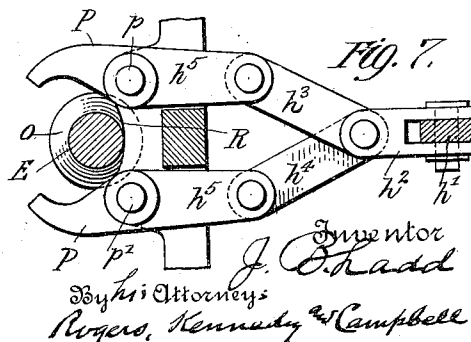
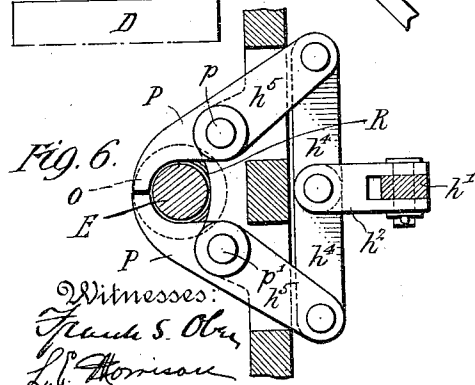
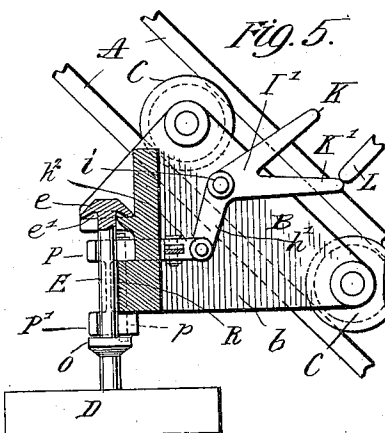
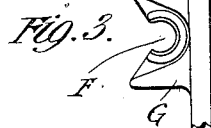
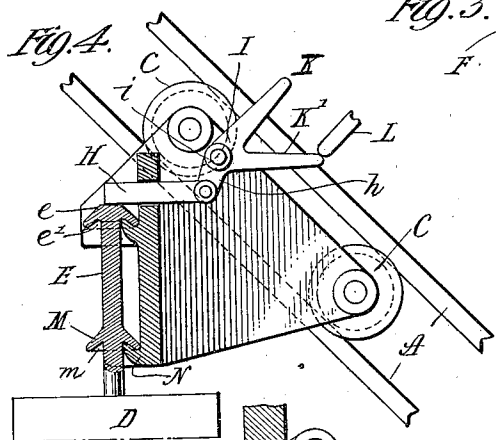
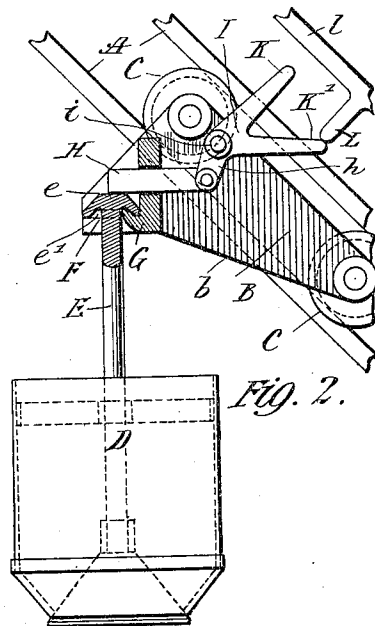
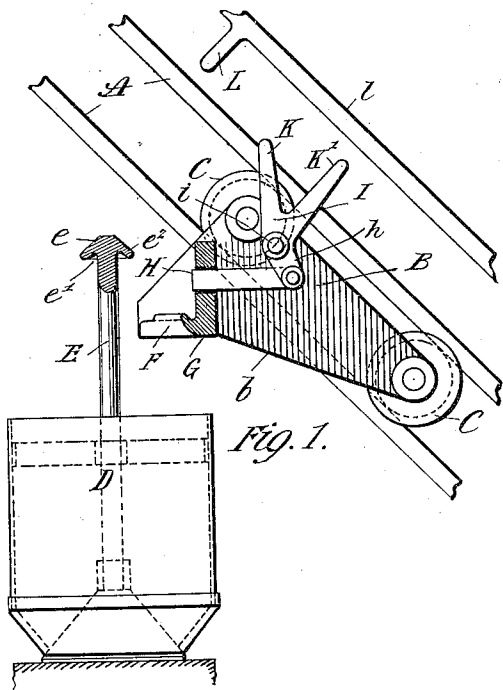


J. B. LADD.
FURNACE CHARGING MECHANISM.
APPLICATION FILED FEB. 25, 1911.

1,036,272.

Patented Aug. 20, 1912.
2 SHEETS—SHEET 1.



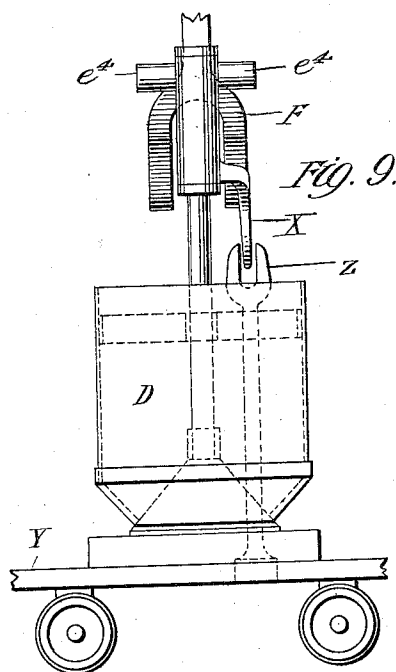
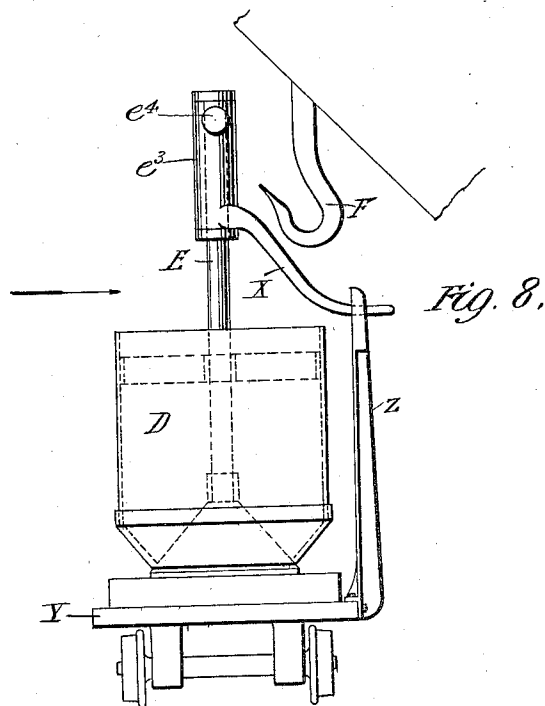
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2 SHEETS—SHEET 2.

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UNITED STATES PATENT OFFICE.

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FURNACE-CHARGING MECHANISM.

1,036,272.

Specification of Letters Patent.

Patented Aug. 20, 1912.

Application filed February 25, 1911. Serial No. 610,830.

To all whom it may concern:

Be it known that I, JAMES B. LADD, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Furnace-Charging Mechanism, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to that type of furnace charging mechanism in which a portable skip bucket loaded at the base of the furnace, is carried by a skip car or lorry to the top of the furnace and there emptied into the furnace mouth. In charging mechanisms operating on this plan, it is customary to change the position of the bucket relatively to the car, around a vertical axis, between the successive discharges into the furnace, to the end that there will be an equal distribution of the lumps and "fines" in the furnace, and the chief aim of my invention is to enable the skip bucket to be engaged or picked up by the car in whatever position the bucket may be after its previous disengagement from the car.

A further aim of the invention is to hold the bucket on the car so as to prevent its accidental escape during the travel of the car.

A further aim of the invention is to positively hold the bucket against its tendency to swing, more particularly when the car is traveling to the top of the furnace with a loaded bucket.

With these ends in view my invention consists of the combination with a skip car, of a skip bucket provided with supporting means adapted to be operatively engaged by the car in any position of the bucket relative to the car. More specifically, and in its preferred form, this branch of the invention comprehends a skip bucket having a symmetrically formed suspending means, such as a head, adapted to be supported in a socket on the car.

The invention consists also in the combination with a skip car and a detachable skip bucket adapted to be carried by the car, of releasable locking means for holding the bucket on the car and preventing its accidental detachment.

The invention consists also in the combination with a car and a skip bucket adapted to be carried thereby, of means for posi-

tively holding the bucket so that it will be prevented from swinging as the car moves up or down.

The invention consists also in the details of construction and combination of parts hereinafter described and claimed.

In the accompanying drawings: Figure 1 is a side elevation, partly in section, of a portion of a track or way, a skip car thereon, and a skip bucket, the latter being detached from the car and in the position it occupies in receiving its load at the base of the furnace. Fig. 2 is a similar view showing the bucket operatively engaged by and suspended from the car, the latter having started on its travel to the furnace top. Fig. 3 is a plan view of the socket on the car in which the suspending head on the bucket engages. Fig. 4 is a view similar to Fig. 2, but with the bucket suspending stem and the socket on the car in modified form, and adapted to positively hold the bucket against swinging motion. Fig. 5 is a similar view showing still another modification of the suspending stem and the means for locking the bucket and for preventing the swinging motion of the same. Fig. 6 is a horizontal sectional plan view on the line *a-a* of Fig. 5. Fig. 7 is a similar view with the parts in a different position. Fig. 8 is a side elevation of a bucket and its suspending head, and the engaging member on the car, in modified form. Fig. 9 is an elevation of the same as viewed in the direction of the arrow in the preceding figure.

Referring particularly to Figs. 1, 2 and 3, A represents a section of an inclined track or way leading from the base to the top of the furnace to be charged. B represents a skip car or carrier comprising the frame *b* and the carrying wheels C, the latter traveling on the track, and the car being operated by suitable means (not shown) to cause the same to travel back and forth from the base to the top of the furnace. D represents a skip bucket or charging receptacle to receive the material to be charged into the furnace. This bucket is adapted to be filled at the base of the furnace and engaged by the car and carried thereby to the top of the furnace, where its contents are introduced into the furnace, the empty bucket being returned by the car to the base of the furnace for another load.

In the operation of furnace charging mechanisms of this general character, it is usual to change the position of the bucket around a vertical axis, or partially rotate the same, either at the time of charging its contents into the furnace, or at any time prior to the elevation of the bucket by the car, and this in order that the successive charges will not enter the furnace in the same distributive relation and cause the accumulation of the heavier particles or lumps at one side. To permit of such rotative changes in the position of the bucket, and at the same time provide for the operative engagement of the bucket by the car, regardless of the position in which it may stand after such rotation, I provide the bucket with a suspending or supporting device of such form that it may be operatively engaged by the car in any position of the bucket, so that no matter how far the bucket may have been rotated after its disengagement from the car, the latter will again pick it up in the position left and without requiring that the bucket be set in a predetermined position relative to the car, as heretofore has been the case. The supporting device on the bucket to enable the same to be operatively engaged by the car in this manner, may be of a variety of forms, but I prefer to adopt the construction shown in the drawings, in which it will be seen that the bucket is provided with an upwardly extending centrally fixed stem E , having at its upper end a symmetrically formed head e of general conical shape, containing in its underside or base an upwardly extending groove or annular depression e' , thereby forming on the edge of the cone a depending annular surrounding flange e^2 . This head is adapted to be received and supported in a horizontal semi-circular socket F formed in the upper face of a horizontal bracket or ledge G projecting forwardly from the frame of the car near its upper end. This socket corresponds in form and contour to the base of the conical head, and when suspended therein, as shown in Fig. 2, the annular flange e^2 on the head extends in the socket and the edge of the latter extends upwardly and fits in the depression in the underside of the head, with the result that the parts are interlocked in such manner that the head cannot be disengaged from the socket without first moving the head vertically slightly to cause the annular flange thereon to free the edge of the socket, whereupon the head may be removed laterally and the bucket disengaged from the car. From this construction, it will be seen that no matter in what position the bucket may be, as regards its adjustments around a vertical axis, the head on the stem will enter and be supported by the socket on the car as the latter is moved on

its track from the position of Fig. 1 to that of Fig. 2 in picking up the bucket. It is manifest that the form of the supporting head may be variously modified to adapt the same to be operatively engaged by the car as above described, the essential feature of the invention in respect to the preferred construction for this purpose being that such part of the stem as is engaged by the car shall be symmetrical around the axis of the same and preferably of such form as would be produced by rotating a cross-section around its axis. Other symmetrical forms can be produced which will approximate the same. As shown in Figs. 8 and 9, the broad idea of this feature of my invention, that is the provision of the bucket with supporting means adapted to be operatively engaged by the car in any rotative position of the bucket relative to the car, may be realized by a supporting head which is non-symmetrical, but which will retain its engaging position relative to the car although the bucket itself may be changed in position. On reference to these figures it will be seen that the suspending head e^3 is swiveled on the upper end of the stem E' , so that the stem, when the bucket is rotated to change its position around a vertical axis, may be turned relative to the head. The head is provided with oppositely extending suspending lugs e^4 , adapted to be engaged by a double hook F' carried by the car, the said hook, when so engaged with the lugs, straddling the suspending head. In order to maintain the swiveled head in its proper engaging position when the bucket is rotated, the head is provided with an arm X extending laterally therefrom and adapted when the bucket is seated on a transfer car Y on which it is loaded and turned to engage in the upper forked end of a vertical arm Z fixed at its lower end to the car. From this construction it will be seen that notwithstanding the fact that after the bucket has been loaded when disengaged from the car and changed in position around a vertical axis, the suspending head will remain in its former engaging position so that it may be picked up by the car as the latter begins to ascend. It will be understood, therefore, that my invention in its broad aspects comprehends this construction of the suspending head, as well as a head symmetrically formed as in the first instances described, the broad and underlying feature being that the suspending means will be of such form that it may be operatively engaged by the car in whatever position the bucket may be placed, as far as its rotation around a vertical axis is concerned.

In the travel of the car on the track in the elevation of the loaded bucket, or in the return of the empty bucket, there is danger of the suspending head becoming disen-

In Fig. 5 I have shown a modified form of the means for positively holding the bucket against its tendency to swing, as well as a modified form of the means for locking the bucket on the car to prevent its

pivoted to the bracket G on vertical parallel pivot pins p, p' . The relation of these jaws to the stem of the bucket, when the latter is suspended from the car, is such that the lower pair of jaws may be closed on the stem above the shoulder O, while the upper pair of jaws may close on the stem below the suspending head, the form of the jaws being such that they will embrace the forward side of the stem and hold the same laterally in a vertical groove or socket R in the bracket below the suspending socket. By means of these jaws, not only is the stem held positively in an upright position and swinging of the bucket prevented, but by reason of the engagement of the lower jaws just above the shoulder O, the same will be held against vertical movement, such as would be necessary to release the suspending head from the socket on the car. These jaws are adapted to be operated automatically to grasp the stem when the car picks up the bucket, and to release the same when the car returns with the empty bucket to the base of the furnace. This automatic operation of the jaws is conveniently effected by means of a rocking plate I' pivoted on the car and similar in construction and operation as that already described in connection with the preceding figures. The lower arm k' on this rocking plate is jointed between the forked end of a horizontal link k^2 , which link is pivotally connected to the inner ends of two oppositely extending plates k^3 and k^4 , whose outer ends are pivotally connected with the ends of arms k^5 extending rearwardly from the opposing connected jaws. When the jaws are opened, as shown in Fig. 7, the plate I' will be in such position that its lower operating finger will be projected upwardly, with the result that when the car begins its ascent, this finger will be engaged with the overlying lug L and the plate being rocked, the jaws will, by means of the connections between the same and the plate, be closed on the bucket stem and over the annular shoulder O, as shown in Fig. 5. On the return of the car with the empty bucket, the upper finger on the plate I', which had by the previous movement of the plate been projected upwardly, will contact with the lug L, and by the further movement of the car, the plate will be rocked and the jaws opened to release the bucket.

It will be understood that any appropriate means and mechanism may be employed to effect the discharge of the contents of the bucket into the top of the furnace, such mechanism constituting no part of the present invention.

It is manifest that the details of the construction described may be variously modified without departing from the limits of my invention, provided the operation is substantially as indicated above, and it is to be

understood that my invention is not limited to any particular form or construction of the parts except in so far as such limitations are specified in the claims.

Having thus described my invention, what I claim is:

1. In combination with a traveling skip car, a skip bucket detachable therefrom and capable when detached of occupying different operative positions relatively to the car in its path of travel, the said parts being provided with cooperating means to adapt the bucket to be picked up by the car in any of the said operative positions.

2. In combination with a traveling skip car, a skip bucket detachable therefrom and capable when detached of occupying different positions relatively to the car in its path of travel and provided with supporting means in position to be engaged by the car irrespective of the relative position of the bucket and car.

3. In combination with a traveling skip car, a skip bucket provided with supporting means detachable from the car and capable when detached of occupying different operative positions relatively to the car so as to be engaged thereby in any of said operative positions.

4. In combination with a traveling skip car, a skip bucket detachable therefrom and capable when detached of occupying different operative positions around a vertical axis relatively to the car in its path of travel, the said bucket and car being so formed relatively that the bucket will be operatively engaged by the car in any of its different operative positions.

5. In combination with a traveling skip car provided with a relatively fixed open supporting socket, a skip bucket provided with a symmetrically formed supporting head in position to be engaged by the socket during the travel of the car.

6. In combination with a skip car provided with a fixed supporting socket, a skip bucket detachably engaged with said socket and adapted to be supported solely thereby, and a releasable locking device adapted to cooperate with the bucket in preventing the accidental disengagement of the bucket from the socket.

7. In combination with a skip car provided with a fixed supporting socket, a skip bucket provided with a suspending stem detachably engaged with the socket and adapted to be disengaged therefrom by a relative vertical movement of the socket and stem, and a locking device acting when in one position to prevent such movement and when in another position to permit it.

8. In combination with a skip car, a detachable skip bucket provided with a suspending stem adapted to be engaged by and suspended from the car, and means on the

car for grasping the stem to prevent swinging motion of the bucket.

9. In combination with a traveling skip car, a skip bucket detachable therefrom and adapted when detached to be picked up and carried by the car in its travel, and means operated automatically for engaging the bucket to prevent swinging thereof.

10. In combination with a skip car, a skip bucket detachable therefrom and adapted when detached to be picked up and carried by the car in its travel, and means for locking the bucket in position on the car, said

means also acting to prevent swinging of the bucket.

11. In combination with a skip car, a skip bucket provided with supporting means to adapt the same to be operatively engaged with and suspended from said car at a plurality of points.

In testimony whereof I have affixed my signature in presence of two witnesses.

JAMES B. LADD.

Witnesses:

MAE HOFMANN,
LOUISE B. MORRIS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."