Dec. 29, 1931. R. E. BRIGGS 1,838,805

SAND TEMPERING MACHINE

Filed Oct. 5, 1927 2 Sheets-Sheet 1

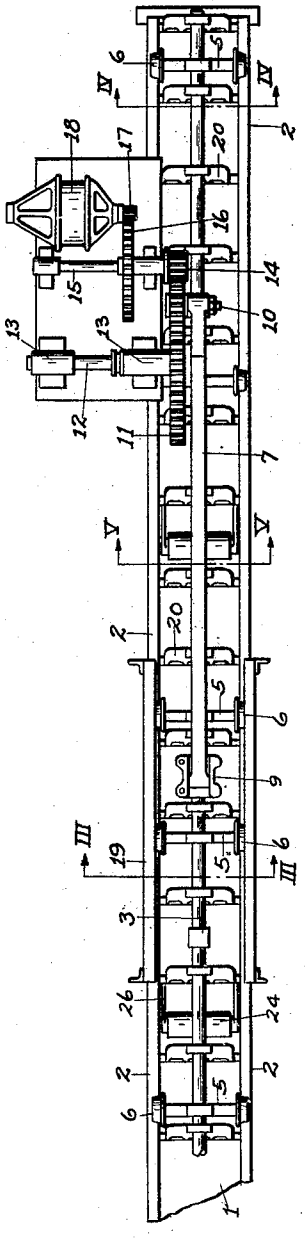


Fig. 1

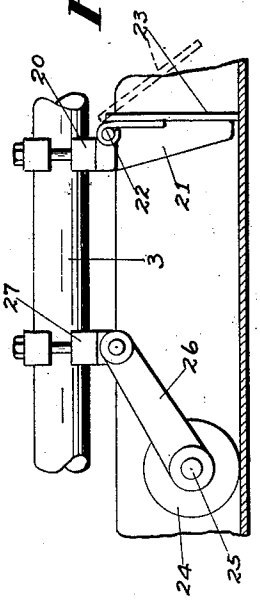


Fig. 7

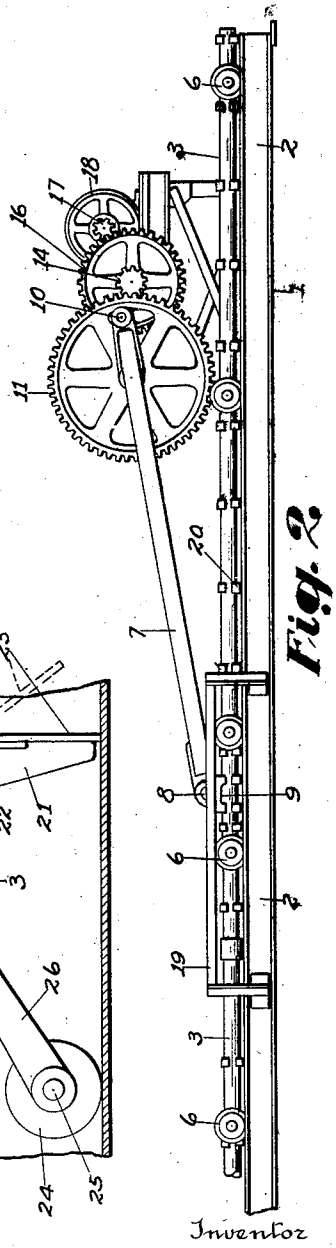


Fig. 2

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SAND TEMPERING MACHINE

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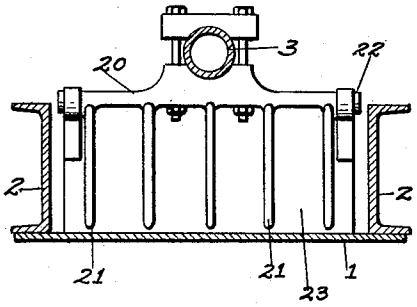


Fig. 4

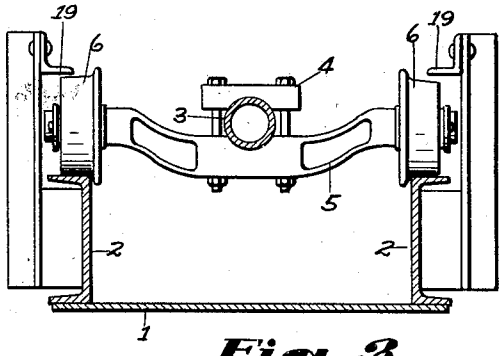


Fig. 3

Fig. 8

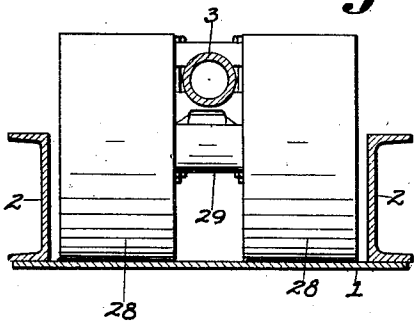
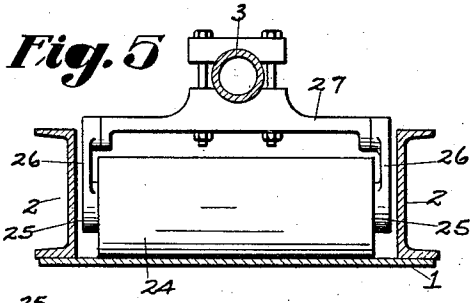


Fig. 5



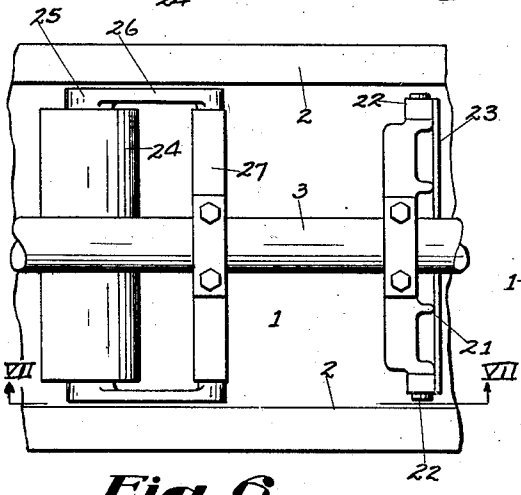
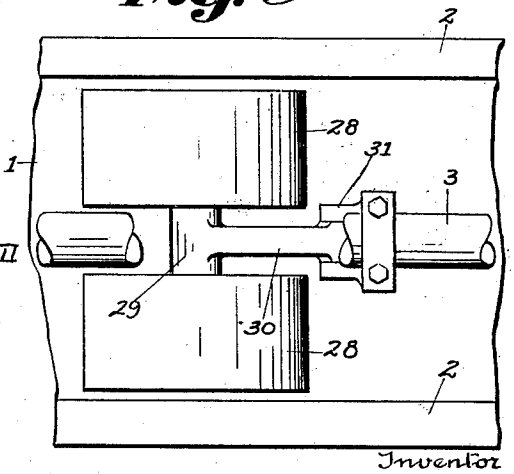


Fig. 6

Fig. 9



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UNITED STATES PATENT OFFICE

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SAND TEMPERING MACHINE

Application filed October 5, 1927. Serial No. 224,231.

The present invention relates to certain new and useful improvements in sand tempering machines of the type adapted for the preparation of foundry sand.

In foundry practice molds are made of sand and suitable bonding material mixed together with enough moisture to render the mass sufficiently cohesive to give to the mold the necessary mechanical strength. This mixture must be of uniform texture and sufficiently porous to permit the escape of the gases generated by the molten metal when poured into the mold. In quantity production foundries where the processes of molding and casting are continuous, the molds are broken up as soon as the metal is sufficiently chilled. The sand is then collected and such ingredients added as are necessary to maintain its character. These ingredients must be thoroughly incorporated, sufficiently cooled to retain the desired moisture, and stirred and aerated to produce the desired porosity. This process of preparation is known in the trade as sand tempering.

The especial object of this invention is to provide an efficient mechanism for tempering the sand while transporting it to the molding floor.

The means whereby I attain this object are fully set forth in the following specification and illustrated in the accompanying drawings of which

Fig. 1 is a fragmentary plan view of a sand tempering machine constructed in accordance with my present invention.

Fig. 2 is a side elevation of the machine illustrated in Fig. 1.

Fig. 3 is a transverse sectional view taken along the line III—III of Fig. 1.

Fig. 4 is a transverse sectional view taken along the line IV—IV of Fig. 1.

Fig. 5 is a transverse sectional view taken along the line V—V of Fig. 1.

Fig. 6 is a fragmentary plan view on an enlarged scale of the devices illustrated in Figs. 4 and 5.

Fig. 7 is a longitudinal sectional view taken along the line VII—VII of Fig. 6.

Fig. 8 is a transverse sectional view illustrating a modification of the devices illustrated in Fig. 6.

Fig. 9 is a fragmentary plan view of the devices illustrated in Fig. 8.

Like numerals refer to similar parts in the several figures.

In the drawings I have illustrated one embodiment of my invention comprising an elongated trough along which the foundry sand may be propelled from the mixing floor, or other source of supply, to the molding floor or other points at which the sand will be used, and in which the sand will be thoroughly kneaded, aerated, cooled, stirred and mixed to render it suitable for the formation of foundry molds. This trough consists of a bottom plate 1 along the lateral edges of which are securely fixed two channel bars 2 which serve as the side walls of the trough and as the main frame for the machine. Positioned in the central, longitudinal, vertical plane of this trough, and extending from end to end thereof, is a rod 3 which for rigidity and lightness is preferably formed of a steel tubing. Clamped to the rod 3 by the clamping members 4 at spaced intervals along its length, are transversely extending axle bars 5 each of which is provided with two flange rollers 6 adapted to engage and roll upon the upper surface of the channel bars 2 to movably support the rod 3 thereon, and thereby form a carriage.

Means are provided for imparting reciprocatory movement to the rod 3 longitudinally of the trough by an actuating mechanism comprising a connecting rod 7 one end of which engages a wrist pin 8 attached to the rod 3 by a clamping member 9 and the other end engages the crank pin 10 fixed to a gear wheel 11. The gear wheel 11 is attached to a power shaft 12 journaled in bearings 13 of the supporting frame work. The gear wheel 11 is engaged by a spur pinion 14 which is fixed to the countershaft 15. The countershaft 15 also carries a spur gear 16 which is engaged by an armature pinion 17 of the motor 18. The motor 18 may be of any preferred type suitable to the conditions under which the machine operates. For purposes of

illustration I have here shown an electric motor which may receive its actuating current from any suitable and convenient source, and which may be controlled by any preferred means, but as such devices are well understood in the art their illustration and description is not thought to be required at this time. Guide bars 19 supported in spaced parallelism above the channel bars 2 engage the supporting rollers 6 adjacent the wrist pin 8 to maintain their contact with the channel bars 2 and thereby insure smoothness of operation.

Clamped to the rod 3 in longitudinally spaced relation are a plurality of raking devices 20 each having downwardly projecting fingers 21 extending into close proximity with the bottom plate 1 of the trough, and adapted to engage and stir loose material lying upon said bottom plate. Pivotally supported by lugs 22 formed on the forward side of the raking devices 20 are scraper plates 23 adapted, as the rods move rearwardly, to swing away from the fingers 21 and to slide over the material lying upon the bottom plate 1 and by that sliding movement to smooth down and compact said material. As the rods 3 move forwardly the plates 23 swing into contact with the fingers 21 and are held rigid thereby to act as scrapers by which the material is propelled along the conveyor trough.

Positioned within the trough, intermediate certain of the raking devices, as illustrated in Figs. 5 and 6, are rollers 24 having gudgeons journaled in suitable bearings 25 formed on links 26 which are pivotally attached to cross-arms 27 clamped to the rods 3. As the rod 3 reciprocates longitudinally of the trough the rollers 24 pass over the material lying upon the bottom plate 1 crushing the lumps and compacting the mass to more thoroughly incorporate the ingredients thereof.

Under some circumstances greater weight is required to satisfactorily compact the material under treatment in the trough than can be secured with rollers such as are illustrated in Figs. 5 and 6. To met such requirements I have provided an alternative construction which is illustrated in Figs. 8 and 9, wherein two rollers 28 of relatively large diameter are positioned one at each side of the reciprocating rod 3. These rollers are journaled upon an axle 29 which is formed integral with a connecting link 30 pivotally attached to the clamping member 31 secured to the reciprocating rod 3.

In the operation of the machine the several ingredients necessary to the production of molding sand are placed within the trough at its receiving end, and are propelled longitudinally thereof by the action of the pivoted scraper flight 23. During their progress along the trough these ingredients are thoroughly stirred together by the fingers 21, and kneaded by the retrograde movement of the scraper flight 23 and by the rollers 24 to the end that when discharged at the delivery end of the trough they constitute a homogeneous mass of material suitable for the production of foundry mold.

It is to be understood that I do not limit myself to the precise construction here illustrated and described, since it is obvious that wide variation may be made as to details without departure from the spirit of my invention.

What I claim is:

1. In a sand tempering machine, the combination with an elongated trough, of a plurality of stirring devices reciprocably movable longitudinally of the trough and adapted to disintegrate and stir material upon the bottom of said trough, devices associated with said stirring devices adapted alternately to compact said material and to propel it longitudinally of said trough, and rollers associated with said device and movable in said trough to compress the material.

2. In a sand tempering machine, the combination with an elongated trough, of a plurality of rakes reciprocably movable longitudinally of said trough adapted to disintegrate and stir materials upon the bottom of said trough, plates hinged to said rakes adapted when moving in one direction to compact said material and when moving in the opposite direction to propel said material longitudinally of the trough, and rollers associated with said rakes and movable in said trough to compress the material.

3. In a sand tempering machine, the combination with an elongated trough, of rakes reciprocably movable longitudinally of said trough adapted to disintegrate and stir materials upon the bottom of said trough, plates hinged to said rakes adapted when moving in one direction to propel material longitudinally of the trough, and rollers positioned intermediate said rakes and movable therewith adapted to compress materials upon the bottom of the trough as and for the purpose set forth.

4. In a sand tempering machine, the combination with an elongated trough, of a plurality of stirring devices reciprocably movable longitudinally of the trough and adapted to stir and propel material along the bottom of the trough and rollers positioned intermediate said stirring devices and movable therewith adapted to compress said material upon the bottom of the trough as and for the purpose set forth.

5. In a sand tempering machine, the combination with a trough, reciprocatory means, a raking device associated therewith and extending into said trough, and a propelling plate hingedly connected to said reciprocatory means for swinging movement in one di-

rection of said reciprocatory means, and for abutment with said raking device upon movement of said reciprocatory means in the opposite direction.

6. In a sand tempering machine, the combination with a trough, a member reciprocably mounted above said trough, means carried by said member for propelling material longitudinally through said trough, a raking device connected to said member and operated in said trough to stir the material, and a roller hingedly connected to said reciprocatory member for compacting said material in said trough.

7. In a sand tempering machine, the combination with a trough, reciprocating means for moving material longitudinally through said trough, rakes associated with said means for stirring material in the trough, and rollers movably associated with said means for compacting the material in the trough.

8. In a sand tempering machine, the combination with a trough, reciprocatory means for moving material longitudinally of said trough, rakes associated with said means for stirring material in said trough, and rollers movably associated with said means for compacting the material in the trough as it is moved along the trough.

9. In a sand tempering machine, the combination with a trough, reciprocatory means for moving material longitudinally through said trough, rakes associated with said means for stirring material in the trough, and freely vertically movable rollers movable with said means for compacting the material in the trough.

10. In a sand tempering machine, the combination with a trough, reciprocatory means for moving material longitudinally through the same, rakes associated with said means for stirring material in the trough, an inclined link pivotally connected to said reciprocatory means, and a roller carried by said link to travel in said trough over the material.

11. In a sand tempering machine, the combination with a trough, reciprocatory means for moving material longitudinally through the same, and a roller pivotally connected to said reciprocating means and operating in said trough to compact material therein.

In testimony whereof, I have hereunto set my hand.

ROBERT E. BRIGGS.