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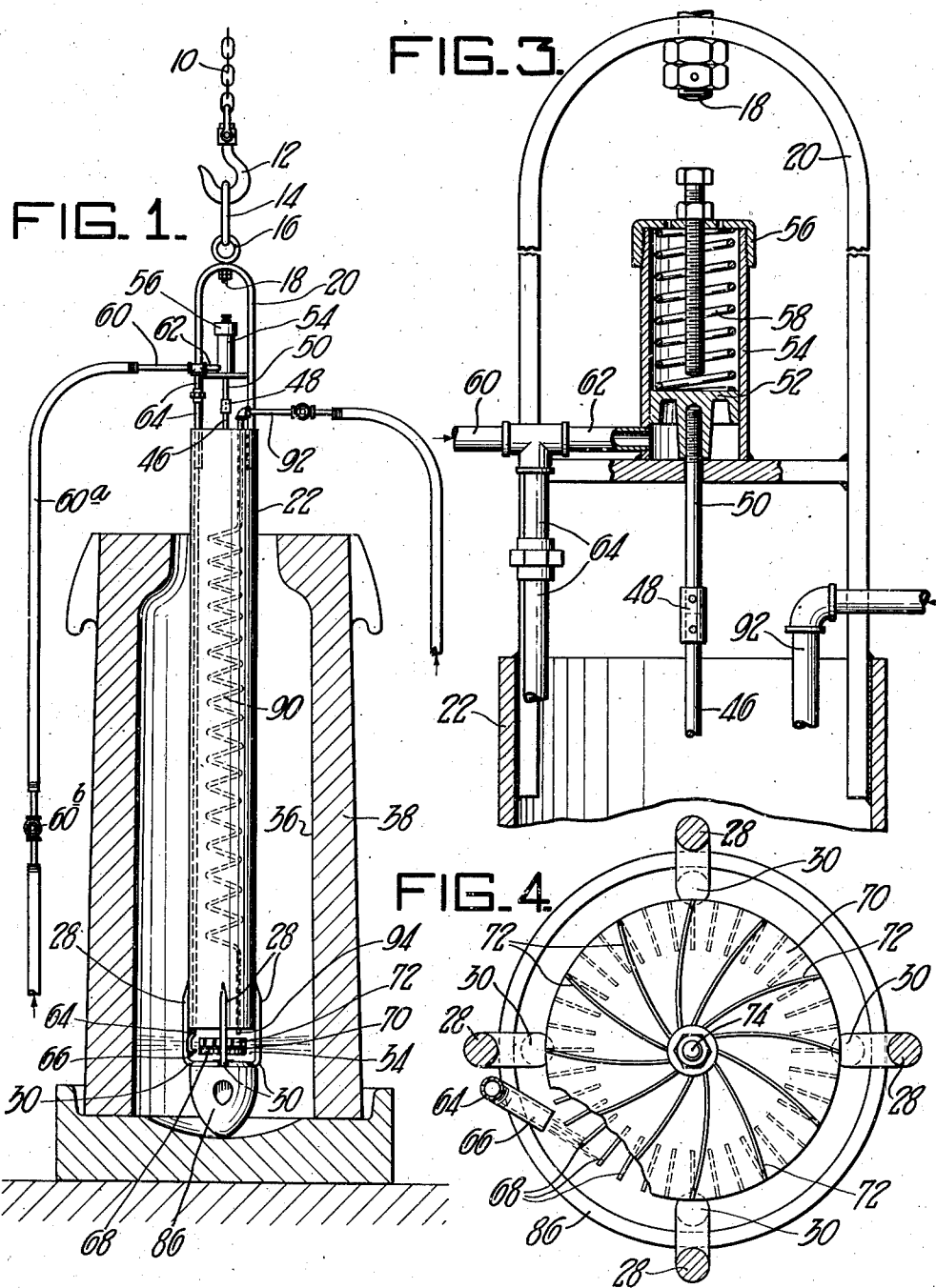
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2,387,362

INGOT MOLD SPRAYER

Filed April 15, 1944

2 Sheets-Sheet 1



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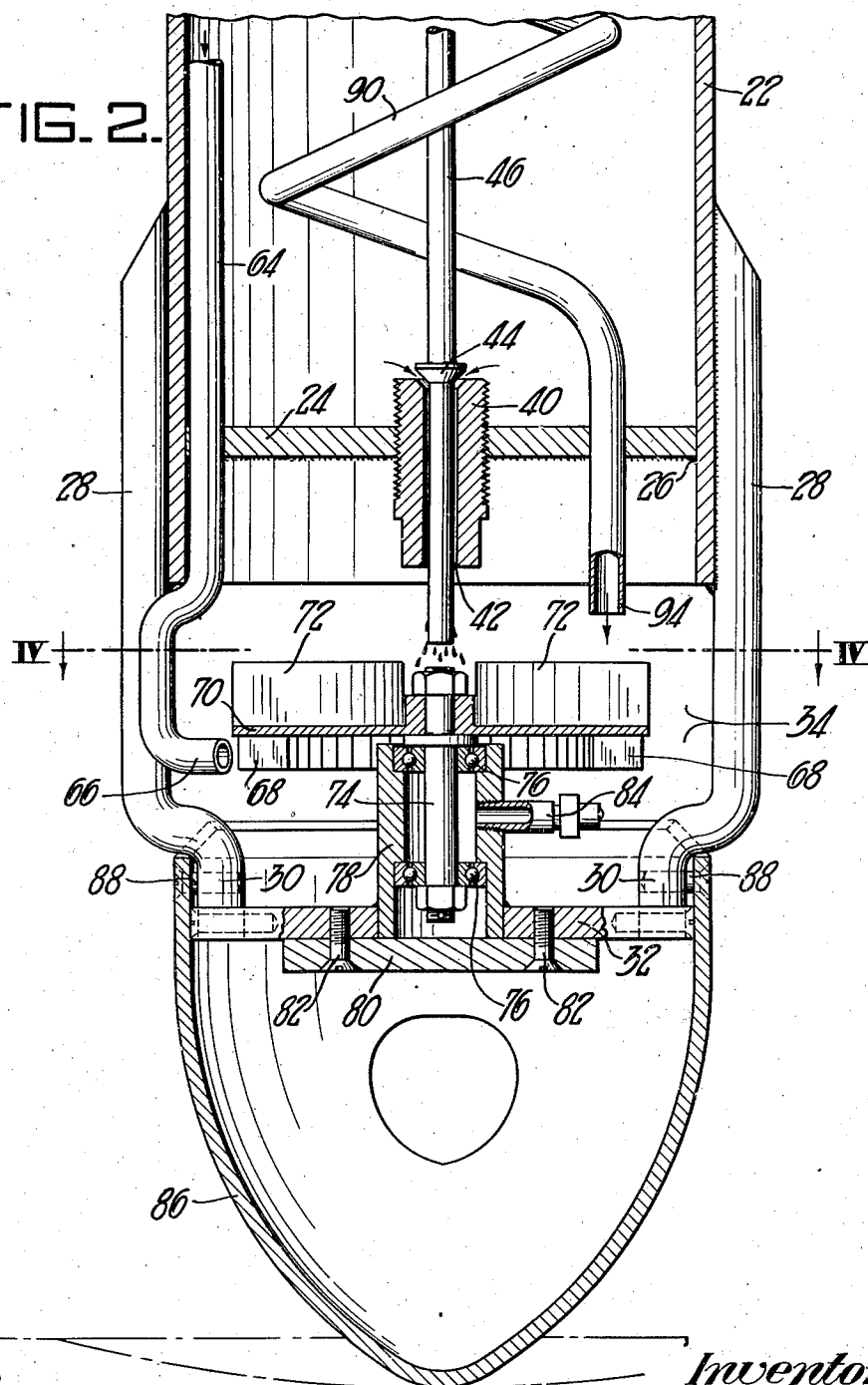
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FIG. 2.



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UNITED STATES PATENT OFFICE

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INGOT MOLD SPRAYER

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6 Claims. (Cl. 22—88)

The present invention relates to specific features of construction and arrangement of the component parts of an air-driven sprayer adapted to apply a coating of tar or the like to the interior wall of an ingot mold cavity.

It is broadly old to provide apparatus for centrifugally throwing tar or similar coating material against the walls of an ingot mold, but prior art devices usually include an electric driving motor and electrically operated actuating means for controlling the outflow of tar or like coating material. One such known tar sprayer is shown in Hadley Patent No. 2,151,100. The motor of the Hadley apparatus is enclosed in a top casing of considerably larger size than the portion which enters the mold, and the enlarged casing is in a location which obstructs the view of an overhead crane operator who spots the apparatus over the molds to be sprayed. My present invention is an improvement over the apparatus shown in the Hadley patent, and aims to provide an arrangement in which the operator's view will not be obstructed, and also to provide a rugged air-actuated means for rotating the impeller which throws the tar outwardly.

A further object of the invention is to provide a streamlined structural arrangement in the nature of an elongated tubular reservoir having a suspension bale at the top and a head at the bottom having a bullet-like nose for guiding the apparatus into an ingot mold, the head being spaced from the reservoir by a plurality of longitudinally-extending rods to thus provide an outlet space between the lower end of the reservoir and the head in which space the impeller is located.

The above and other characteristic features of the invention will be more fully apparent from consideration of the following detailed disclosure, the accompanying drawings, and the appended claims.

In the drawings:

Figure 1 is a vertical section illustrating the improved apparatus in the act of applying tar to the interior of an ingot mold.

Figure 2 is an enlarged view in central longitudinal section of the lower part of the apparatus shown in Figure 1.

Figure 3 is a similar view of the upper portion of the apparatus.

Figure 4 is a horizontal section on line IV—IV of Figure 2.

Referring in detail to the drawings, 10 represents a suspension member such as a chain or cable, depending from an overhead crane (not shown), the member having a hook 12 for engage-

ment with a ring 14 secured to a fitting 16 having a swivel shank 18 passing freely through a hole formed in the top of a ball-like U-shaped member 20. The lower extremities of the legs of the member 20 project into a tubular reservoir 22, said legs being welded thereto, as shown. The reservoir 22 is in the nature of an elongated tube or casing having a bottom plate 24 secured near its lower extremity by a welded seam 26.

Welded to the lower portion of the reservoir 22 are a plurality of rods 28 whose lower extremities 30 are secured to a head 32, the assembly being such that there is an open space 34 between the lower extremity of the reservoir 22 and the head 32. The reservoir is adapted to be substantially filled with a body of tar or equivalent coating material with which it is desired to coat the interior face 36 of an ingot mold 38.

Located axially of the bottom plate 24 is a fitting 40 having an outlet orifice 42 therein. The discharge of coating material from the reservoir through the orifice 42 is under control of a valve 44 secured to a valve-operating rod 46 whose upper end is connected by a coupling 48 with a stem 50 depending from a piston 52 located within a cylinder 54 having a cap 56 closing its upper end. A spring 58 bears at one end against the cap 56 and at the opposite end against the piston 52, and normally tends to keep the valve 44 in closed position.

An air inlet supply pipe 60 has one branch 62 connected with the cylinder 54 and another branch 64 extending downwardly along the side wall of the reservoir 22. The lower end of the branch 64 is bent laterally, as indicated at 66, so as to direct a jet of air against propeller vanes 68 formed on the under-side of an impeller 70 the upper face of which is equipped with a plurality of tar-throwing distributor vanes 72. The impeller is secured to a stub shaft 74 mounted in antifriction bearings 76 carried by a sleeve 78 welded or otherwise secured to the head 32, the lower extremity of the sleeve being closed by a cover plate 80 secured by screws 82 to the lower face of the head. A suitable ball-type check-valve fitting 84 is screwed into the wall of the sleeve 78 so as to provide for the introduction of grease or similar lubricant to insure smooth action of the impeller. A substantially parabolic or bullet-like nose 86 is secured to the head 32 by means of screws 88 or other suitable fastening devices. The rounded tapering contour of the nose 86 facilitates entry of the apparatus into the mold cavity, and also protects the impeller and related coating portions of the ap-

paratus. The several rods 28 secured to the exterior of the lower end of the cylinder 22 form a cage-like protective structure for the impeller which is of rugged construction and streamlined design adapted to effectively guide the device into the mouth of the mold cavity.

For maintaining the tar or similar coating material in proper fluid condition, in some cases I provide a steam coil 90 whose inlet end 92 is connected with a suitable steam supply and whose outlet end 94 terminates in the peripheral region of the distributor vanes 72.

In the normal operation of the device, air is admitted to the pipe 60 through a flexible hose 60^a under control of a valve 60^b operated by a workman at about the ground level of the ingots to be coated, the hose being connected with a suitable source of compressed air (not shown). When the valve 60^b is manually opened, the air pressure lifts the piston 52 against the action of the spring 58, thus lifting the valve 44 and permitting the tar to flow outwardly through the orifice 42 and to be discharged in the central or axial region of the impeller 10, as suggested by the arrows in Figure 2. The impeller is driven by the jet of air emanating from the bent portion 66 of the branch pipe 64, this air jet impinging on the propeller vanes 68, thereby causing a high-speed rotation of the impeller. It is obvious that the rotary action of the impeller will cause the vanes 72 to throw the tar outwardly with considerable force through the space between the lower extremity of the reservoir 22 and the head 32, thus distributing the tar on the inner face 36 of the ingot mold 38. While the tar is thus being centrifugally thrown outwardly, the entire apparatus will be pulled upwardly under control of the operator stationed on the overhead crane. During this upward travel of the device, another operator on the ground pulls on the hose 60^a, thus imparting a partial turning movement to the entire apparatus, this being permitted by the bale-like swivel suspension devices above described.

Upon complete withdrawal of the device from a given mold which has been coated, the crane operator then moves on to the next mold and spots the device thereover. He then pays out the cable or chain, thus lowering the apparatus into another mold. During such lowering it will be understood that the bullet-like nose 86 serves as a guide to facilitate the entry of the apparatus into the mold cavity. It will also be apparent that the design and construction of the parts are such that the operator on the crane will not have his vision obstructed by any of the structure of the coating device. Thus there is less likelihood of damaging the device than is the case when using prior art devices.

Having thus described my invention and the preferred practical means for making it available, what I desire to protect by Letters Patent is defined with particularity to meet the requirements of the patent statutes in the following claims.

I claim:

1. A sprayer for coating the interior of an ingot mold cavity, comprising an elongated reservoir for coating material, a head spaced from

the lower extremity thereof, an impeller rotatably mounted between the reservoir and said head, said impeller having distributor vanes on one face adapted to throw coating material outwardly and propeller vanes on its other face, means for impinging a fluid against said propeller vanes so as to rotate the impeller, and means for delivering a controlled quantity of coating material from the reservoir to the central axial region of the impeller.

2. The apparatus of claim 1, further characterized in that said delivering means includes an axial outlet orifice in the lower part of said reservoir, a valve controlling the flow of coating material through said orifice, and air-operated means for actuating said valve.

3. The apparatus of claim 1, further characterized in that said delivering means includes an axial outlet orifice in the lower part of said reservoir, a valve controlling the flow of coating material through said orifice, and an air-operated valve-actuating means connected to an air supply pipe which also delivers an air jet against the propeller vanes of said impeller.

4. The apparatus of claim 1, further characterized in that said delivering means includes an axial outlet orifice in the lower part of said reservoir, a valve controlling the flow of coating material through said orifice, and an air-operated valve-actuating means connected to an air supply pipe which also delivers an air jet against the propeller vanes of said impeller, said air-operated valve-actuating means comprising a piston having an extension rod disposed axially of the reservoir for controlling the flow through the axial orifice in the bottom thereof.

5. The apparatus of claim 1, further characterized in that a bail-like suspension member is secured to the upper portion of the reservoir to facilitate lifting and lowering the apparatus relatively to an ingot mold to be coated, the said head having a bullet-like nose secured thereto for guiding the apparatus into an ingot mold and being connected to the lower portion of the reservoir by a plurality of rods which serve to space the head from the lower extremity of the reservoir, thus providing a space between the two through which the coating material is adapted to be thrown outwardly by the rotary action of said distributor vanes.

6. The apparatus of claim 1, further characterized in that a bail-like suspension member is secured to the upper portion of the reservoir to facilitate lifting and lowering the apparatus relatively to an ingot mold to be coated, the said head having a bullet-like nose secured thereto for guiding the apparatus into an ingot mold and being connected to the lower portion of the reservoir by a plurality of rods which serve to space the head from the lower extremity of the reservoir, thus providing a space between the two through which the coating material is adapted to be thrown outwardly by the rotary action of said distributor vanes, the said head including a top plate supporting a tubular sleeve carrying antifriction bearings and the impeller having a stub shaft supported by said bearings.

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