

[54] **IMPELLER REPLACING DEVICE FOR
MOLTEN METAL STIRRING EQUIPMENT**

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[30] **Foreign Application Priority Data**

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[52] U.S. Cl..... **266/1 R, 266/15, 266/34 A**

[51] Int. Cl..... **C21c 7/00**

[58] Field of Search **266/1 R, 15, 16, 19, 34 A**

[56] **References Cited**

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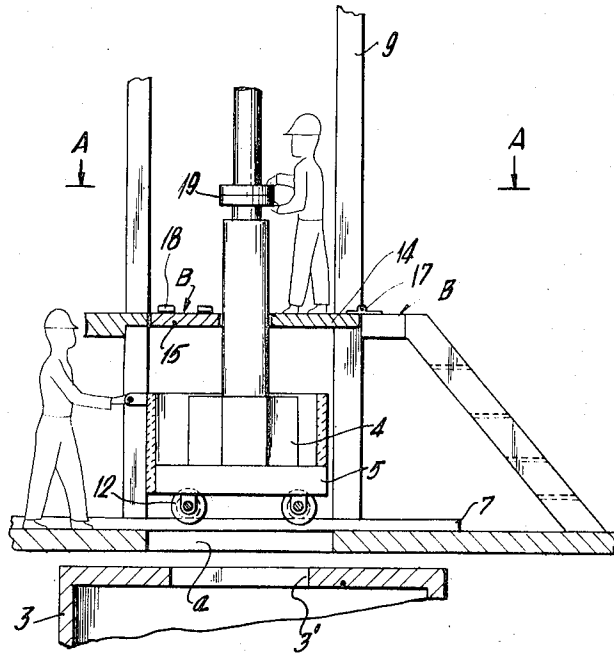
Primary Examiner—Gerald A. Dost

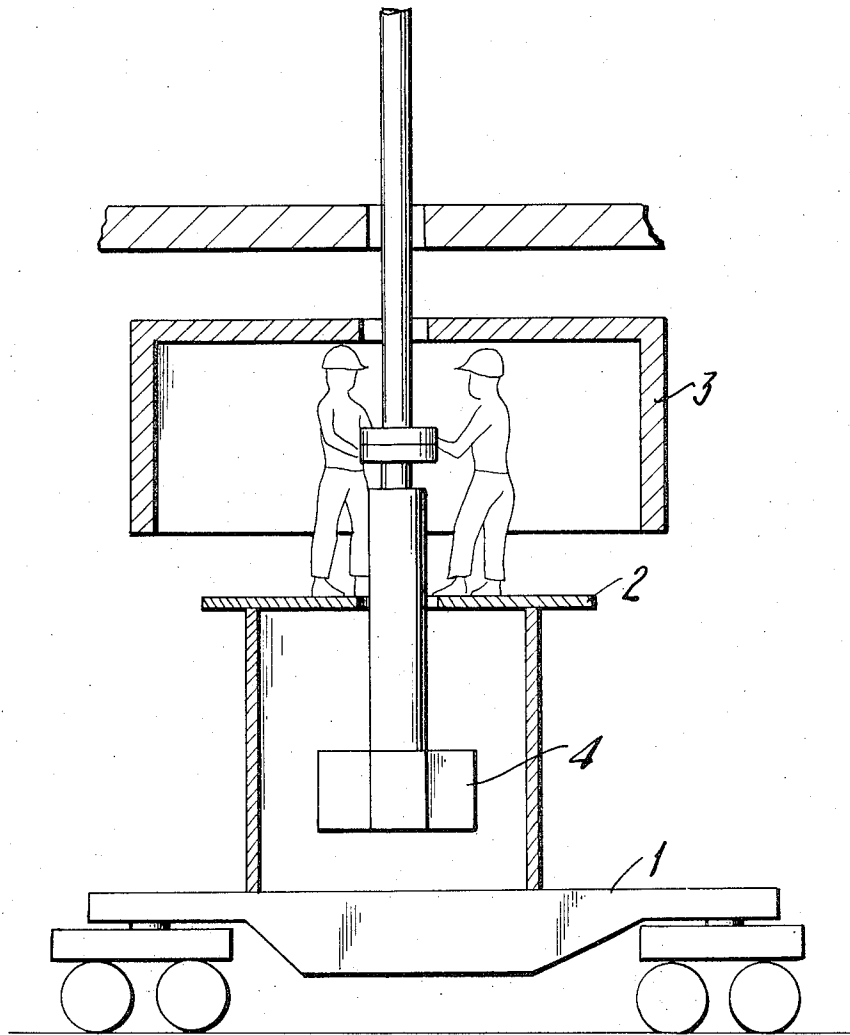
Attorney, Agent, or Firm—Toren, McGeedy and Stanger

[57] **ABSTRACT**

In a molten metal stirring equipment comprising a hood, a rotary shaft extending through the hood, an impeller attached to the end of the shaft by means of coupling and a molten metal vessel which is taken in and out below the hood, the impeller replacement device comprises a work floor provided on the hood, openings provided through the hood and the floor through which the impeller passes, a truck movable on the floor to the openings, and a work deck arranged above the opening of the floor.

2 Claims, 8 Drawing Figures





(PRIOR ART)
FIG. I

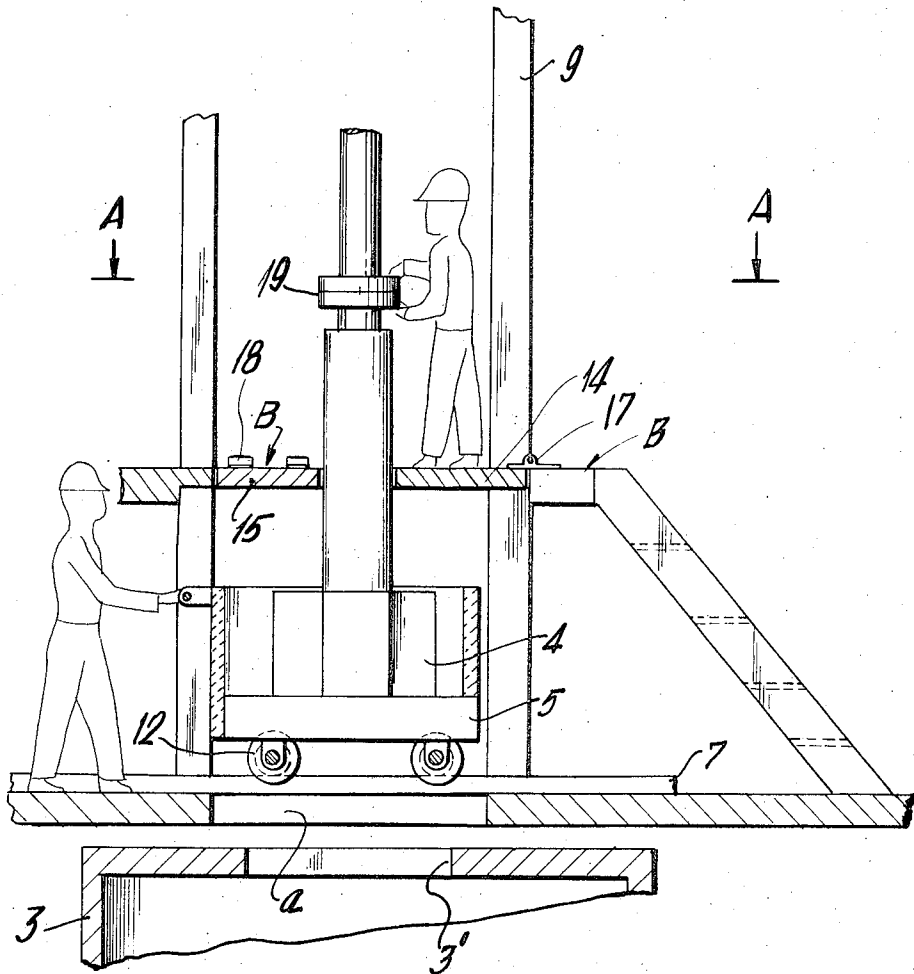


FIG. 2

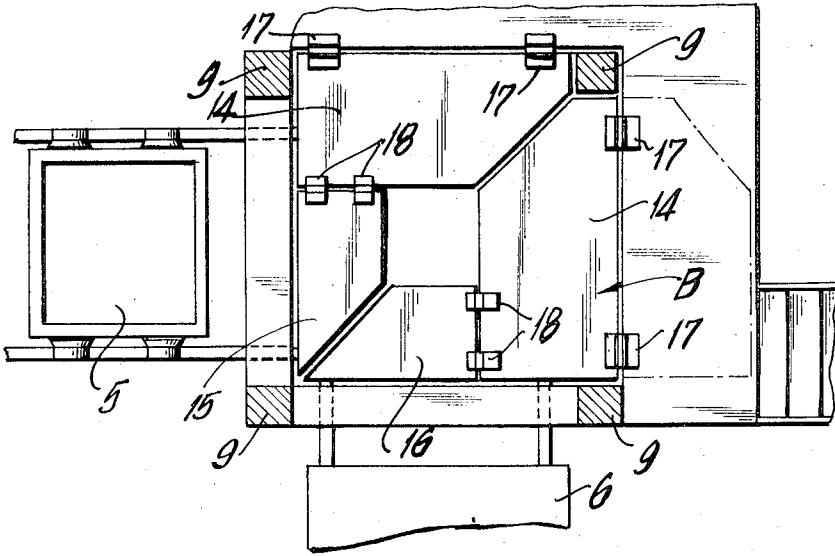


FIG. 3

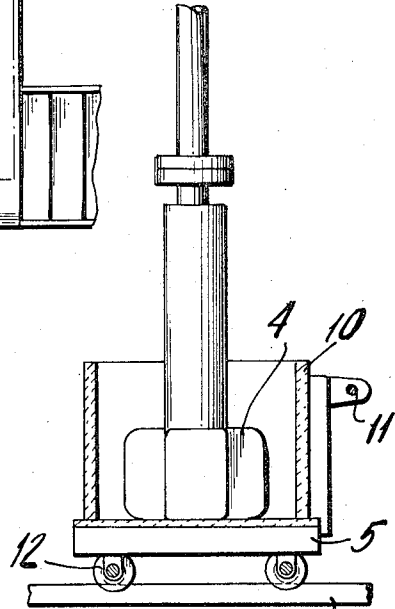


FIG. 5

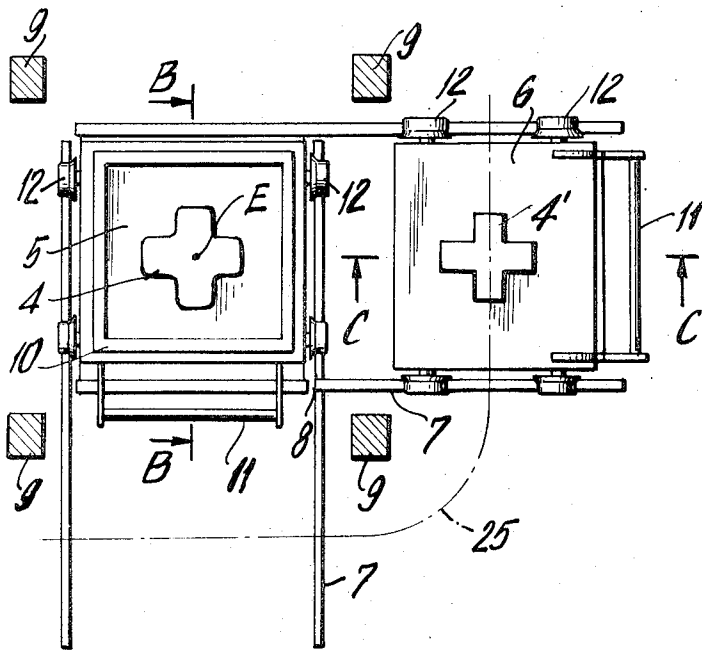


FIG. 4

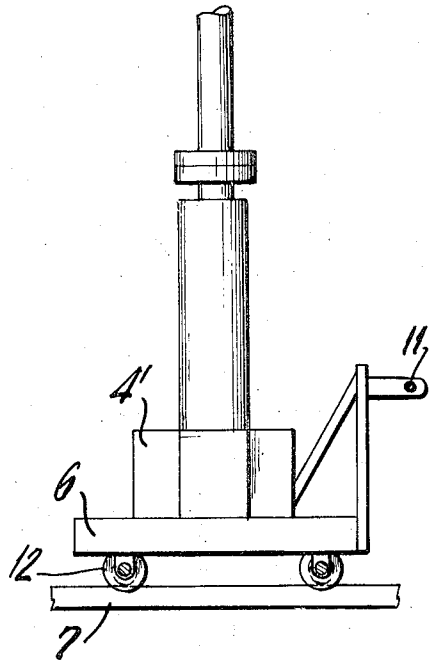
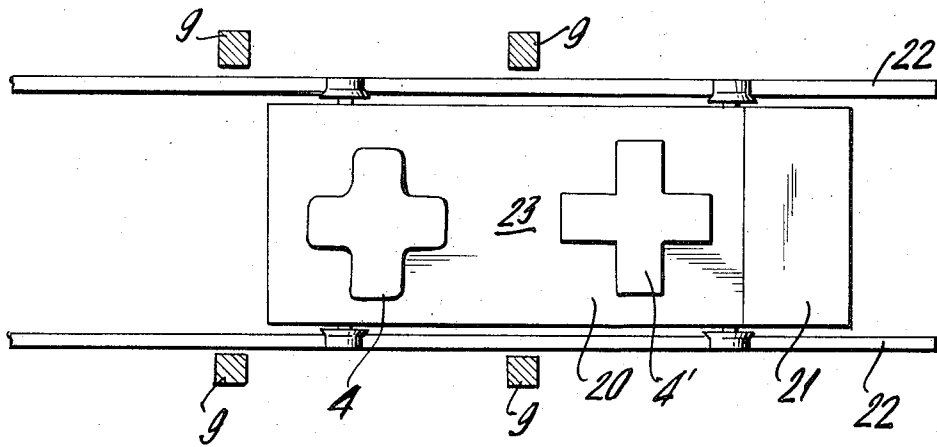
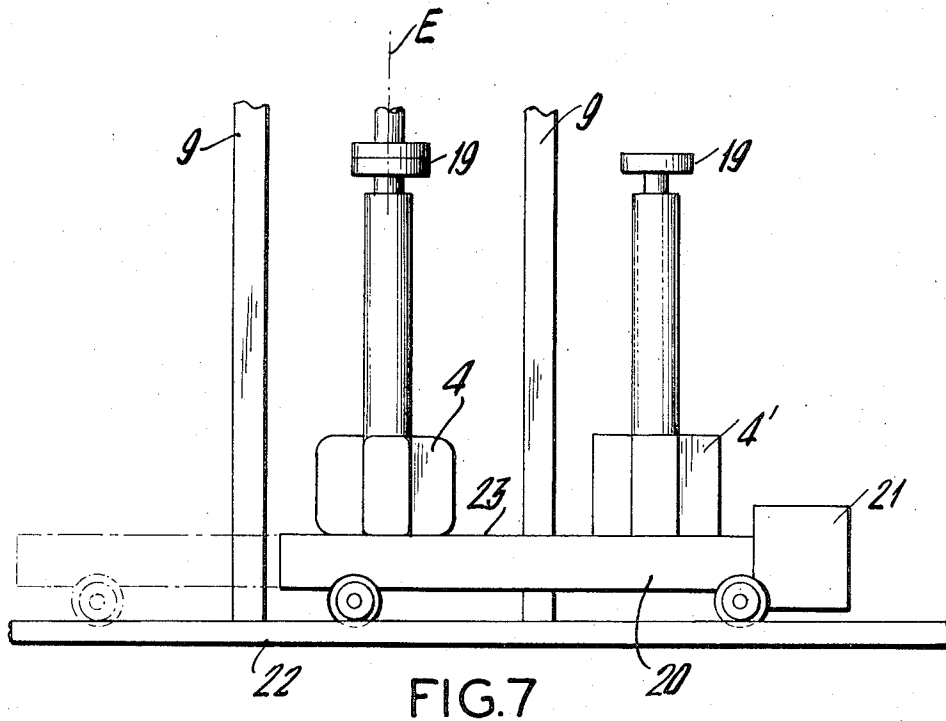


FIG. 6



IMPELLER REPLACING DEVICE FOR MOLTEN METAL STIRRING EQUIPMENT

The present invention relates to a molten metal stirring device having an easily replaceable impeller.

The present invention will be described in details referring to the attached drawings.

FIG. 1 shows the replacement work in a conventional art.

FIG. 2 shows one example of the present inventive device.

FIG. 3 is a cross-sectional view along A—A line in FIG. 2.

FIG. 4 shows the replacement truck in FIG. 2.

FIG. 5 shows a cross-sectional view along B—B line in FIG. 4.

FIG. 6 shows a cross-sectional view along C—C line in FIG. 4.

FIG. 7 shows a front view of another example of the replacement truck of the present invention and;

FIG. 8 shows a plane view of the truck in FIG. 7.

According to a conventional molten metal stirring device, the replacement of the impeller is done as shown in FIG. 1. Namely, the replacement is done in such a manner that the impeller 4 is put on the replacement truck 1 and operators replace the impeller within the hood 3 as shown. Thus the operators are exposed to very hot temperature due to the residual heat of the hood 3 and the replacement is very severe work particularly in the summer season. Also the replacement has been a dangerous work because metal slag or the like adhering on the inside of the hood 3 often falls on the operator and hurts him, and it has been usual that the replacement work takes about 2 or 3 hours.

One object of the present invention is to eliminate the above defect and provide a device in which the replacement of the impeller can be done in a short time.

In FIG. 2, an opening 3' through which an impeller can pass is provided in the center portion of a hood 3, and a similar opening is provided also at a corresponding portion of a work floor A above the hood 3. A truck 5 is moveably arranged over the opening a and a work deck B is provided on the floor A.

For the replacement of the impeller, the impeller 4 is lifted above the opening 3' of the hood 3 and the opening a of the floor A, the truck 5 is moved to a position just below the impeller, and after the impeller is put on the truck the operators get on the deck B and perform the replacement.

In this case, by arranging a foldable deck 14, 15, 16 as shown in FIG. 3 the coupling 19 can be easily engaged or disengaged.

The space above the hood 3 is completely cut off from the heat even during the operation so that the operator is not exposed to the heat during the replacement work and can perform the work very easily. Thus the replacement work can be done very safely and in a short time.

In FIG. 4 which shows a plane view of the truck of the present invention, the come-in directions of the take-out truck 5 for worn impellers and the take-in truck 6 for new impellers are crossed at the point E in a right angle to each other. These trucks travel on the rails 7 provided along the opening a of the floor A so that the center of the trucks can move to the center E of the stirring device. For this purpose, the rail 7 is provided

with a slit 8 through which the brim of the wheel 12 passes.

The rails are not always necessary to be provided within the four pillars 9 and the rail may be provided only the time of impeller replacement.

Next explanations will be made on the replacement work.

When the impeller is worn, the impeller is lifted up through the opening 3' of the hood 3 and the opening a of the floor A. Then the take-out truck 5 is advanced up to the center E of the device as shown in FIG. 4, and the worn impeller 4 is put on the truck 5.

It is desirable to apply refractory linings 10 on the inside surface of the take-out truck 5 as shown in FIG. 5 to protect the operator from the heat of the impeller. Also handrails 11 may be provided as shown so that the operator can take out or in the truck thereby. It is also advantageous that the trucks are driven mechanically. Then the worn impeller 4 is put on the truck 5, the operators unfold the foldable decks 14, 15 and 16 over the deck B and disengage the coupling as shown in FIG. 2. When the coupling 18 is removed, the operator grasps the handrail 11 and takes out the truck 5 carrying the impeller 4.

The new impeller 4' shown in FIG. 4 is taken in by the take-in truck 6. The new impeller 4' is put on the take-in truck 6 before the beginning of the replacement work so as to save idle time thus increasing the efficiency of the replacement work.

By pushing forward the take-in truck 6 carrying the new impeller 4', the center of the new impeller 4' is aligned with the center E of the stirring device, and the operators on the foldable decks 14, 15 and 16 perform the installment of the new impeller. When the installment is completed, the impeller is lifted up slightly and the take-in truck 6 is taken out to complete the replacement work.

In this way, the replacement work is very safe and easy, and can be done only in 10 to 20 minutes.

The foldable decks 14, 15 and 16 on which the operators disengage the coupling 19 are of such a structure as shown in FIG. 3, and when they are not used they are folded and placed outside the space made by connecting the four pillars of the stirring device. When they are used, they are partially expanded inwardly by means of the hinge 17 and completely expanded by the hinge 18.

After the operators on the decks disengage the coupling of the worn impeller, the impeller can be taken out by lifting up one 15 of the decks, and the new impeller can be taken in by lifting up the other 16 of the decks, thus the replacement work can be done very easily.

Regarding the transfer of the worn impeller on the take-out truck to a repair shop and the transfer of the new impeller from the repair shop and its placement on the take-in truck, these works can be done by providing hoist rails 18 running over the take-in truck 6 and the worn impeller 5 to the repair shop.

In this way, the impellers put on both of the take-in and take-out trucks can be lifted up only by one hoist, and it is possible to transfer the impellers to the repair shop by a very simple mechanism.

FIG. 7 and FIG. 8 show a modification of the truck portion of the present invention.

The replacement truck 20 is driven by a driving device 21 and runs on rails 22 and advances into the

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space made by connecting the four pillars 9 of the stirring device.

On one portion of the upper side 23 of the replacement truck, the new impeller 13 is placed and on the other portion of the upper side the worn impeller 12 is placed.

After the worn impeller 4 is disengaged, the truck 20 is moved to a position where the center E of the stirring device coincides with the center line of the new impeller. Then after the coupling 19 is connected, the truck 20 is moved outside the space made by the four pillars to complete the replacement work.

As understood from the above, the present invention has advantages that the operators are protected from the high heat and dangers, that the impeller replacement

can be easily done in a short time.

What is claimed is:

1. In a molten metal stirring equipment comprising a hood, a rotary shaft extending through the hood, an impeller attached to the end of the shaft by means of coupling and a molten metal vessel which is taken in and out below the hood, the impeller replacement device comprises a work floor provided on the hood, openings provided through the hood and the floor through which the impeller passes, a truck movable on the floor to the openings, and a work deck arranged above the opening of the floor.

2. The impeller replacement device according to claim 1 in which the deck is foldable.

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