, the upper and lower halves being joined through the flanges 25^b, by means of the bolts 25^c.

After each pouring operation, connector 17 will retain on its inner surface a coating or "skull" of steel and slag, due to the cooling of the metal as it passed through the elbow. In order to remove this skull to best advantage, the connector 17 should be taken from its associated parts to a more convenient location. As will be seen, upon removal of the top half of the gear casing 25 and the cap 19^a of the bearing 19, the elbow 17 may be easily lifted out of place and returned thereto when desired.

Below the gear end of the connector and on suitable standards 30—30, a compressed air cylinder 31 is mounted, the same being provided with a piston or plunger, not shown because the same may be of the usual and ordinary construction. The cylinder has associated therewith the connecting pipes 32 for the admission and discharge of the compressed air, as is usual in a device of this kind. The reciprocatory piston of such cylinder is connected by a piston-rod 33 with a rack 34, having a down turned end 35 for such connection and supplied with a plurality of teeth 36 meshing with those of the gear 22, it being understood, as is shown in Fig. 4, that the casing of the connector is cut away to permit the proper reciprocation of this rack.

The operation of this appliance is substantially as follows; The compressed air is admitted to the cylinder or chamber 31 so as to force the unclosed piston or plunger to one end of its limit of travel, such movement of the plunger or piston causing a corresponding sliding of the rack 36, the movement of the latter rotating the gear 22 and the connector whereby to bring its outer mouth into direct communication with one or the other of the spouts 15 or 16. The furnace is then tapped and the molten metal flows down the spout 11 through the connector 17 and through one of the spouts, such for example as 15, into a receptacle or ladle 37 placed beneath the same for the reception of the metal. When the desired or proper amount of the liquid metal has been received by such ladle or the like, the supply of compressed air to the cylinder 31 is manipulated so as to shift the piston or plunger to the opposite end of its travel, thereby through the rack and gear connection rotating the connector in its two roller bearings so as to establish communication between the spout 11 and the other mouth of the bifurcated trough. As will be readily understood, the metal now flows into the receptacle 38, and while so doing the ladle or other container 37 may be removed and another put in its place, so that when the receptacle 38 has received its proper quantity of metal the connector may be again shifted so as to establish the flow of metal through the other spout 15. This, of course, may be continued indefinitely if desired or necessary.

It will be apparent to those skilled in the art that many changes could be made in the detailed construction of the parts which I have described without departing from the spirit of my invention.

I claim:

1. In a device of the character described, the combination of a relatively stationary spout with a plurality of discharge mouths, a movable connector adapted to convey the molten metal from the furnace to said spout, and means whereby said connector may be shifted to have the metal issue from any one of the mouths of said spout without interruption of the flow, substantially as described.

2. In a device of the character described, the combination of a spout with a plurality of discharge mouths, a rotary bent connector adapted to convey the molten metal from the furnace, and means to rotate said connector, whereby to have the metal issue from any one of the discharge mouths of said spout without interruption of the flow, substantially as described.

3. In a device of the character described, the combination of a spout having a plurality of discharge mouths, a rotary bent connector adapted to convey the molten metal from the furnace to said spout, and fluid-actuated means to rotate said connector, whereby to have the metal issue from any one of the mouths of said spout without interruption of the flow, substantially as described.

4. In a device of the character described, the combination of a spout having a plurality of discharge mouths, a rotary bent connector adapted to convey the molten metal from the furnace to said spout, a gear on said connector, a rack meshing with the teeth of said gear, and means to reciprocate said rack to rotate said connector, whereby the metal may be caused to issue from any one of the mouths of said spout without interruption of the flow, substantially as described.

5. In a device of the character described, the combination with a plurality of discharge spouts, of a connector adapted to conduct molten metal from a furnace to one of said spouts, and means for moving said connector into register with any of said spouts, substantially as described.

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Witnesses:
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