Sept. 13, 1960 S. KATZMAN 2,952,054

SPLIT MOLD FOR METAL PIG CASTING MACHINES

Filed Dec. 1, 1958

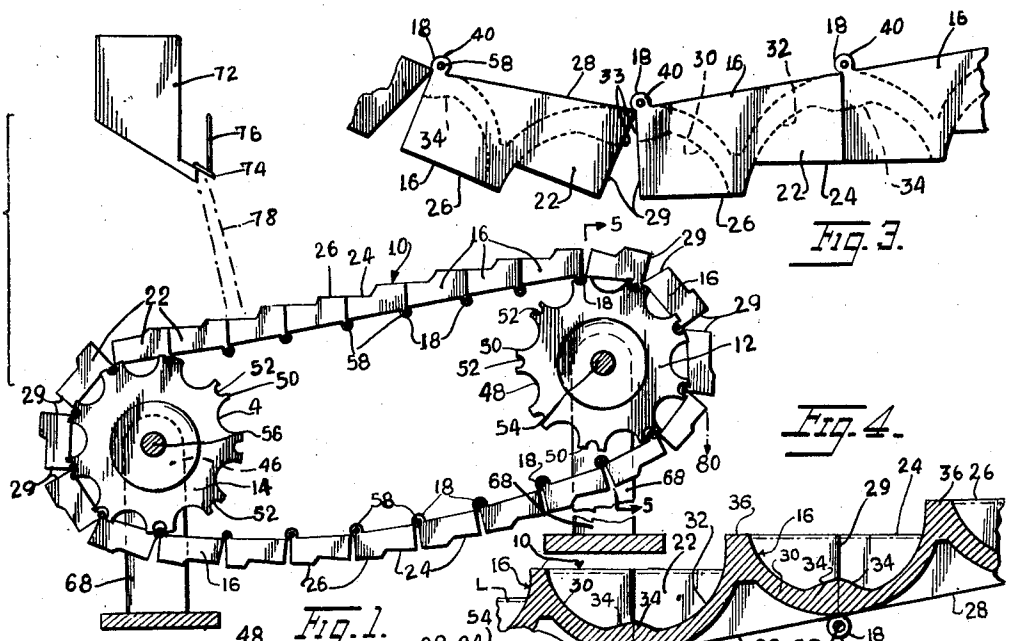

Fig. 1.

Fig. 3.

Fig. 4.

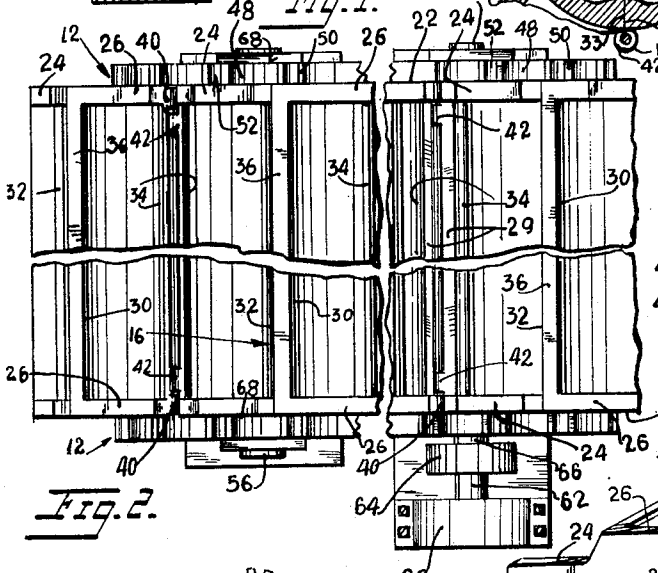

Fig. 2.

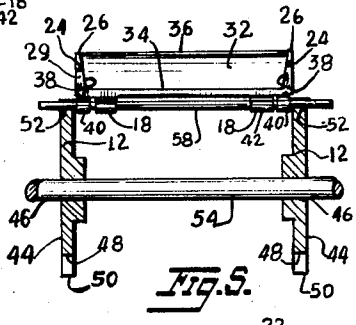

Fig. 5.

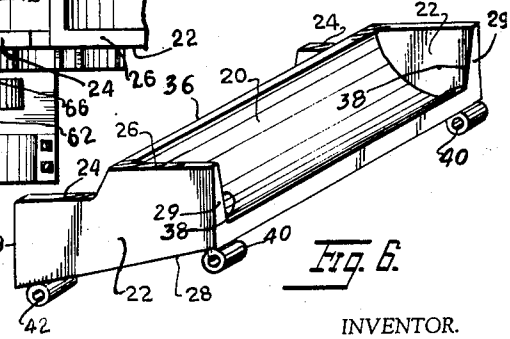

Fig. 6.

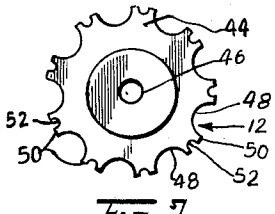

Fig. 7.

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SPLIT MOLD FOR METAL PIG CASTING MACHINES

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3 Claims. (Cl. 22—62)

This invention relates to pig casting machines and particularly to a novel split mold assembly for use in a metal pig casting machine.

Pig casting machines are used to make metal ingots from molten iron or other metal. Conventionally, a pig casting machine consists of a series of molds incorporated into a conveyor device. The molten iron is poured into molds one at a time at one end of the conveyor. By the time the filled mold reaches the other end of the conveyor the metal has cooled and solidified into a pig. As the mold reaches the remote end of travel on the conveyor it becomes inverted and the metal pig falls from the mold into a collecting container.

In order to prevent the pig from adhering to the mold it is sprayed with a lime solution or other equivalent substance. Occasionally the pigs stick in the mold even though pretreated with an anti-sticking compound. It then becomes necessary to pry the pig loose by some such device as disclosed in Patent 1,728,483.

The present invention has as a main object to provide a mold for a pig casting machine so constructed that the pig will not stick in the mold.

A further object is to provide a mold assembly for a pig casting machine which is self-sustaining and does not require the usual conveyor chains or belts heretofore required.

A still further object is to provide a split mold assembly so constructed and arranged that the molds separate on being rotated around a rotatable sprocket support causing the pigs contained in the molds to fall from the molds.

Another object is to provide a split mold assembly which does not require pretreatment with an anti-sticking compound to effect release of a pig therefrom.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is an elevational view of a pig casting machine embodying the invention, the drive being omitted.

Fig. 2 is a top plan view thereof, on an enlarged scale, showing the drive diagrammatically, parts being broken away.

Fig. 3 is a side elevational view of part of the machine shown in Fig. 2.

Fig. 4 is an enlarged sectional view through the longitudinal center of a portion of the mold assembly shown in Fig. 1.

Fig. 5 is a vertical sectional view taken on the plane of the line 5—5 of Fig. 1, parts being omitted.

Fig. 6 is an enlarged perspective view of one of the molds.

Fig. 7 is a side elevational view of a sprocket wheel employed in the machine.

Referring to Fig. 1, there is shown a metal pig casting

machine including an articulated endless mold structure or assembly 10 supported and stretched around a pair of head sprocket wheels 12 and a pair of end sprocket wheels 14. The mold structure 10 comprises a series of juxtaposed molds 16 hinged to each other by hinge constructions 18.

The molds 16 each comprises an elongated body 20 rectangular in plan and of substantially inverted V-shape in cross section, with flat plates 22 extending across the ends of the body, the plates being formed with stepped portions 24 and 26 at their tops and with straight flat bottoms 28 and straight flat end edges 29. The body is divided into side portions or sections 30 and 32 which are smooth-walled and curved slightly downwardly and outwardly as viewed in Fig. 4, the outer free elongated end edges having flat faces 33 and being enlarged and rounded on the inner surface thereof as indicated at 34. The apex or top 36 of the body is flat. The inner surface of each end plate 22 tapers downwardly and inwardly as indicated at 38 in Fig. 5.

A bearing sleeve 40 is formed on each corner of each mold body 20 along one side thereof and disposed lengthwise thereof. A similar bearing sleeve 42 is formed on each corner of the other side of the body, parallel to the sleeve 40 but spaced inwardly of the end plates 22 a distance equal to the length of the sleeve 40 so that the sleeves 40 on one side are offset relative to the sleeves 42 on the other side. The bearing sleeve is disposed outwardly of the plane of the mold body when the mold bodies are in assembled condition. The side portions 30 and 32 of the mold body constitute molds for two separate adjacent pigs of metal.

The sprocket wheels 12 and 14 each consists of a disc-shaped body 44 with an axial opening 46. The outer periphery of the body 44 is formed with relatively deep semicircular grooves 48 thereacross forming a pair of teeth 50 with a shallow semicircular groove 52 therebetween, the teeth having flat tops and squared off corners. A shaft 54 connects the front pair of sprocket wheels 12 in spaced relation and a similar shaft 56 connects the rear pair of wheels 14. The wheels are spaced a distance slightly greater than the length of a mold 16 as shown in Fig. 5.

In the assembled structure, the sleeve bearings 40 of one mold body 20 are aligned and juxtaposed with the sleeve bearings 42 of the next adjacent mold body and the hinge construction 18 between adjacent mold bodies is constituted by a pin 58 extending loosely through the aligned sleeve bearings. The ends of the pin are journalled in shallow grooves 52 between the sets of teeth 50 on opposed sprocket wheels.

The mold structure 10 is driven around the sprocket wheels 12 and 14 by means of a motor 60, the drive shaft 62 of which is connected through speed reduction gearing 64 to an extension 66 of the shaft 54 of the head or front sprocket wheels 12.

In use, the machine is supported with its front shaft 54 journalled on a standard 68 and raised at an inclination to the horizontal so that the molds 16 are inclined upwardly in the plane of travel, from wheels 14 to wheels 12, the plane of travel being substantially tangential to the wheels. It is desirable to raise the rear end of the machine so that sufficient clearance is afforded to permit the pigs to drop into a conveyance such as a railroad car. The mold assembly, however, could be disposed perfectly level if desired. When the mold bodies are thus assembled, the adjacent molds will be at the same elevation and the end plates 22 will be rectangular in shape. As shown in Fig. 1, the mold bodies on the upper level of the mold structure or assembly are normally subjected to downward forces due to the weight thereof. This will tend to force the end edges 29 of the mold bodies closer

to each other and will ensure a positive seal to the cavity in which the molten metal is to be poured. The mold bodies along the lower level will tend to sag and hang, providing a little slack to permit the mold bodies to open partially. However, the upper level mold bodies and the hinged connections therebetween constitute a rigid beam spanning the space between the sprocket wheels **12** and **14**, whereby the mold bodies may be driven around the wheels by the motor **60**. If the space between the wheels **12** and **14** is made very large, the weight of the molds suspended between the wheels may be such that some intermediate support may be desirable. This support may be provided in the form of idler sprocket wheels (not shown) disposed at intermediate points between the end sprocket wheels.

When in use, a pot or runner **72** of molten metal is disposed over the mold assembly of the machine near one end thereof as shown in Fig. 1, for filling the molds in succession with molten metal. The runner is preferably provided with a closure member **74** operated by a lever **76**. The molten metal, such as iron, is discharged from the runner as indicated by dotted lines **78** to fill the molds in turn, while the mold bodies **20** constituting the mold assembly move steadily upward in the plane of travel. The mold bodies are driven by the motor **60** through the driven shaft **66** to shaft **54** of sprocket wheels **12** to mold bodies **20** to sprocket wheels **14**. The molds will each be filled to a level such as indicated by dot-dash lines at L in Fig. 4. The molten metal will quickly cool off by air during its travel, the curved convexed undersides of the molds facilitating conduction of heat away from the molten metal. By the time each filled mold reaches the sprocket wheels **14** it will have cooled and solidified into a pig of metal. The solid pig will have a flat top and a generally rounded bottom with a longitudinal recess therein formed by the enlargement **34** along the top of the edge face **33** of the mold. The pigs will normally lie loosely on the molds and as the molds bearing the pigs continue their travel around the sprocket wheels **14**, the molds will be forced apart angularly as indicated in Figs. 2 and 3, and the pigs will drop out of the mold as indicated at **80** of their own weight, the enlargement **34** and the tapered inner walls of the end plates **22** facilitating such ejection.

The material to be used for the molds will, of course, depend upon the metal to be cast therein. If the pigs are to be formed of iron, the molds may be formed of steel. Other metal to be cast may employ molds made of bronze, refractory ceramic materials, etc.

The endless assembly of the molds makes it unnecessary to provide a conveyor belt or chain support for the molds either when full or empty so that an economy in manufacture is realized over pig casting machines requiring such auxiliary supporting structure.

The molds are so constructed that they can be cast by known molding methods in economical fashion.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. A mold for a pig casting machine comprising an elongated inverted V-shaped body having opposed curved side body portions connected along one long edge of the body, said curved body portions each curving downwardly and outwardly of the center of the body, flat end plates spanning both body portions, the long free edges of said body portions having flat faces, said body portions being enlarged and rounded on the inner surfaces thereof, adjacent the edges thereof, said body portions and end plates constituting two halves of two separate adjacent mold cavities, said curved body portions having convex undersides providing heat radiating surfaces for the mold, bearing sleeves on the corners of the body along one side thereof and bearing sleeves on the corners of the body along the opposite side thereof, the latter bearing sleeves offset inwardly from the first-named sleeves, the mating of adjacent elongated bodies providing a pig mold with a thickened center portion.

2. A pig casting machine comprising spaced pairs of spaced sprocket wheels, a shaft between each pair of wheels, an endless assembly of elongated molds encircling said wheels, said molds each including an elongated inverted V-shaped body having opposed curved side body portions connected along one long side edge of the body, said curved body portions each curving downwardly and outwardly of the center of the body, flat end plates spanning both body portions, the long free side edges of said body portions having flat faces, said body portions being enlarged and rounded on the inner surfaces thereof, adjacent the edges thereof, said body portions and end plates constituting two halves of two separate adjacent mold cavities, the adjacent end edge faces of said molds abutting each other, hinge means joining adjacent molds and motor means connected to the shaft of one pair of sprocket wheels for rotating said endless assembly of molds, the weight of said molds between said pairs of wheels forcing said end edge faces together to provide complete seals thereat to retain molten metal in the mold cavities, the mating of adjacent elongated bodies providing a pig mold with a thickened center portion.

3. A mold for a pig casting machine comprising an elongated inverted V-shaped body having opposed curved side body portions connected along one long edge of the body, said curved body portions curving downwardly and outwardly of the center of the body, the long free edges of said body portion having flat faces, said body portions being enlarged and rounded on the inner surface, adjacent the edges thereof, in a manner such that upon rotation of one mold body with respect to the adjacent mold body, the enlargement will exert a force on the pig casting causing its rejection from the mold, the mating of adjacent elongated bodies providing a pig mold with a thickened center portion.

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