Dec. 8, 1936. J. KLOOS 2,063,684

INGOT STRIPPER

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FIG. 1.

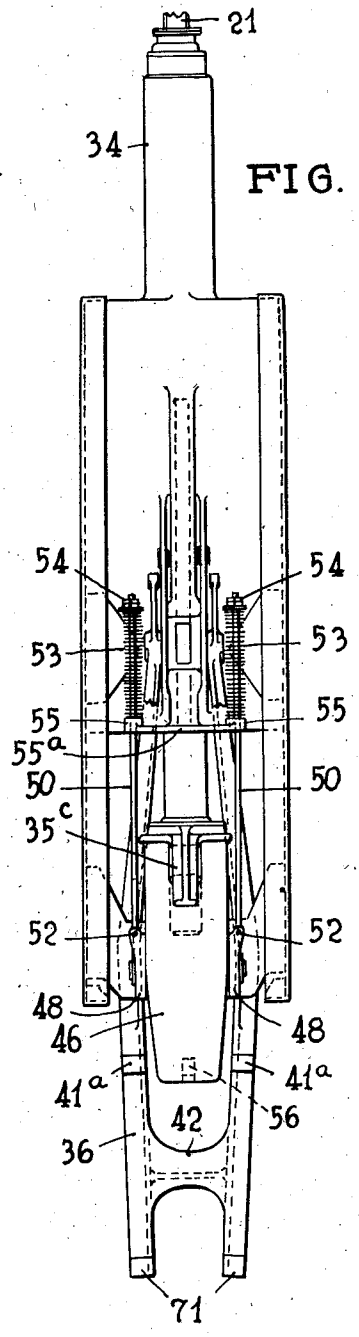
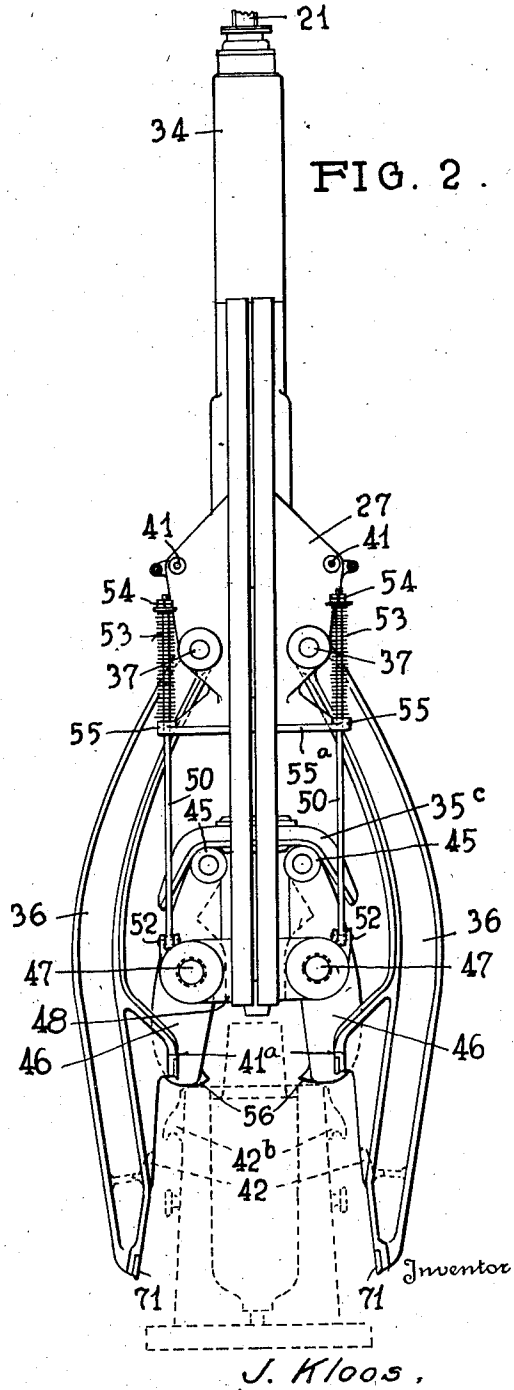


FIG. 2.



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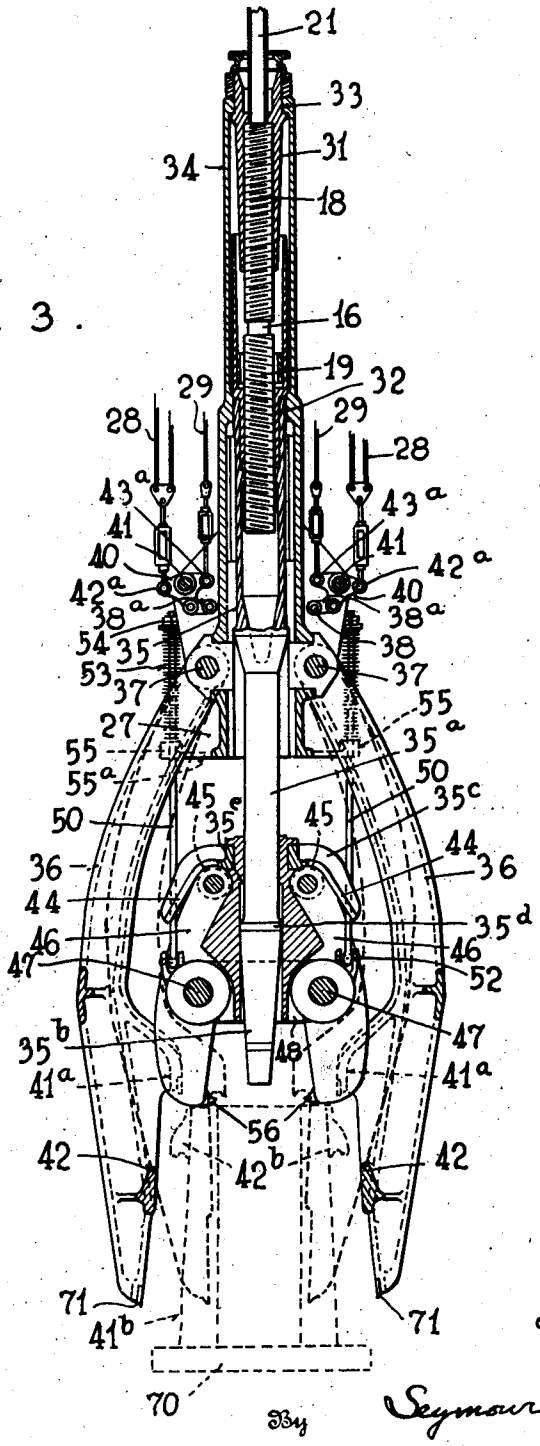
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INGOT STRIPPER

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FIG. 3.



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INGOT STRIPPER

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Application February 12, 1935, Serial No. 6,256

11 Claims. (Cl. 22—95)

This invention relates to improvements in ingot strippers and more especially to improvements in strippers of the type disclosed in U. S. Patent No. 1,807,275, dated May 26, 1931, issued to C. L. Bigler and J. Kloos.

The primary purpose of the present invention is to modify a stripper of the type shown and disclosed in that patent, in such manner that the stripper may be employed for separating a big-end-down ingot from a mold, and loosening ingots from mold stools, as well as for removing big-end-up ingots from molds.

In the patented structure it is necessary to remove the bull head when stripping hot tops and attach a long horseshoe-shaped casting when loosening standard ingots from the stools. It requires about ten minutes to make each of such changes, and obviously this is a disadvantage if the "heat" to be stripped contains molds for both "big-end-up or hot top" and "little-end-up or standard ingots". Therefore, another object of my invention is to furnish stripper apparatus that will perform all of these operations without the removal or attachment of parts and one which will not require much time for transforming the same from an apparatus adapted for one purpose to another adapted for another purpose.

In order that the invention may be clearly understood, reference may be had to the above mentioned patent. In the structure there shown, a bull head or nose may be attached for pushing downwardly on an ingot while a big-end-down mold is lifted from the ingot. This bull head must be removed when the apparatus is to be employed for stripping a big-end-up or hot top ingot from its mold. Moreover, in that patent, the ingot tongs are movable about axes arranged at right angles to the axes of the mold-handling links or arms, while in the present invention the tongs and links are movable about parallel axes so as to permit the bull head to form a permanent part of the structure and to move into and out of a position between the tongs. In other words, the tongs and links are so arranged as to provide clearance for the movement of the bull head to permit the latter to be adjusted or moved without interference by the tongs and links. Furthermore, the links in my improved structure are made of greater length than those used heretofore so that they may be brought into engagement with a mold stool while the tongs loosen a big-end-down ingot from the stool.

Another object of the invention is to furnish a stripper mechanism including a vertically movable bull head, which may be projected or retracted by the main screw of the mechanism.

The invention will be fully described with reference to the accompanying drawings, in which

Fig. 1 is a side elevation of the improved mechanism.

Fig. 2 is a similar view of the same taken at right angles to Fig. 1.

Fig. 3 is a view similar to Fig. 2 but showing parts in vertical section and also showing the bull head in partially projected position.

Referring to the drawings, it will be noted that the structure illustrated is adapted to be suspended and controlled from a trolley mechanism such as is disclosed in the above mentioned patent. A double screw 16, forming a part of the operating mechanism, has an upper thread 18 pitched opposite from the lower thread 19. It is preferred, for example, to provide the part 18 with a right hand thread, and the part 19 with a left hand thread.

The screw has an upwardly projecting extension 21 which may be of square cross section and is adapted to slide up and down in a bushing (not shown) having a square bore. By suitable mechanism on the trolley car this bushing is rotated to cause movement of the screw and the bushing permits the screw to move upwardly and downwardly to accommodate raising and lowering of the mechanism illustrated.

The screw is positioned within a structural steel shell or tube 27 which depends from and is supported by the trolley, and acts as a guide for the stripper mechanism. Such mechanism can be raised and lowered by cables 28 and 29 which are wound at their upper ends by motor-driven hoisting drums (not shown) that are located on the trolley. These parts are shown more or less diagrammatically in Fig. 1 of the above mentioned patent, and as they are of known construction, it will be unnecessary to describe the same in detail, except to say that the cables 28 are operated by one pair of drums acting in unison and the cables 29 are operated by another pair of drums acting in unison.

The upper thread 18 of the screw works in a non-rotary nut 31 which is secured at its upper end as shown at 33 to the upper end of the housing 34, and the lower thread 19 engages a non-rotatable nut 32 which is fixed to the upper end of the ram 35.

Stripper arms or links 36 are journaled on fulcrum pins 37, mounted on the housing 34, and the upper ends of these arms or links are pivotally connected at 38 to links 38a. The latter are

pivotally connected at their opposite ends to depending arms or rocking levers 40, pivotally mounted at 41 on the housing 34. Each of these levers has an outwardly extending arm connected at 42a to the lower end of one of the cables 28, and each lever also has an inwardly extending arm connected at 43a to one of the cables 29. From the foregoing it may be seen that when the weight of the suspended portion of the stripping mechanism falls upon the inner cables 29, the levers 40 will force the upper ends of the stripper arms 36 inwardly, and in consequence, the lower ends of these arms will be moved outwardly. On the other hand, when the weight of the stripping mechanism is transferred to the hoist cables 28, the reverse action occurs, and the arms are swung toward the axis of the screw 16.

Each arm 36 is provided with a cross member or abutment 41a designed to rest on the upper edge of the mold 41b, while an ingot is being stripped from the latter. The lower ends of the arms are provided with eyes 42, adapted to engage the lugs 42b, when the mold is to be lifted or handled by the machine.

As best shown in Fig. 3, the ram 35 is rigidly united with the depending vertical shaft 35a of a bull head 35b so that the operation of the screw 16 causes the threads 19 of the latter to raise or lower the bull head.

A tong operating member 35c is mounted on the shaft 35a and said shaft can slide through said member. However, the shaft has a shoulder 35d that is designed to engage an internal shoulder or abutment 35e in the member 35c when the bull head is elevated for the purpose of lifting the member 35c.

The member 35c is provided internally with downwardly diverging guides or tracks 44 that receive trunnions or rollers 45 on the upper ends of tong levers 46. These levers are pivotally mounted on shafts 47 supported by a pair of links 48. Rods 50 support the links 48 and have their lower ends connected to the links at the points 52. Their upper ends slide through eyes 55 in a flange 55a at the lower end of the housing 27. Above the flange, each rod is provided with a nut 54 threaded on the upper end of the rod, and used for adjusting a buffer spring 53 which surrounds the rod and is located between the nut and said flange.

Each of the tong levers 46 is provided at its lower end with a bit 56, preferably made of hardened steel.

From the above and an examination of Fig. 3, it may be seen that when the member 35c is raised by operation of the screw 16, the points of the bits will be caused to move in arcs which extend upwardly from the top of the mold, and consequently, as the bits move inwardly, they also rise so that they not only grip the hot top of the ingot, but they will simultaneously lift the ingot out of the mold. While the ingot is being raised in this way, the thread 18 of the nut will exert downward pressure on the arms or links 36 so that their portions 41a will bear upon the top of the mold with a force equal to the lifting force and this also aids in the separation of the ingot from the mold. Obviously when the ingot has been separated from the mold, the entire assemblage may be raised by means of the cables 28 and 29 to permit the ingot to be withdrawn from the mold and deposited wherever desired.

When the apparatus is to be employed in lifting a mold from a big-end-down ingot, the bull head 35b can be lowered by turning the screw 16 in the proper direction and at such time the member 35c will come to rest on the upper ends of the tong levers 46 and will hold those levers in open position. While the bull head is being moved downwardly the eyes 42 of the arms 36 can be brought into engagement with the lugs on the mold and therefore the mold may be lifted with a force equal to the force exerted downwardly on the bull head, while the latter is pushing or forcing the ingot downwardly.

When a big-end-down ingot is to be broken loose from the stool 70 of the mold, the bull head can be raised to an elevated position and then the tips 71 of the arms 36 can be brought to bear on the stool while the tong arms 46 grip the ingot and break it from the stool. Of course, while the tongs are moving upwardly, the arms 36 will bear on the stool with a force equal to the lifting force.

It will therefore be understood that in handling the different types of ingots and molds, the tongs may be raised while the arms 36 are holding down either the mold or the stool, and on the other hand whenever necessary the arms 36 may be used to raise a mold while the bull head operates to hold the ingot down.

While I have disclosed what I now consider to be a preferred embodiment of the invention in such manner that the same may be readily understood by those familiar with such apparatus, it is manifest that changes may be made in the details illustrated and described without departing from the spirit of the invention as expressed in the claims.

What is claimed and desired to be secured by Letters Patent is:

1. In an ingot stripper, in combination with ingot gripping tongs, and mold-engaging links, of supporting means for the tongs and links, a bull head movably connected to the supporting means and projecting into a position between said tongs, and means for moving said bull head into and out of vertical position between the tongs.

2. In an ingot stripper, in combination with ingot gripping tongs and mold engaging links, of supporting means for the tongs and links, a bull head movably connected to said supporting means, and means for moving said bull head into and out of a vertical position between said tongs.

3. In an ingot stripper, in combination with ingot gripping tongs and mold engaging links, of supporting means for the tongs and links, a bull head movably connected to said supporting means, and means for moving said bull head into and out of a vertical position between said tongs and links.

4. In an ingot stripper, supporting means, ingot-engaging tongs carried by the supporting means, mold-engaging links carried by the supporting means, means for moving the tongs into and out of ingot-gripping position, a bull head slidably carried by said supporting means for up and down movement relatively to said tongs, and means for moving the bull head into and out of a vertical position between the tongs.

5. In an ingot stripper, a supporting structure, ingot-engaging tongs carried by the supporting structure for breaking an ingot loose from a supporting stool, links depending from the supporting structure and engageable with the stool for holding the stool down while the tongs are separating the ingot from the stool, means for pushing the links downwardly to cause them to exert downward pressure against the stool, and means for lifting said tongs while they engage the ingot

for simultaneously pulling the ingot from the stool with an effort equal to said pressure.

6. An ingot stripper comprising parallel trunnions, tong levers mounted on certain of said trunnions and having bits movable toward and away from one another, means for operating said tong levers, mold-engaging links pivotally mounted on the other trunnions, a bull head movably mounted for movement in a plane arranged at an angle to said trunnions, and means for moving said bull head vertically into and out of a position between said tong levers.

7. In an ingot stripping apparatus, tong levers provided with bits for gripping an ingot, means for moving said bits toward and away from one another and for raising and lowering said tong levers, links having their upper ends pivotally mounted at points above said levers, a bull head movable into and out of a position between said levers, and means for raising and lowering said bull head relatively to said levers.

8. In an ingot stripper, supporting means adapted to be raised and lowered, ingot-gripping tongs carried by the supporting means, a vertically movable bull head carried by the supporting means, means for moving the bull head vertically relatively to said tongs, a member for closing said tongs, and means for controlling said member by the bull head.

9. An ingot stripping mechanism including supporting means adapted to be raised and lowered, ingot gripping tongs carried by the supporting means, means for opening and closing the tongs, a bull head movable vertically relatively to said tongs and cooperating means on the bull head and member for causing movement of the bull head to control the opening and closing of said tongs.

10. In an ingot stripping apparatus, tong levers provided with spurs for gripping an ingot, means for moving said spurs toward and away from one another and for raising and lowering said tong levers, links having their upper ends pivotally mounted at points above said levers, the lower end portions of said links being movable toward and away from one another and projecting downwardly a sufficient distance below the tongs to engage a mold stool.

11. In an ingot stripping apparatus, tong levers provided with spurs for gripping an ingot, means for moving said spurs toward and away from one another and for raising and lowering said tong levers, links having their upper ends pivotally mounted at points above said levers, the lower end portions of said links being movable toward and away from one another and projecting downwardly a sufficient distance below the tongs to engage a mold stool, each link being provided with a shoulder to engage the upper end of the mold, a cross piece to engage the mold ear, and a tip to engage the mold stool, said cross piece and tip being arranged below said shoulder, and the cross piece being positioned about midway between the tip and shoulder.

JOHN KLOOS.