Aug. 25, 1953 J. W. THOMLEY, JR 2,649,630

MACHINE FOR THE RECOVERY OF USED FOUNDRY SAND

Filed Aug. 26, 1950 3 Sheets-Sheet 1

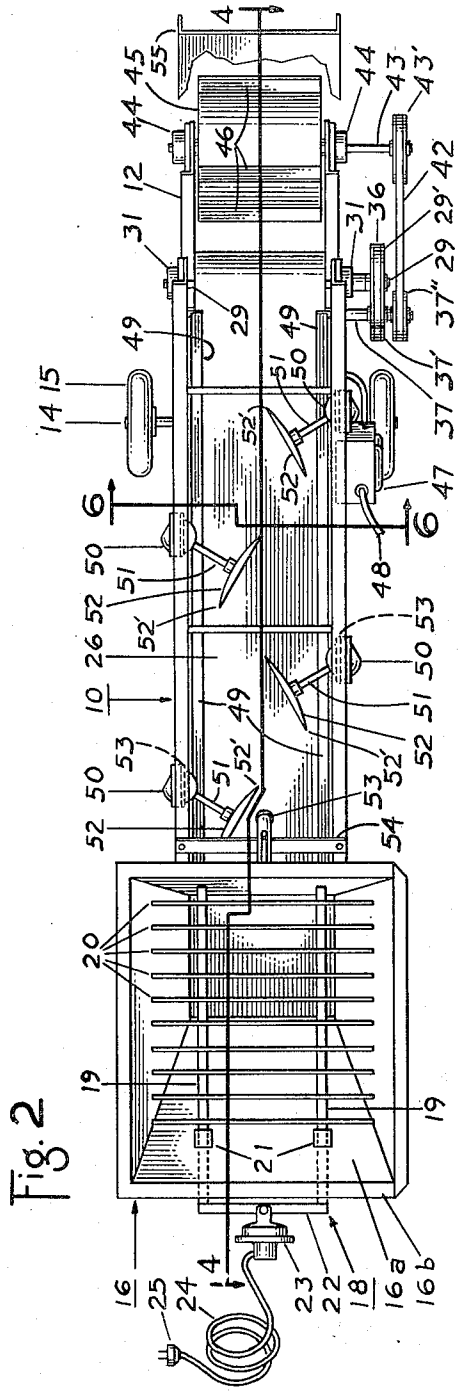


Fig. 2

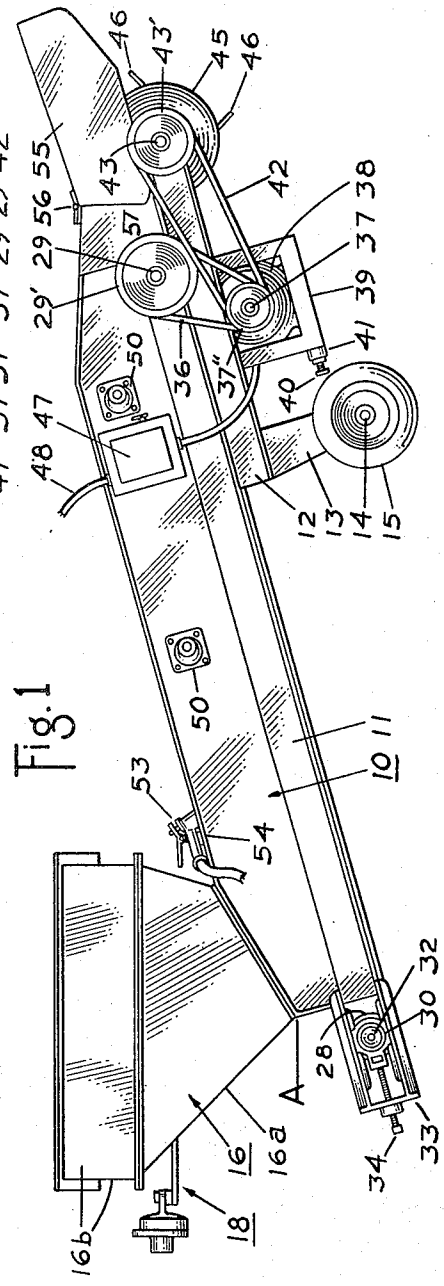


Fig. 1

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Filed Aug. 26, 1950 3 Sheets-Sheet 2

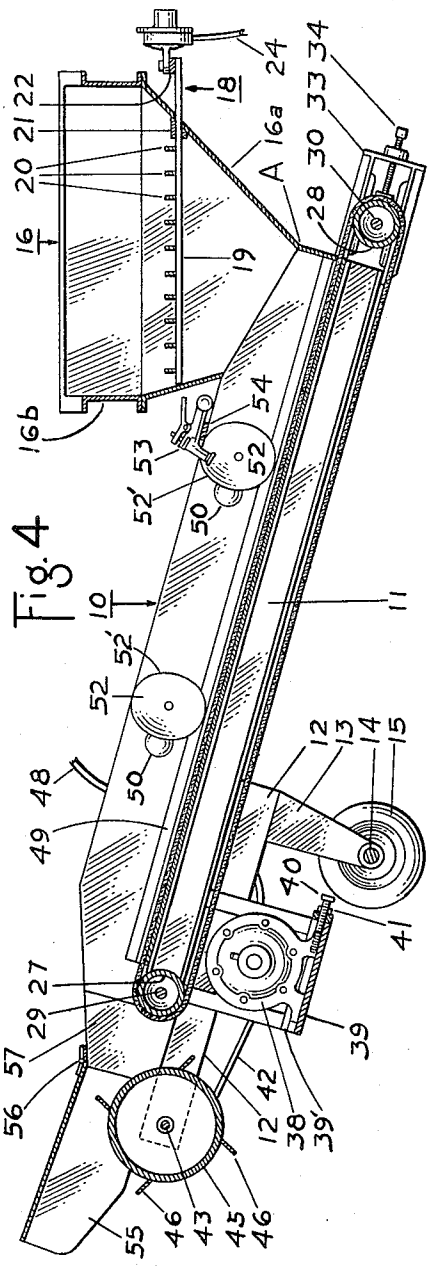


Fig. 4

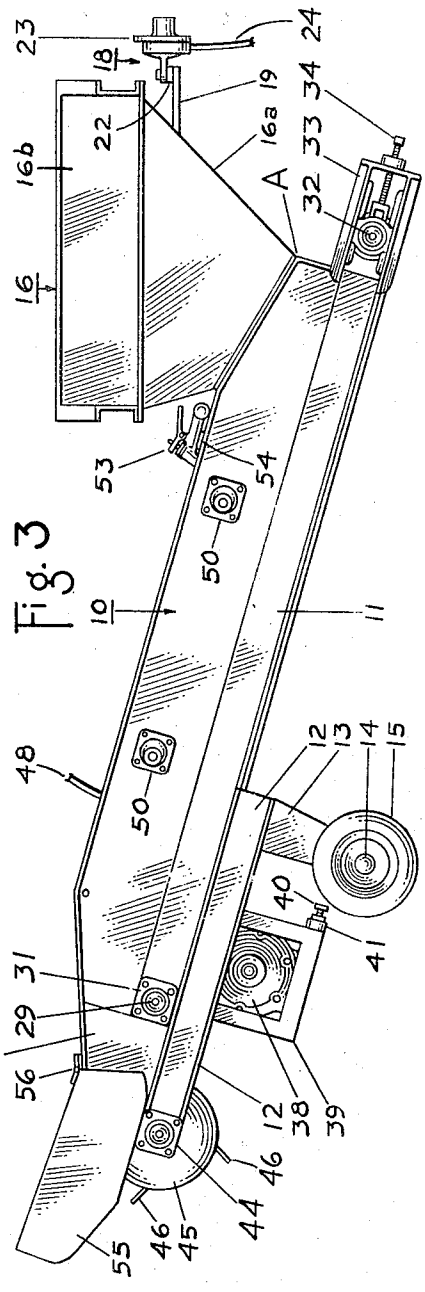


Fig. 3

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MACHINE FOR THE RECOVERY OF USED FOUNDRY SAND

Filed Aug. 26, 1950 3 Sheets-Sheet 3

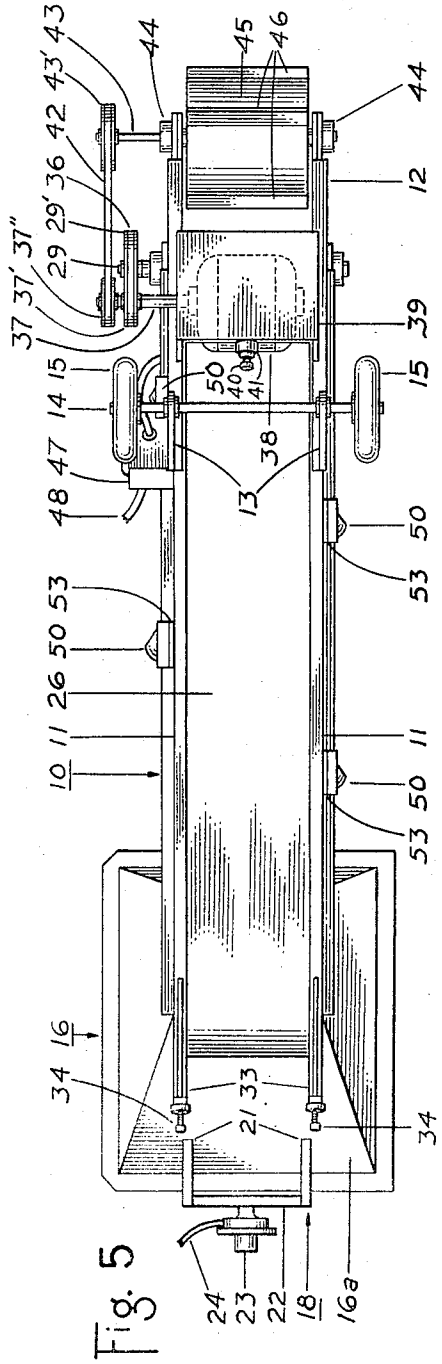



Fig. 5

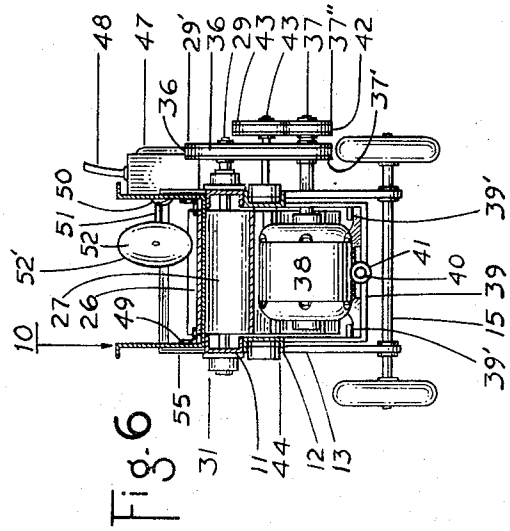



Fig. 6

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# UNITED STATES PATENT OFFICE

2,649,630

## MACHINE FOR THE RECOVERY OF USED FOUNDRY SAND

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Application August 26, 1950, Serial No. 181,637

3 Claims. (Cl. 22—89)

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The present invention relates to a machine for mass recovery of sand which has been used for foundry moulding purposes, and has more particularly to do with a machine of this type adapted for lump breaking, disintegrating and aerating such sand.

To facilitate economical and convenient handling and reclaiming of sand broken from the mould after the casting operation is completed, the invention contrives to enable the mould flask to be discharged directly upon a vibratory assembly which breaks apart any adherent lumps of sand, admitting the smaller particles thereof to a suitable conveyor belt arrangement, thus accomplishing an important object.

Another important object is accomplished by provision of a series of diffusing discs adapted for the further disintegration and heat-freeing of the sand.

A further object is to provide a machine which is continuously automatic in operation from the loading end to the discharge end thereof and serves to reclaim and prepare used foundry sand for repeated use.

Other objects and advantages of the present invention will appear from the following detailed description which refers to the accompanying drawings by like reference numerals for like parts.

In the drawings:

Figure 1 is an elevational view of the machine as it is normally positioned for use.

Figure 2 is a top plan view of the machine illustrated in Figure 1.

Figure 3 is a side elevational view showing the opposite side from that shown in Figure 1.

Figure 4 is a sectional view taken on the line 4—4 of Figure 2, the motor element being shown in elevation.

Figure 5 is a bottom plan view showing the opposite face from that illustrated in Figure 2, and,

Figure 6 is a view partly in section and partly in elevation taken laterally of the machine on the line 6—6 of Figure 2.

In general, foundry characteristics with respect to arrangement, operation, and the handling of various necessary machinery, tools and materials are well known and obvious to those skilled in the art, and the following description is therefore confined to the particular structure, arrangement of parts, and related operation of the various improved features embodied in the present invention.

Referring first to the Figures 1, 2, 4 and 6,

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there is illustrated one form of apparatus for practising this invention comprising the main body 10, being of general channel formation elongated from an open hopper loading end to a discharge end. Mounted on the loading end is a loading hopper carrying a vibratory assembly hereinafter described.

The main body portion 10 is mounted on a pair of channel members 11 integrally engaging the opposite edge portions on the lower face of the body 10 and extending along substantially the length thereof, the flanged side of the members 11 facing inwardly toward each other. The channel members 11 are in turn integrally mounted upon a pair of similar although relatively shorter channel members 12 at the discharge end of the body 10 with their flanged sides facing outwardly away from each other. Mounted on the lower face of the channel members 12 and at the ends toward the loading end of the device is a pair of downwardly projecting web-like wheel supports 13 engaging the laterally disposed axle 14 on the opposite ends of which are mounted the wheels 15.

As shown, the device is adapted for use upwardly inclined toward the discharge end, which, for conciseness, may hereinafter be termed the front end, while the loading end may be termed the rear end.

It will be noted that the upper portion of the rear end of the body 10 is tapered to a depth of approximately one-half its height as at A and that the length of said taper comprises the longitudinal dimension of the base opening of the hopper 16 while the lateral dimension of said base opening is determined by the width of said body 10.

The upwardly flaring walls of the hopper 16 as illustrated, effect the rearwardly overhanging arrangement of said hopper so as to provide ample foot room for the workmen and minimize the possibility of injury from accidentally tripping over the lower and rearmost parts of the device, while at the same time tending to somewhat withhold from the conveyor assembly the full extent of the load pressure from the sand loaded hopper, as a certain amount of the load is held by the inclined wall 16a of the hopper, thus enabling a substantially steady and gradual feeding of sand to the conveyor assembly which will later be explained. The upper vertical wall portion 16b of the hopper extends along two lateral side edges and one longitudinal side edge of the hopper top, enabling the workmen to dump the loaded sand flask into the hopper from one side

of the machine and also serving as a shield around three sides thereof to prevent undue spilling of sand on the foundry floor.

The vibratory assembly 18 has a pair of spaced apart supporting bars 19 on which are integrally mounted at spaced intervals the laterally arranged cross bars 20, said bars 19 being adapted to project through suitable apertures in the wall 16a into loose fitting through engagement with a pair of suitable supporting blocks 21 integrally mounted inwardly on said wall 16a and in register with the said apertures. A cross bar 22 integrally engages the outer end of each of the bars 19 and a vibratory element 23 is mounted on said cross bar 22 intermediate its ends, said vibratory element 23 being equipped with an electric cord 24 and plug 25 for connection with any suitable source of electric power for the purpose of actuating the vibratory element.

The conveyor belt assembly is comprised of the usual endless belt 26 of suitable material mounted on and between a pair of rollers members 27 and 28 which are mounted on the driven axle 29 and the idler axle 30 respectively. The driven axle 29 is mounted in the sealed bearing units 31 mounted on the channel members 11, and the idler axle 30 is mounted in the sealed bearing units 32 slidably mounted in the usual tension rack elements 33 having the adjusting screw 34 by means of which the tension of the belt 26 is fixed.

The axle 29 has mounted on one end thereof the pulley 29' engaging the V-belt 36 which engages the pulley 37' mounted on the drive shaft 37 of a suitable electric motor 38 slidably and adjustably mounted in the depending frame 39 integrally mounted on the bottom edge face of the channel members 11. Oppositely positioned fixed cleat members 39' are provided on the sides and adjacent the bottom of the frame 39 just above the base part of the motor to enable the slidable movement of the motor either forwardly or rearwardly of the frame 39 by means of the threaded bolt 40 which is suitably connected to the base part of the motor and threadably mounted in a lug member 41 on said frame 39 thus serving to adjust the tension of the belts 36 and 42 as well as enabling easy and convenient removal of the motor on occasion.

The axle 37 also has mounted thereon the pulley 37'' outwardly of the pulley 37' and engaging the V-belt 42 which in turn engages the pulley 43' mounted on the driven axle 43, said axle 43 being mounted in the sealed bearing units 44 which are mounted in the front end of the channel members 12.

A hollow rotatable drum element 45 having a series of circumferentially spaced blade-like members 46 integrally mounted thereon and extending the length of the drum, is mounted on said axle 43 for a purpose which will later be explained.

The usual arrangement referring generally to the electric wiring hookup between the motor 38 and the control box 47 is practised in this device and is here noted as obvious to those skilled in the art and requiring no detailed description, although for clarity it is mentioned that the electric cable 48 shown broken off in the drawings may be adapted for any suitable connection with electric power.

Fixed suitably to the opposite inner walls of the body 10 are the rubber strip members 49 overlapping the conveyor belt 26 as shown, thereby to prevent the sand from working under the belt in operation.

Universal ball-joint units 50 are mounted in the opposite walls of the body 10 in register with suitable openings in said walls to enable the ball portion of said units 50 to protrude through the walls. A relatively short shaft member 51 is fixedly mounted in each of the ball portions, and a concavo-convex disc member 52 is rotatably mounted on each shaft 51 which may be turned in various directions as required according to the type of sand being handled, as for example, larger moulds may at times contain relatively larger and hotter lumps of sand to be aerated and disintegrated, in which case the agitation and buffeting of the sand must be sharper and more pronounced than is required for smaller moulds containing smaller quantities of sand holding proportionately less heat. It will appear obvious from reference particularly to Figures 2 and 4 that as the upwardly inclined conveyor belt moves the sand from the loading end to the discharge end of the device, the disc members 52 may be set at such angles as will cause the traveling sand to be tossed from side to side of the body 10 with pre-determined degree of impact, thereby effecting a maximum turbulence throughout the travel course of the sand. A resilient pad 53, preferably of rubber, is interposed between each of the ball-joint units 50 and the outer face of the body 10 to serve as a yieldable cushion to absorb the shock of the traveling sand lumps against the peripheral cutting edge 52' of the disc members 52 in use.

The detailed operation of the present invention is apparent from the foregoing description, but briefly summarizing the same the electric power is released to the motor 38 and to the vibratory element 23, the motor then operating the mechanism generally, and the vibratory element 23 causing the vibratory assembly 18 to sharply vibrate. Then the sand mould flask—common to all foundry practice—is dumped by the workman into the hopper 16 where the loose hand falls through the cross bars 20 of the vibratory assembly 18 to the loading end of the conveyor belt 26, while the larger congealed portions of the sand are stopped momentarily on the cross bars 20 where the vibration breaks up the sand lumps to drop through to the conveyor belt where the sand is wetted down and somewhat cooled by a spray of water directed thereupon from a suitable spraying unit 53 mounted medially on the cross strap member 54 integrally mounted on and spanning the upper side edges of the body 10 as shown.

Now, as the sand is carried along on the belt 26 it contacts the concave face of the sand diffusing disc members 52, each of which in turn tosses the sand in a different direction so that when the sand arrives at the discharge end of the belt it is well disintegrated and cooled due primarily to the diffusing action of said disc members 52, although further provision is made for the same purpose by the relatively rapidly rotating drum element 45, the blade-like members 46 of which—being set at a slightly rearwardly reclining angle with respect to the direction of rotation of said drum element—serve to substantially scoop and project the moving sand through the air to form it in a pile of desired size at any suitable point on the foundry floor. The hood 55 is mounted by an elongated hinge 56 on and adjacent the front end of the channel members 12 to prevent the upward slinging

of the sand as it is forcibly ejected from the machine by said drum element as above described, although in the Figure 2 the hood 55 is shown in fragment only, to facilitate a clearer showing of the drum element, and the hinge 56 is omitted for the same reason. Likewise, the hood 55 is omitted from Figure 5 as well for the same reason.

Oppositely disposed side shield portions 57 are mounted on the body 10 adjacent said drum element to span the gap between the end of the body 10 and the hood 55.

It is noted that the normal operating position of the machine is as illustrated in the drawings and that it is only necessary to raise the rear or loading end thereof to enable it to be conveniently wheeled to any suitable location in the foundry.

Without further description it is believed that this invention is clearly understandable from the foregoing, and although the apparatus is somewhat specifically described and illustrated, it is to be understood that other combinations and arrangements of parts may be used by others in practising the invention without departing from the scope hereof.

Reference should be had to the appended claims to determine the scope of the invention.

What is claimed is:

1. In a machine of the type herein described comprising in combination a body portion having a loading end and a discharge end, sand vibrating means mounted on said body over the loading end, sand conveying means connected with the loading end and discharge end, said sand conveying means being under the vibrating means, sand diffusing disc means carried by said body over said conveying means, sand ejecting means mounted adjacent the discharge end of said body, means carried on said body adjacent said sand ejecting means to direct the throw of the sand from the said ejecting means, contained automatic electric motivating means carried by the machine for operating the same, and water spraying means mounted on said body for wetting down the sand as it is carried therethrough in practice.

2. In a machine of the type herein described comprising in combination an elongated body portion having a loading end and a discharge end, hopper means carried on said loading end,



sand vibrating means mounted in said hopper means, sand conveying belt means mounted in said body and connected with the loading and discharge ends thereof, adjustable sand diffusing disc means carried by said body and positioned above in proximity with said sand conveying belt means, sand ejecting means mounted adjacent the discharge end of the body, blade members on said sand ejecting means for effecting the throw of the sand, means carried on said body adjacent said sand ejecting means to direct the throw of the sand therefrom, electric motor means carried by the machine for the operation thereof, water spraying means mounted on said body adjacent its loading end for wetting down the sand as it is conveyed through the machine in practise, and wheel members carried by the machine for enabling its movement to suitable locations for use.

3. In a machine of the type herein described comprising in combination an elongated body portion having a loading end and a discharge end, hopper means carried on said loading end, sand vibrating means mounted in said hopper means, sand conveying belt means mounted in said body below said hopper connecting the loading and discharge ends thereof, means for cooling the sand on the discharge means comprising a wetting means mounted over the belt conveying means to discharge a cooling medium on the sand on the conveying belt and sand diffusing disc means carried by the side of the body in contact with the sand moving with the conveyor.

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