J. A. MOHR & F. H. N. GERWIG.

APPARATUS FOR COATING MOLDS.

APPLICATION FILED APR. 12, 1909.

965,394.

Patented July 26, 1910.

3 SHEETS—SHEET 1.

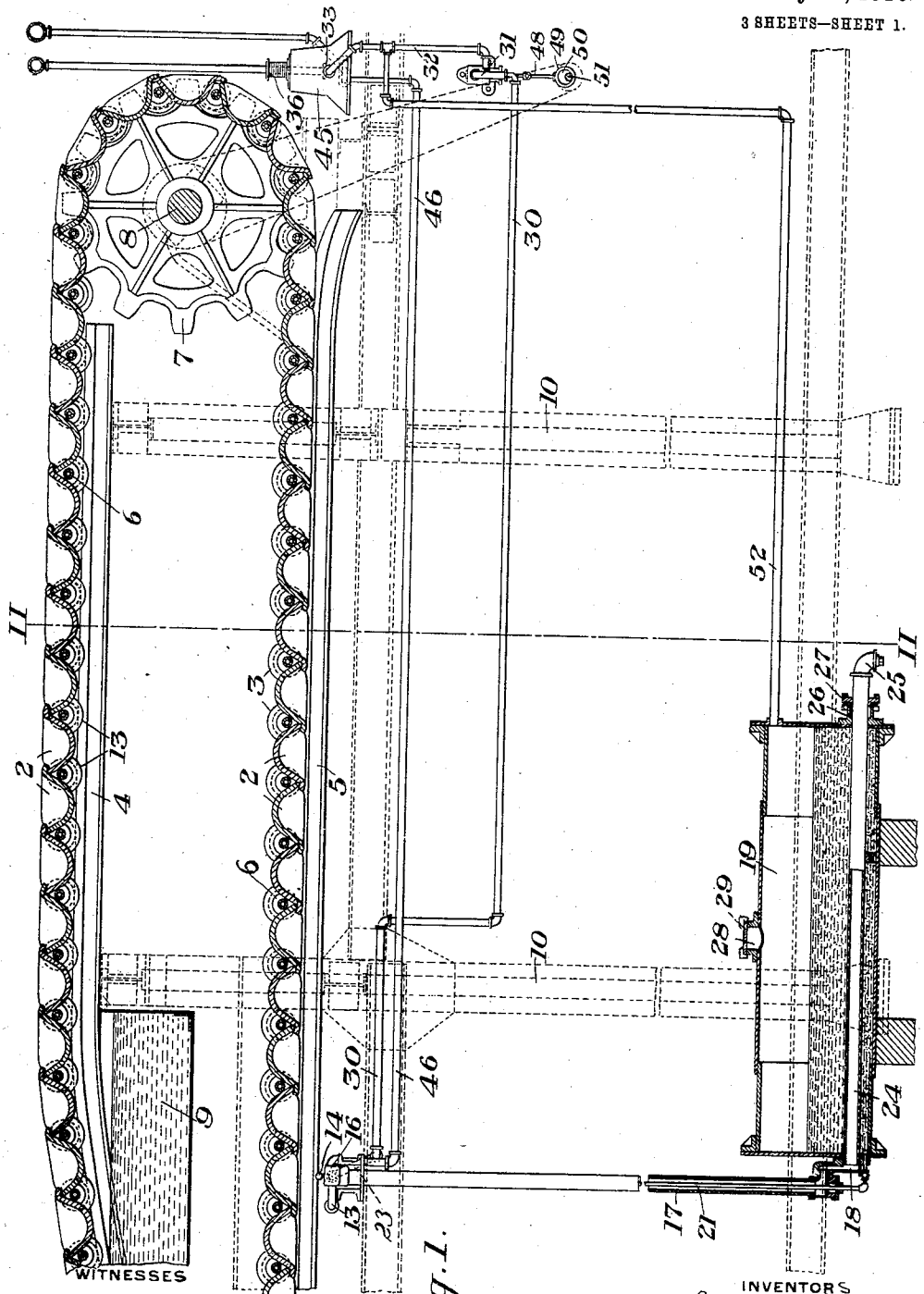

Fig. 1.

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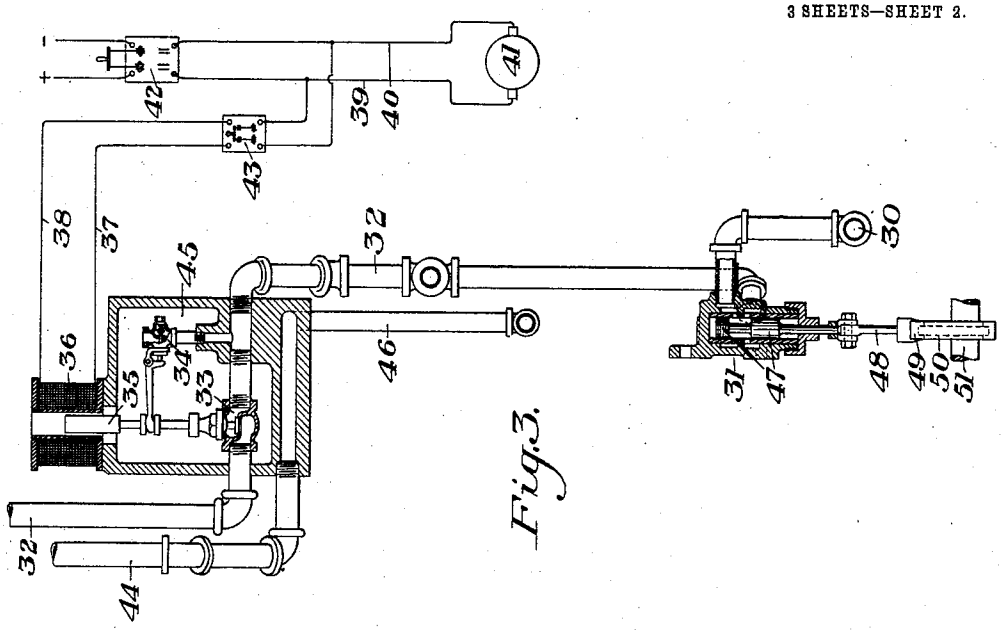

Fig. 3.

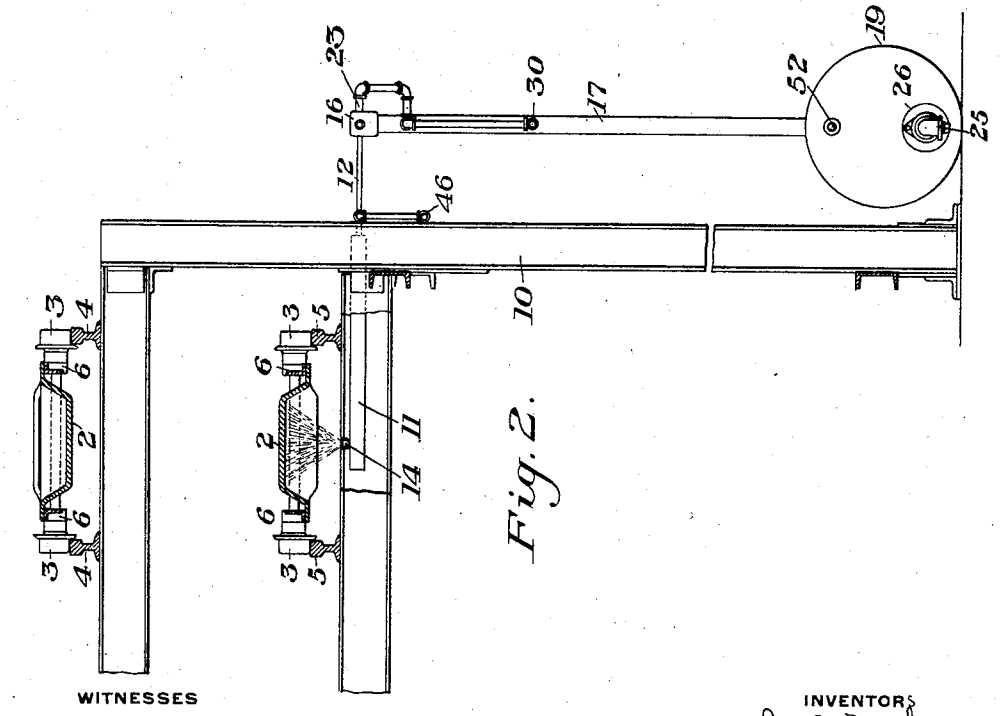

Fig. 2.

WITNESSES

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3 SHEETS—SHEET 3.

Fig. 4.

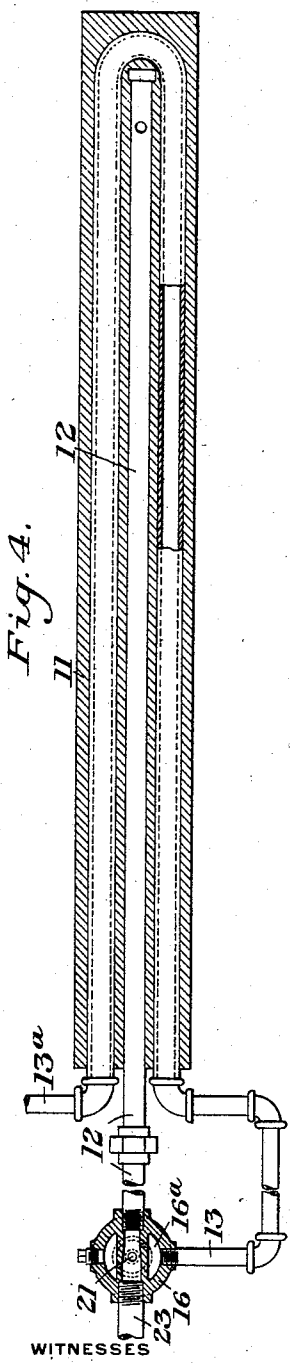


Fig. 5.

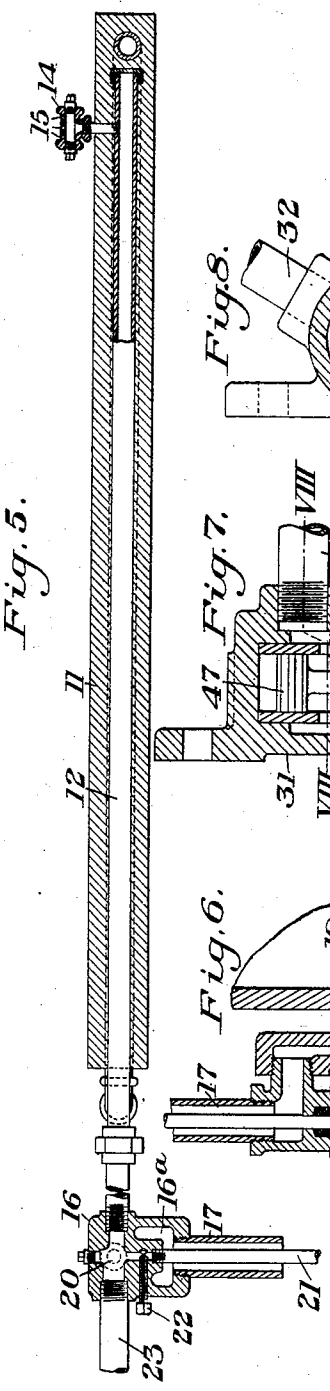


Fig. 8.

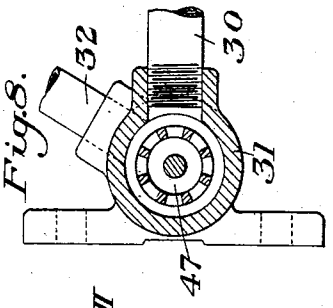


Fig. 7.

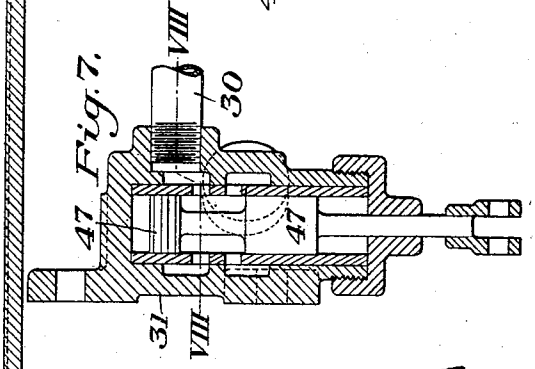
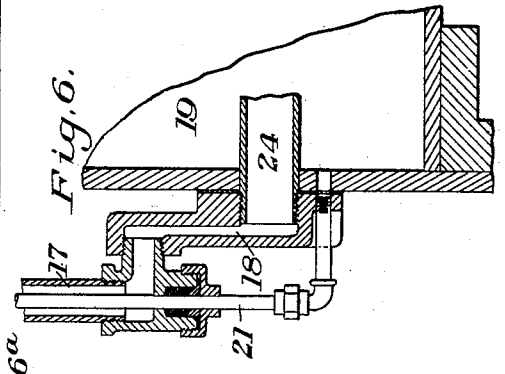


Fig. 6.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR COATING MOLDS.

965,394. Specification of Letters Patent. **Patented July 26, 1910.**

Application filed April 12, 1909. Serial No. 489,374.

To all whom it may concern:

Be it known that we, JACOB A. MOHR, of Braddock, and FREDERICK H. N. GERWIG, of Wilkinsburg, in the county of Allegheny, State of Pennsylvania, have invented a new and useful Improved Apparatus for Coating Molds, of which the following is a full, clear, and exact description.

Figure 1 is a longitudinal sectional side elevation showing the front end of a casting machine having mold coating apparatus constructed and arranged in accordance with our invention; Fig. 2 is a sectional end elevation of the same on the line II—II of Fig. 1; Fig. 3 is a detail sectional elevation on a larger scale showing the valves and the valve operating mechanism and showing the electrical connections as arranged in accordance with our invention; Fig. 4 is a sectional plan showing an enlarged detail of the spray heater forming part of our invention; Fig. 5 is a longitudinal sectional side elevation of the same; Fig. 6 is a detail sectional elevation showing the connection of the supply pipe and the heating pipe to the receiver or tank containing the materials used for coating the molds; Fig. 7 is a sectional elevation showing the piston valve used in connection with the apparatus constructed as shown in the drawings. Fig. 8 is a sectional plan of the valve on the line VIII—VIII of Fig. 7.

Our invention relates to apparatus used in applying coating materials to the molds of pig casting machines for pigs, to prevent sticking of the molten iron to the molds during the casting operation in which the molten iron is formed into pigs.

Another object of our invention is to provide improved means by which the coating materials are applied continuously to the successive molds while the casting machine is in operation and is automatically stopped when the casting machine is not being operated.

A further object of the invention is to provide novel means for handling and storing and for delivering the coating materials to the point at which they are sprayed on the molds and means by which the spraying of the coating materials is automatically controlled during the operation of the casting machine and by which the spraying operation is regulated by the operation of the casting machine.

In the drawings, 2 represents an endless string of molds having track wheels 3 which run upon the rails 4 and 5 forming the mold tracks of the casting machine, which is of an old and well known type. The chains or links 6 on each side of and connecting the series of molds pass over the driving sprocket wheels 7 on the front or delivery end of the apparatus, which are mounted on the driving shaft 8. The chain links on the opposite end of the string of molds pass over similar sprocket wheels (not shown) which are adapted to be adjusted longitudinally to take up slack in the chains or links and regulate the tension on the string of molds. The molds in the construction shown after passing from the point at which they are filled with molten metal, dip downwardly into and then lead upwardly out of the cooling tank 9, which is kept filled with water. The track rails 4 and 5 are supported upon and carried by the supporting framework 10.

Secured below the string of molds 2 on the frame-work 10 is a horizontally extending spray heater 11 in which the spray supply pipe 12 is surrounded by a heating coil or pipe 13 so as to keep the coating material, which preferably is coal tar, in a fluid condition. The outer end of the spray heater is provided with a tee 14 having perforations 15 in its top surface through which the tar or other coating material is sprayed in being applied on the molds, the tee 14 being located preferably beneath and between the lower track rails 5 as shown in Fig. 2.

One end of the supply pipe 12 is connected into the hollow connection 16 and one end of the heating coil 13 also leads into the annular recess 16^a in the connection 16, the other end 13^a of the heating coil or pipe being connected to a source of steam supply. The recess 16^a is also connected by a pipe 17 which leads downwardly, and is connected at its lower end into the hollow connection 18 secured on one end of the storage tank 19. The recessed connection 16 is also

provided with a passage 20 which connects the spray supply pipe 12 with the pipe 21 which is telescoped in the pipe 17 and which leads downwardly through the pipe 17 and is connected into the lower portion of the tank 19. A threaded screw 22 is provided on the connection 16 which acts as a needle valve to regulate the flow of coating materials from the pipe 21 through the connection 16 into the spray supply pipe 12. The connection 16 is also connected by the pipe 23 with a source of fluid pressure supply.

The connection 18 secured on the tank 19 connects the pipe 24, which extends from end to end through the tank 19, with the pipe 17, the pipe 24 having an elbow 25 through which steam escapes after passing through the spray heater, the pipe 17 and the pipe 24 in order to heat the coating materials and maintain them in a fluid condition. The pipe 24 is free to expand at one end, the stuffing box 26 and gland 27 being provided on the tank for that purpose, and a man-hole 28 is provided on the tank 19 through which the coating materials are put into the tank 19, the opening 28 being closed by means of the man-hole cover 29.

The air pipe 23 is connected by the supply pipe 30 into the piston valve 31 and a fluid pressure pipe 32 connects the valve 31 with a source of fluid pressure supply through the regulating valve 33. Also connected into the pipe 32 is a relief valve 34, the valves 33 and 34 being operatively connected to the core 35 of the solenoid by which they are actuated, the valves 33 and 34 being arranged in such manner that when either valve is closed the other remains open.

The coil 36 of the solenoid is connected by the wires 37 and 38 to the wires 39 and 40 which supply current to the motor 41 by which the driving shaft 8 of the casting machine is actuated. The switch 42 is provided to cut off the supply of current from the motor 41 when it is desired to stop the casting apparatus and a second switch 43 is employed on the circuit formed by the wires 37 and 38 so as to cut out the supply of current to the solenoid 36 and permit the casting machine to be operated without operating the solenoid and the valves 33 and 34.

The pipe 32 is connected with an air compressor or other source of fluid pressure supply and the pipe 44 connects a source of steam supply through the recessed solenoid support 45 with the steam pipe 46 which leads and is connected with the end 13^a of the spray heating coil 11.

The piston 47 of the valve 31 is connected by the rod 48 and eccentric strap 49 with the eccentric 50 on the eccentric shaft 51. The shaft 51 is operatively connected to the driving shaft 8 of the casting machine or other part of the driving mechanism by which the casting machine is operated so as to rotate the shaft 51 when the shaft 8 is being driven.

In the operation of our improved apparatus, a supply of coal-tar or other material used in coating the molds is placed in the storage tank 19. When the casting operation is started and the molds 2 are caused to travel along their tracks during the casting operation, the coating material is sprayed in the form of a mist upon the molds as they are successively passed over the spraying nozzle 14, the switches 42 and 43 being thrown into position to supply current to the motor 41 and the solenoid core 36 and cause the molds to move upon the track rails. Fluid pressure is then supplied through the pipe 32 and the valve 31 to the pipe 23 and into the connection 16, from which point the air forces the coating material through the pipe 12 upwardly through the nozzle 14 from which point it is sprayed upon the molds, during such time as the molds are caused to travel on their track.

In order to prevent waste of the coating materials, means are provided for causing the spraying operation to operate intermittently. As shown in the drawings, the coating material is caused to ascend in the supply pipe 21 by fluid pressure which is supplied to the tank through the branch pipe 52 which connects the tank 19 with the pipe 32 at a point between the valves 31 and 33.

The air being supplied to the tank under compression, its tendency to expand in the tank causes the tar or other coating material to ascend through the supply pipe 21 and be sprayed on the molds after the casting machine has been stopped and the necessity for spraying the molds no longer exists. To overcome this difficulty, the valve 34 is provided, which is located between the valve 33 and the branch pipe 52 leading from the pipe 32 to the tank. The valve 33 is closed by the movement of the solenoid core and the same movement of the solenoid core opens the valve 34 and permits any fluid pressure in the tank to escape, in this way reducing the pressure in the tank to that of the atmosphere. When the pressure is thus reduced there is no tendency for the coating materials to rise in the pipe 10 and pass through the spraying nozzle 14 except at such times as the valve 34 is closed.

Coal tar when heated, is quite fluid and heat in the body of the molds 2 will cause the tar to distribute itself over the sloping sides of the molds, even after passing out of the range of the spraying nozzle 14. For this reason the spraying operation, when desired need be for only a part of the time in which any one mold is passing over the spray nozzle. To secure this result, the piston valve 31 is provided for controlling the passage of fluid pressure through the supply

pipe 23, the valve being operatively connected to the shaft 51. The shaft 51 is driven by a sprocket chain connected as shown to the driving shaft 8, so that as the shaft 8 rotates the eccentric shaft 51 is caused to turn. Each revolution of the shaft 51 will open and close the piston valve 31 so as to momentarily admit air or other fluid pressure into the pipe 23 and force any coating materials present in the supply pipe 12 through the nozzle 14 in the form of a spray.

In order to keep the tar, which is preferably used for coating the molds, in a liquid condition the steam coil formed by the pipe 13 is provided in the spray heater and is connected into the recess 16^a in the connection 16. The recess 16^a is connected by the pipe 17 with the recessed connection 18 on the tank 19 and the connection 18 has one end of the pipe 24 connected thereto, this pipe 24 passing through the tank 19 from end to end in a manner before described. The supply end 13^a of the pipe 13 is connected with a source of steam supply and the steam in passing through these pipes heats the tar and maintains it in a fluid condition, the steam finally escaping through a contracted opening in the elbow 25 located on one end of the pipe 24.

The advantages of our invention will be apparent to those skilled in the art. The apparatus is simple and is easily kept in repair. By means of our improved apparatus the molds are easily and quickly sprayed with a coating of even thickness of the materials which will effectively prevent sticking of molten iron when poured into the molds. The improved means for delivering the coating materials to the point at which they are sprayed upon the inner surfaces of the molds and the means employed for spraying the coating materials on the molds prevents waste of such materials. By the arrangement of the intermittently operated valve mechanism the spraying operation is performed at the exact time and for just the right length of time, while the inlet and relief valves permit of the use of the fluid pressure to force tar from the reservoir or tank to the point of use and at the same time prevents waste of the material when the casting machine is not in operation. The means employed for heating the tar and similar coating materials maintains these materials in a fluid condition. The use of fluid pressure, together with means for heating the materials enables the coal tar to be deposited upon the molds in the form of a mist.

Modifications in the arrangement and construction of the apparatus can be made without departing from our invention. One tank or reservoir may be provided of sufficient size to supply a series of strings of molds. The type and location of the valves may be changed and means other than the solenoid may be used for operating the valves. The coating materials may be heated or not, as is desired, and other changes may be made.

We claim:

1. Apparatus for coating molds comprising a storage vessel for the coating material, a supply pipe leading therefrom terminating in a nozzle arranged to discharge upon the molds, means arranged to force the coating material from said nozzle into contact with the molds and means adapted to heat the coating material in the vessel and during its passage to the nozzle; substantially as described.

2. Apparatus for coating molds comprising a storage vessel for the coating material, a supply pipe leading therefrom and terminating in a nozzle arranged to discharge upon the molds, means for delivering the coating material from said vessel to the nozzle, means adapted to heat the coating material in the vessel and independent means arranged to force the heated coating material delivered to said nozzle into contact with the molds; substantially as described.

3. Apparatus for coating molds comprising a storage vessel for the coating material, a supply pipe leading therefrom terminating in a nozzle arranged to discharge upon the molds, independent means adapted to spray the materials issuing from said nozzle upon the molds and means arranged to cause the spraying operation at intervals; substantially as described.

4. Apparatus for coating molds comprising a storage vessel for the coating material, a supply pipe leading therefrom terminating in a nozzle arranged to discharge upon the molds and independent means for intermittently spraying the material discharged through said nozzle; substantially as described.

5. Apparatus for coating molds, comprising a storage vessel for the coating material means for heating materials stored therein, a supply pipe leading therefrom and terminating in a nozzle arranged to discharge upon said molds, means arranged to force the coating material issuing from said nozzle into contact with the molds and means for heating the coating material while passing to said nozzle, substantially as described.

6. Apparatus for coating molds comprising a storage vessel for the coating material, a supply pipe leading therefrom terminating in a nozzle adapted to discharge upon the molds and independent means arranged to force the coating material issuing from said nozzle into contact with the molds; substantially as described.

7. Apparatus for coating molds, com-

prising a storage vessel for the coating material, a supply pipe leading therefrom and terminating in a nozzle arranged to discharge upon said molds, fluid pressure means arranged to force material from said storage tank through said pipe, independent means arranged to spray the materials issuing from said nozzle upon said molds, and means for heating the materials in the supply pipe and nozzle; substantially as described.

8. Apparatus for coating molds comprising a storage vessel for the coating material, a supply pipe leading therefrom and terminating in a nozzle arranged to discharge upon said molds, fluid pressure means arranged to force materials from said storage tank through said supply pipe, and independent means arranged to intermittently spray the materials issuing from said nozzle; substantially as described.

9. Apparatus for coating molds having a storage tank, a supply pipe terminating in a nozzle arranged to discharge coating material upon molds, means for supplying fluid pressure to said tank and thereby force coating material into said nozzle, and fluid pressure means arranged to spray the coating material discharged from said nozzle upon said molds; substantially as described.

10. Apparatus for coating molds having a storage tank, a supply pipe terminating in a nozzle arranged to discharge coating materials upon the molds, means for supplying fluid pressure to said tank and force coating materials therefrom into said nozzle, fluid pressure means arranged to spray the coating materials discharged from said nozzle, and means controlling the fluid pressure supply to said nozzle arranged to admit fluid pressure to the nozzle at intervals; substantially as described.

11. In a casting machine having movable molds, mold spraying apparatus comprising a storage tank, a connection leading therefrom terminating in a stationary nozzle arranged to discharge upon said molds and means arranged to supply fluid to said nozzle from the tank while the molds are in operation, said means being arranged to stop the supply of fluid to said nozzle when the molds are not in motion; substantially as described.

12. In a casting machine having movable molds, mold spraying apparatus comprising a storage tank, a connection leading from said tank terminating in a stationary nozzle arranged to discharge upon the molds and means connected to the tank arranged to supply fluid to said nozzle from the tank while the molds are in motion, said means being arranged to stop the supply of fluid when the molds are not in motion; substantially as described.

13. In a casting machine having movable molds, mold spraying apparatus comprising a storage tank, a connection leading from said tank terminating in a nozzle arranged to discharge on said molds, a fluid pressure supply pipe connected to said tank, a valve arranged to control the supply of fluid pressure to the tank and a relief valve arranged to permit the escape of fluid pressure from said tank, one of said valves being open when the other is closed; substantially as described.

14. In a casting machine having movable molds, mold spraying apparatus comprising a storage tank, a connection leading from said tank terminating in a nozzle arranged to discharge on said molds, a fluid pressure supply pipe connected to said tank, a valve arranged to control the supply of fluid pressure to the tank and a relief valve arranged to permit the escape of fluid pressure from said tank; substantially as described.

15. In a casting machine having movable molds, mold spraying apparatus comprising a storage tank for the coating material, connections leading therefrom terminating in a stationary nozzle arranged to discharge upon said molds, a fluid pressure supply pipe arranged to admit fluid pressure to the tank connection to the nozzle and a valve operatively connected to the casting machine arranged to control the flow of fluid pressure into said connection; substantially as described.

16. In a casting machine having molds, mold spraying apparatus comprising a storage tank, a connection thereto terminating in a stationary nozzle adapted to discharge coating material upon said molds, a supply pipe arranged to admit fluid pressure to said nozzle connection, a valve arranged to control the flow of fluid pressure into said connection, and means operated by the casting machine arranged to intermittently open and close the valve; substantially as described.

In testimony whereof, we have hereunto set our hands.

JACOB A. MOHR.
FREDERICK H. N. GERWIG.

Witnesses:
T. E. KENNEY,
THOMAS J. O'BRIEN.