

underside of girder, 20 feet; distance centre to centre of hook, 11 feet; lift, travel of hook, 14 feet 6 inches.

The load is hoisted by means of a steel wire hoisting rope, winding on hoisting drums. These drums are driven by a system of spur and worm gearing, operated by an electric motor.

The trucks consist of structural steel section, provided with bearings for the main axles, to which are fitted double flanged cast iron wheels. The hoisting gearing is supported on bridge girders by means of structural framing. The design of the drum insures equal distribution of load upon girders. The safety factor in the crane design is five.

The hoisting motor is comparatively small as only low speed is required. The motor is fitted with an improved automatic electric brake. This brake is operated by an electric solenoid in circuit with the hoisting motor and is so arranged that it will come automatically into action when the electric current is off the hoisting motor circuit.

All parts easily accessible for oiling and repairs.

Sandless Castings*

By JOHN H. SHAW.

Casting in so-called chills is a method well known at the present time. Outside of the making of rolls and ingot moulds, we find the method used for making bedsteads, sash weights, and other simple castings where there is no difficulty from undue expansion and contraction. The troubles arising from an iron mould, and the lack of understanding the regulation of temperatures in casting into chills, have caused many a failure of an otherwise good idea.

The greater part of these objections have been overcome by the construction of a peculiarly arranged mould, as shown in Figures 1 and 2. The parts of the mould are so arranged that they automatically open out sufficiently to take care of the expansion due to heating without destroying the correctness of the castings made. The further manipulation of the moulds in filling them with molten iron depends upon a proper knowledge of the temperature they must be kept at to insure the best all around results.

CONSTRUCTION OF THE MOULD.

The mould is constructed essentially in two parts. The outer shell which may be locked readily, and the inner dies in close contact with the shell, and securely fastened to it. The design of the mould is such that expansion in two directions may readily take place unhindered except for powerful springs. The arrangement of dies and shell allows of a ready replacement of the former when damaged, this depending upon the thickness of the mould and the temperature they are allowed to reach, their composition, of course being such that a high melting point is attained. Further attention is given to the moulds in designing them, so that they may be closed and opened very quickly, and thus rapid work accomplished.

OPERATING THE MOULD.

In operating a sandless mould, it is necessary to coat the metal in contact with

*Presented before the American Foundrymen's Association.

the molten iron occasionally with a compound containing graphite and crude oil, or other refractory substance carried in a vehicle which in being driven off by heat will not ruin the surface of the casting.

In operating the mould, after spraying it, the first few castings are rejected, the intention being to heat up the mould, though in continuous work, this may be accomplished in a special heating furnace or oven if desired. All cores are set in the regular way before casting. The metal is poured in rapidly, and the mould opened as quickly as possible provided that the metal is set sufficiently that no bleeding takes place. The elastic condition of the mould, however, prevents trouble if this time is not kept properly and the casting allowed to remain in the mould too long, the disadvantage of such a procedure in allowing the mould to heat up too much is naturally evident. The casting is then taken out and piled up so that the whole mass may

The sandless mould is best adapted only to work of fairly large size, though practically everything can be made in this way if proper care is taken in the niceties of the construction and manipulation.

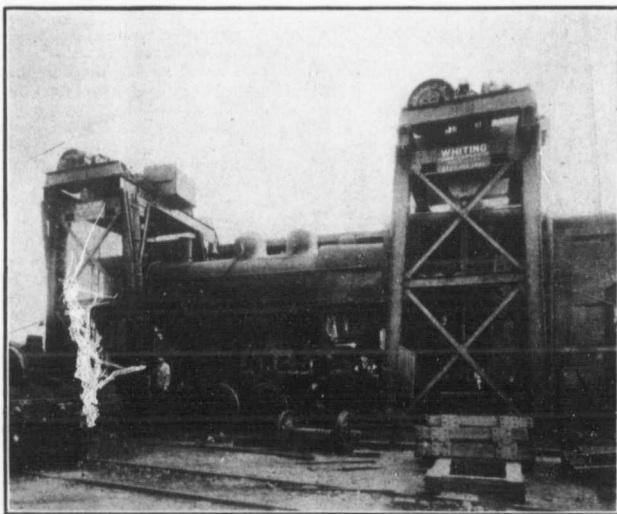
The heating of the mould consumes some time and uses metal which must be returned to the cupola, though this can be avoided by heating in the oven. Moulds are naturally expensive at first, and hence advisable only when a large number of castings are to be made of a kind.

The red hot castings, if small, where machinery is to be done, or special requirements are demanded, must be practically annealed, either in pile, or by an oven. The silicon of the metal also must be a little higher than for sand castings.

ADVANTAGES.

The advantages are as follows:

A limited number of moulds will make a



One Hundred Ton Electric Gantry Crane.

cool slowly, so that the chilling effect of too rapid cooling may not cause hard spots.

The moulds should not be allowed to get too hot, that is beyond 900 degrees Fahr., otherwise they are liable to expand permanently and cause trouble.

COATING THE DIES.

It is only necessary to coat the dies every fifth pouring, more or less, the idea being to get a thin layer of the refractory material evenly spread over the face of the dies, which layer is properly kept up. Between this and a hot mould, and fairly soft iron, no undue chilling effect results in the casting beyond the very desirable closing up of the grain of the metal. In the case in point, the making of brake-shoes, every fifth cast requires a spraying of the mould.

DISADVANTAGES.

In presenting a method to the foundry, it is always well to look at both sides of the problem. That is to show its advantages and disadvantages. Here are the latter.

large number of castings with very little labor, and this is not high class.

The surface of the castings being practically smooth, and accurate in dimensions, the loss of extra metal through excessive rapping of patterns in sand work is avoided, and no expensive cleaning department is required beyond some little grinding of thin fins.

The life of the moulds is long, as may be seen in ingot moulds for brass, and iron bedsteads.

The foundry plant is very small for a heavy tonnage.

The process is adaptable for continuous melting and operating.

Interchangeability of the dies in the shell makes it easy to keep the moulds up to standard, and these dies being of cast iron are inexpensive.

The installation of an expensive power plant is eliminated, the only power required being electricity sufficient to run cupola blower.