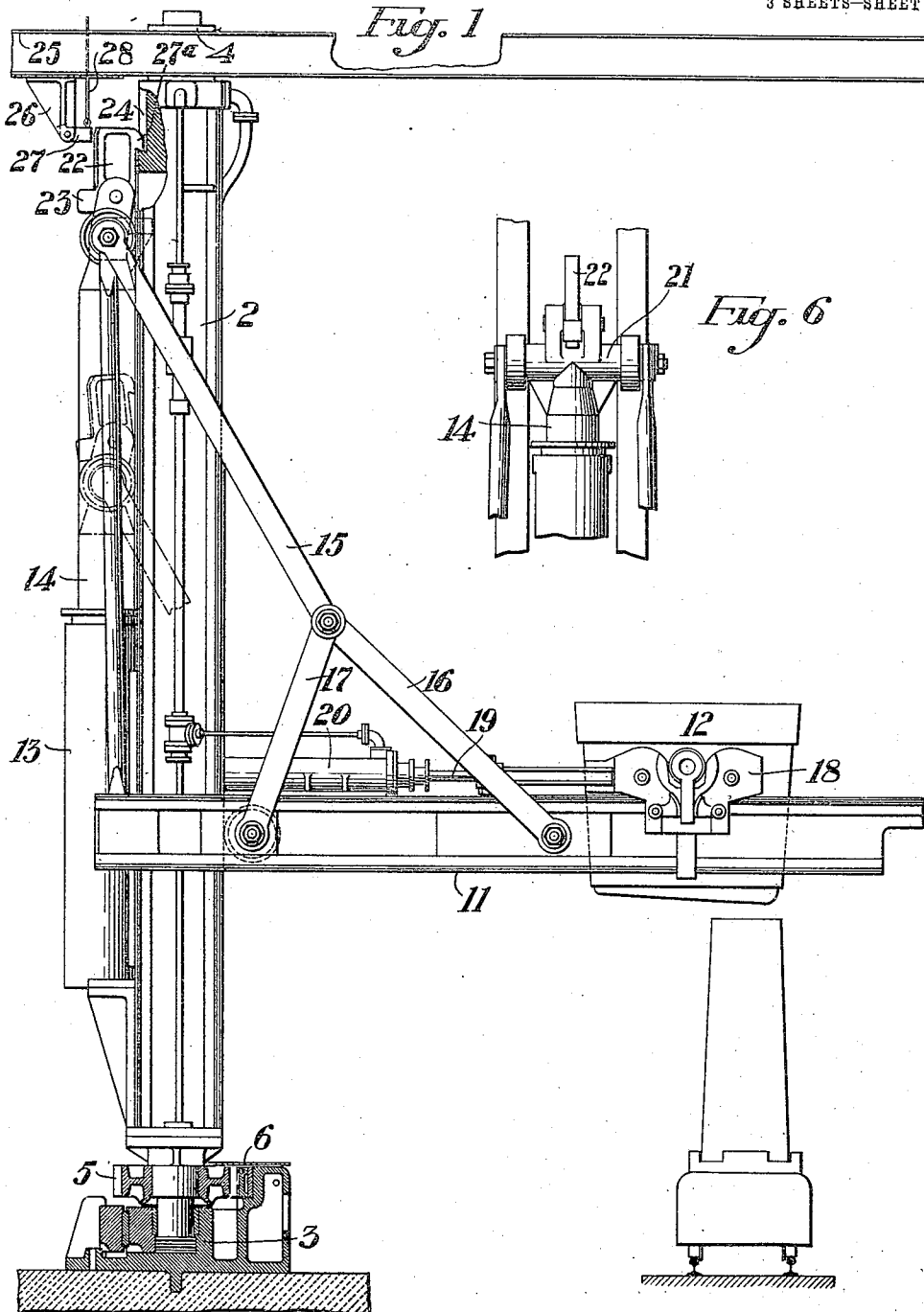


A. PATTON.
SAFETY APPLIANCE FOR JIB CRANES.
APPLICATION FILED NOV. 2, 1910.

992,446.

Patented May 16, 1911.

3 SHEETS—SHEET 1.



WITNESSES
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G. L. Winters.

INVENTOR
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his Attorneys

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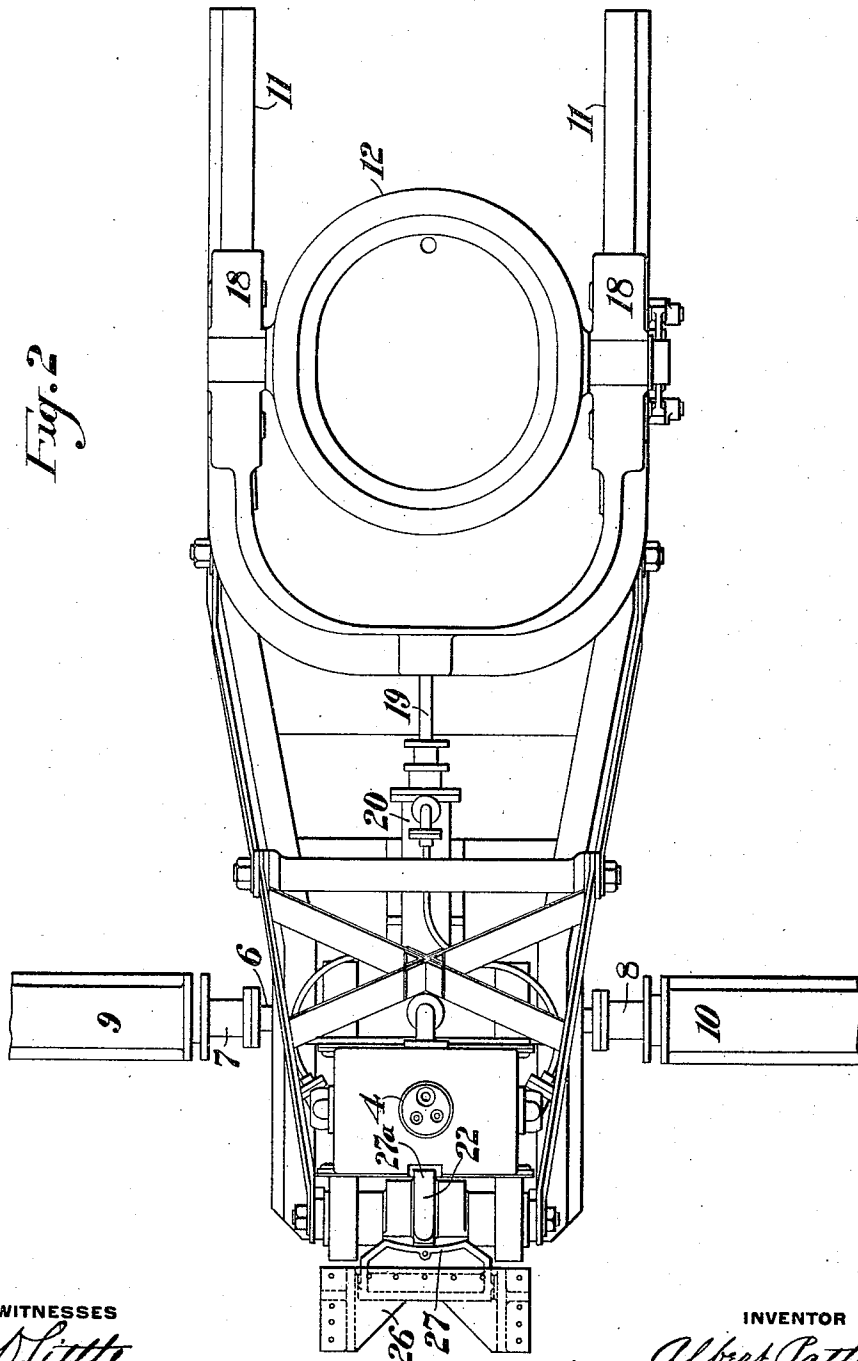


Fig. 2

WITNESSES
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J. L. Winter

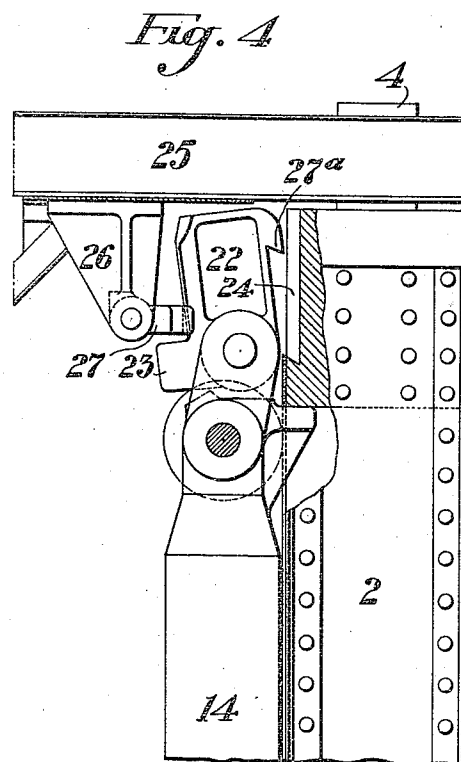
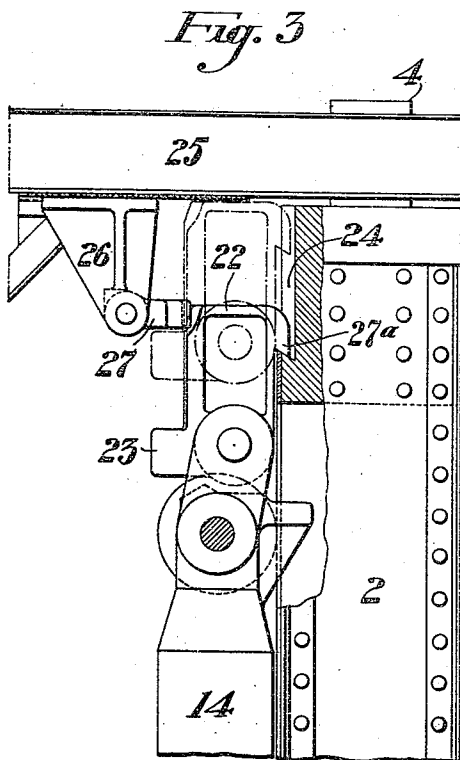
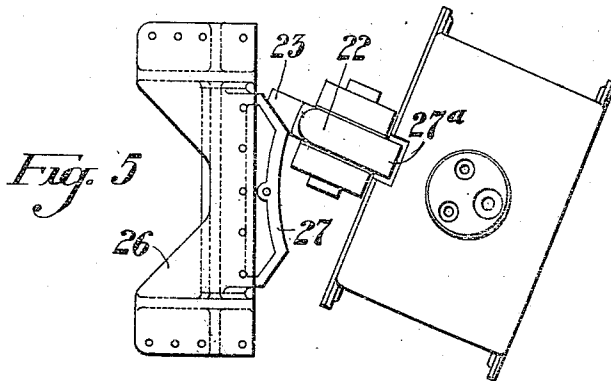
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UNITED STATES PATENT OFFICE

ALBERT PATTON, OF MCKEESPORT, PENNSYLVANIA.

SAFETY APPLIANCE FOR JIB-CRANES.

932,446.

Specification of Letters Patent.

Patented May 16, 1911.

Application filed November 2, 1910. Serial No. 590,299.

To all whom it may concern:

Be it known that I, ALBERT PATTON, of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Safety Appliance for Jib-Cranes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention relates to safety appliances for jib cranes and, while not limited to such use, more particularly relates to safety appliances for jib ladle cranes, such as are used in Bessemer steel works in handling and transporting molten metal between the Bessemer converters and the ingot molds into which the molten metal is poured from the ladles while the ladles are supported upon the crane jib.

One object of my invention is to provide means for supporting the crane jib in the raised position to which it is lifted during the pouring operation by which the ladles are emptied and to provide means for mechanically securing the crane jib in its raised position as the jib is swung to move the ladle into its pouring position, and for locking the jib securing means in such position until after the ladle is swung out of its pouring position.

The invention consists in providing improved means on the vertically movable crane jib by which the jib is secured in its raised position independently of the jib lifting mechanism and the securing means are locked in this position while the crane is being swung through part of the arc or circle in which it is rotated in use.

The invention further consists in providing novel means for mechanically releasing the locking mechanism by which the crane jib is locked in its raised position when, after the jib has been locked in its raised position it is again swung or rotated a pre-determined part of its rotative movement to move the ladle away from its operative pouring position.

In the accompanying drawings, Figure 1 is a side elevation of a low-jib ladle crane having a safety appliance mounted thereon, constructed and arranged in accordance with my invention. Fig. 2 is a plan of the crane shown in Fig. 1. Fig. 3 is a sectional elevation of a portion of the crane mast and jib showing the construction and arrangement of the safety jib support forming part of this invention. Fig. 4 is a side elevation

similar to that shown in Fig. 3, showing the safety appliance in its disengaged position. Fig. 5 is a plan of a portion of the apparatus showing the means by which the safety appliance is mechanically moved into and locked in its operative position when the crane jib is rotated while in its raised position. Fig. 6 is a side elevation showing the cross head connecting the piston of the jib lifting cylinder with the lifting arms of the crane jib.

Referring to the drawings, 2 designates the crane mast which is rotatably mounted in the bottom bearing 3 and top steadiment or bearing 4. Mounted on the lower portion of the crane mast 2 is a spur pinion 5, the teeth of which mesh with those of the rack 6, the ends of which are connected to the pistons 7 and 8 of single acting hydraulic cylinders 9 and 10 by which the crane is rotated. Mounted on the mast 2 of the crane, so as to be vertically movable thereon, is a horizontally extending jib 11 having a ladle 12 removably secured thereon. Fixed to the mast 2 of the crane is a hydraulic cylinder 13 having a vertically extending piston 14, the upper end of which is connected by the cross head 21 and bars or links 15, 16, and 17, to the jib 11 of the crane so as to support the jib from the upper end of the piston 14. The ladle 12 is mounted upon wheeled carriages 18, which travel upon the track formed by the top plate of the girders forming the jib 11, the carriages 18 being connected by the piston rod 19 with a double acting hydraulic cylinder 20 to move the ladle 12 horizontally on the top plates of the crane jib in placing the ladle in proper position for pouring and for receiving its molten contents. Pivoted to the cross head 21 on the top of the upper end of the piston 14, through which the crane jib is raised and lowered, is a latch or lever 22. This latch is provided with an extension forming a counterweight which tends to normally hold the latch in its inoperative position, as is shown in full lines in Fig. 4. The lug on the upper end of the latch 22 engages in a recess 24 on the back or rear surface of the crane mast 2 when the jib is in its raised position so as to independently secure and hold the crane jib in this position, being moved into this position in a manner described hereinafter. Secured, to the bottom chord 25 of the roof of the building in which the crane is erected, is a bracket

26 having pivoted thereto a horizontally extending lock 27. The lock 27, (as is best shown in Figs. 3 and 4) is arranged to extend horizontally when in its operative position and is provided with a flexible connection 28 which leads upwardly over a suitable arrangement of pulleys or sheave wheels to a point near the floor of the building within reach of the operatives through which the lock 27 can be lifted into its inoperative position when desired or found necessary. The lug 27 and its bracket 26 are so located on the bottom chord 25 of the roof truss that the lug 27 is normally in its operative position when the ladle 12 on the crane jib 11 approaches approximately to the pouring position, in which the jib remains stationary for some time while the ladle is being emptied of its molten contents. Suitable connections are made to the several hydraulic cylinders forming the crane lifting and turning mechanisms and the means employed for moving the ladle horizontally on the crane jib, and such construction being old and well known need not be further described.

In the operation of jib cranes provided with my improved safety appliance, the jib and the ladle mounted thereupon are swung into position for the ladle to receive molten materials from the Bessemer converter. The crane is then swung or rotated through the medium of the hydraulic cylinders 9 and 10, the rack 6, and the spur gear 5 upon the lower end of the crane mast 2, into the position shown in Fig. 1, above an ingot mold which is usually mounted upon a truck or car, as shown, this being the pouring position of the ladle. Before, or as the ladle is being rotated, the jib is lifted on the mast 2 and when the ladle approaches the relative position with the lock 27 shown in Fig. 5, the outer vertically extending edge of the latch 22 engages with the concave surface of the lock 27 and is mechanically moved into position so that the lug 27^a on the latch engages with the recess in the top portion of the rear side of the crane mast. In this way the jib of the crane is secured in its raised position and is held locked in this position by means of the latch 22 and lock 27. Should for any reason the crane be swung into the position shown in Fig. 1 without being first raised into the lifted position shown, when the jib is then lifted the top edge of the latch 22 which will be held swung outwardly in its inoperative position, (that shown in Fig. 4) will engage with the lock 27 and will be forced inwardly into engagement with the recess 24 so as to hold the ladle and jib in its raised pouring position upon the crane mast. In case the fluid pressure supply used in operating the hydraulic cylinder 13 becomes lessened or entirely shut off, the crane jib will not be dropped or lowered owing to the safety appliance, and damage to

the apparatus in this way will be prevented and spilling of molten metal causing possible loss of life will be prevented and avoided.

As shown in Figs. 3 and 4, the crane jib can be raised for a short distance while in its pouring position, and this vertical movement which is provided for the purpose of pricking the ladle and starting the pouring operation, can be increased or lessened to any extent desired by varying the length of the safety latch. As the jib is being lowered so as to bring the latch from the position shown in Fig. 4 into that shown in Fig. 3, the lock 27 causes the latch to be moved on its pivot so as to engage with the recess in the crane mast and hold the jib in its raised position so long as the crane jib is not swung about the vertical axis of the crane mast 2, away from the pouring position. After the ladle is emptied, the crane is again rotated and after a certain amount of rotative movement the latch 22 becomes disengaged from contact with the lock 27. On account of the outwardly and upwardly inclined engaging surfaces of the lug on the latch and the recess 24 in the crane mast, the jib is maintained in its raised position until the operator lifts the jib slightly on the mast, and releases the latch from the mast. When the jib is so lifted, the counterweight 23 on the latch 22 automatically swings the latch into the position shown in Fig. 4 and as the latch is now out of engagement with the lock 27 the jib is free to be moved downwardly by the hydraulic cylinder 13 into its low position in which it is held while the ladle is receiving a fresh supply of molten materials. The above described operations are then repeated as required.

The advantages of my invention will be apparent to those skilled in the art. The safety appliance is mechanically actuated to secure and hold the ladle and crane jib in their raised position independently of the lifting mechanism while the ladle is in the position for pouring. The safety appliance is automatically disengaged after the completion of the pouring operation, and in moving the ladle away from its pouring position, the securing of the jib and ladle in their raised position does not depend upon the operator, but is performed automatically and in this way liability of damage by reason of failure to operate the safety appliance is overcome and prevented.

Modifications in the construction and arrangement of the parts may be made without departing from my invention, as defined in the appended claims.

I claim:—

1. In a rotary jib crane having a vertically movable jib, a safety appliance comprising a latch pivotally mounted on the

crane jib to move normally into its disengaged position, a crane mast having means operatively engaged by the latch to secure the crane jib in lifted position on the crane mast and means secured to the structure supporting the top end of the crane mast and arranged to contact with and move said latch into locking engagement with the latch securing means on the crane mast when the crane is being moved through part of its rotative travel.

2. In a rotary jib crane having a vertically movable jib, a safety appliance comprising a latch pivotally mounted on the crane jib and counter-weighted to move normally into its inoperative position, a crane mast having means operatively engaged by the latch to secure the crane jib in lifted position on the crane mast and means secured to the structure supporting the top end of the crane mast and arranged to engage with and move said latch into locking engagement with the latch securing means on the crane mast when the crane is being moved through part of its rotative travel.

3. In a rotary jib crane having a vertically movable jib, a safety appliance comprising a latch pivotally mounted on the crane jib and counter-weighted to move normally into its inoperative position, a crane mast having means operatively engaged by the latch to secure the crane jib in lifted position on the crane mast and means secured to the structure supporting the top end of the crane mast and arranged to engage with and move said latch into locking engagement with the latch securing means on the crane mast when the crane is being moved through part of its rotative

travel, said latch moving means being arranged to be moved into and out of operative engagement with the latch.

4. In a rotary jib crane having a vertically movable jib, a safety appliance comprising a latch pivotally mounted on the crane jib and counter-weighted to move normally into its inoperative position, a crane mast having means operatively engaged by the latch to secure the crane jib in lifted position on the crane mast and means secured to the structure supporting the top end of the crane mast and arranged to engage with and move said latch into locking engagement with the latch securing means on the crane mast when the crane is being moved through part of its rotative travel, said latch being arranged to be disengaged from its locking position in all parts of its rotative movement.

5. In a rotary jib crane having a vertically movable jib a safety appliance comprising a pivoted latch hinged to the crane jib and counter-weighted to move normally into its inoperative position, a crane mast having means adapted to engage the latch to lock the jib in its raised position on the crane mast and means pivotally secured on the supporting structure for the top steadiment of the crane for moving the latch into locking engagement with the crane mast, said pivoted means being movable out of operative position.

In testimony whereof, I have hereunto set my hand.

ALBERT PATTON.

Witnesses:

M. M. KIRKLAND,
R. L. McCARTY.