F. L. STUART.

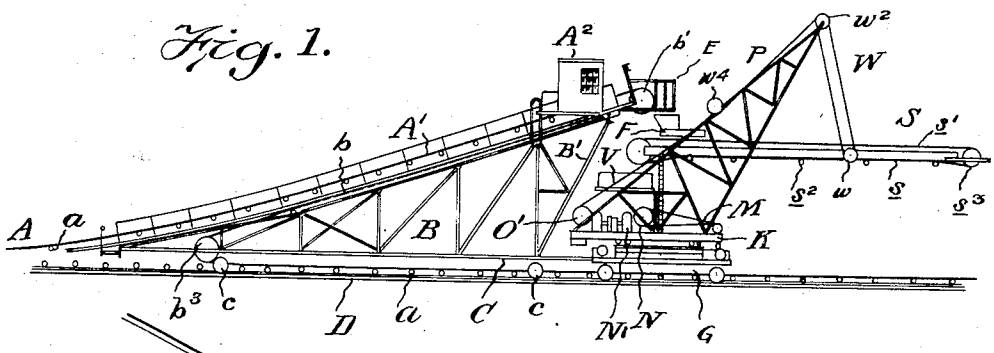
APPARATUS FOR CONVEYING AND DELIVERING MATERIALS.

APPLICATION FILED MAY 31, 1919.

1,331,464. Patented Feb. 17, 1920.

3 SHEETS—SHEET 1.

Fig. 1.



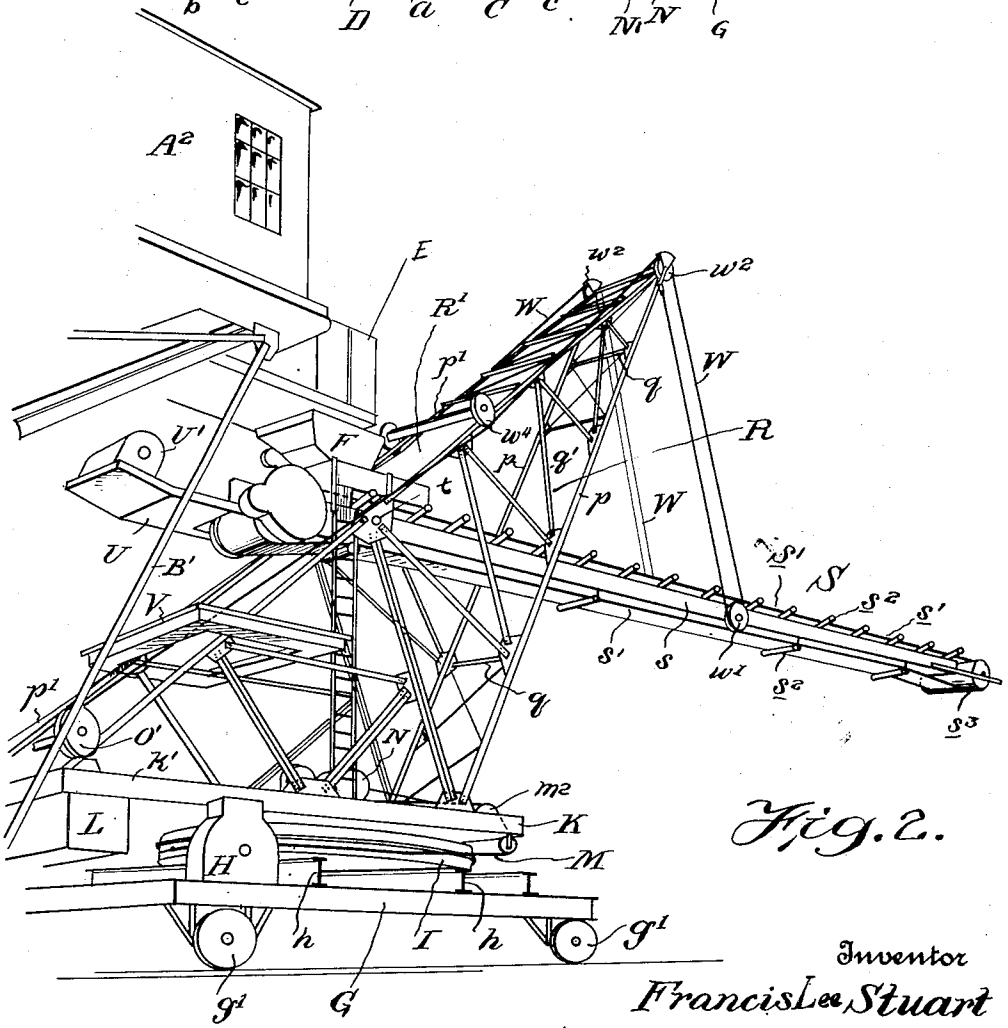


Fig. 2.

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3 SHEETS—SHEET 2.

Fig. 4.

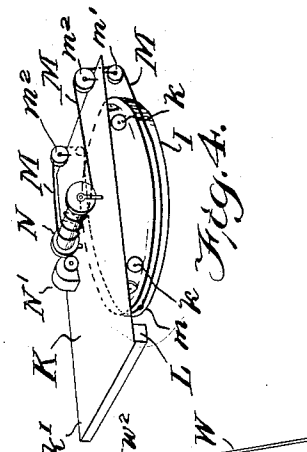


Fig. 5.

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3 SHEETS—SHEET 3.

Fig. 5.

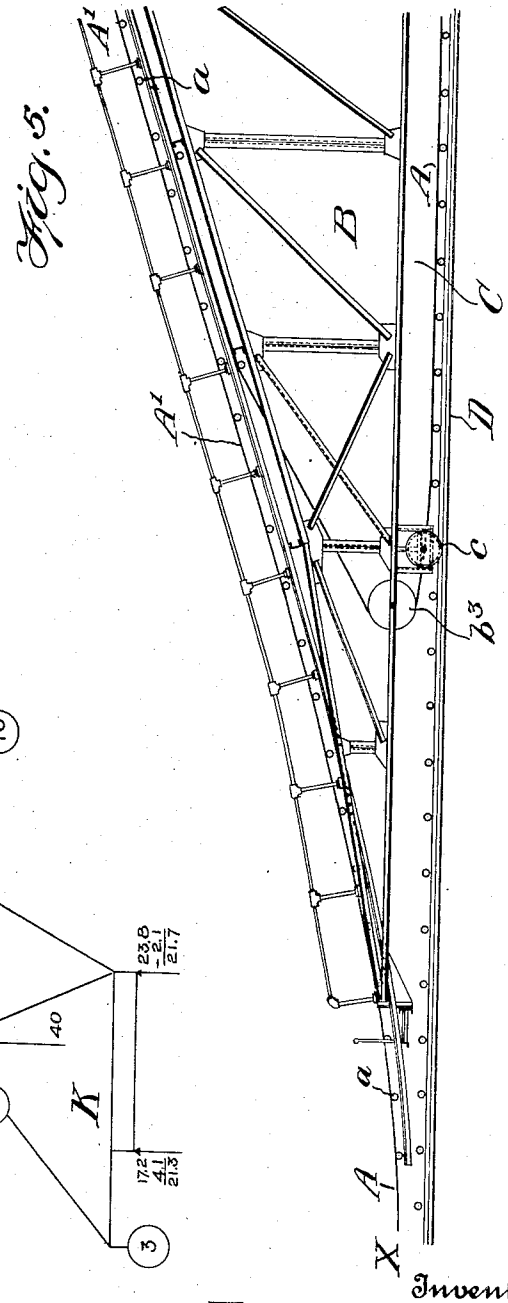
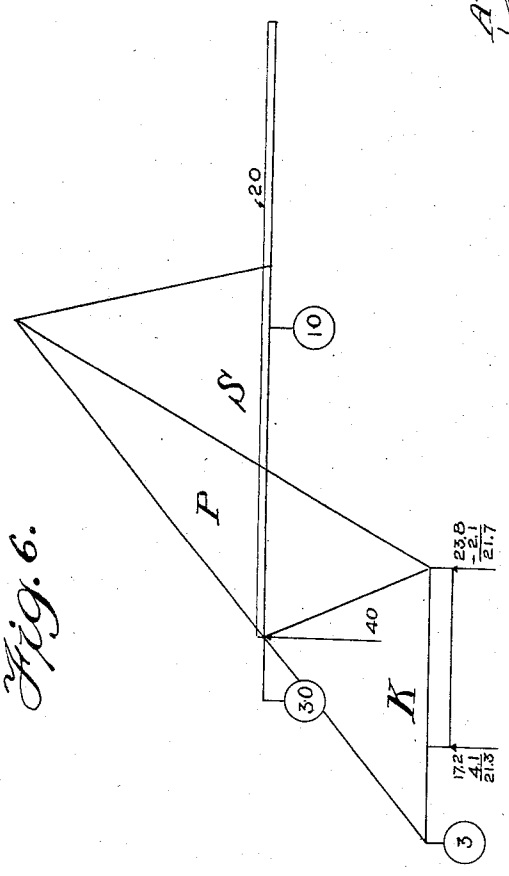


Fig. 6.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CONVEYING AND DELIVERING MATERIALS.

1,331,464. Specification of Letters Patent. Patented Feb. 17, 1920.

Application filed May 31, 1919. Serial No. 300,973.

To all whom it may concern:

Be it known that I, FRANCIS LEE STUART, a citizen of the United States, residing in New York city, county and State of New York, have invented certain new and useful Improvements in Apparatus for conveying and Delivering Materials, of which the following is a specification.

This invention relates to apparatus for conveying and delivering material, in which a main conveyer belt is associated with mechanism which receives material from the belt at any desired point in the length of the belt, and delivers the material to other carriers, bins, or storage spaces located at various points adjacent the belt and at various elevations.

Where large amounts of heavy material are being handled and where it is necessary at times to deliver at unusually long distances from the main conveyer belt or at relatively high elevations, provision must be made for sustaining the increased weight of material and the strains or stresses on the mechanism. Special provision is also necessary for giving proper adjustments to different parts of the apparatus. Difficulties have heretofore been encountered in constructing and operating apparatus for the purpose above mentioned, but these have been successfully overcome by my improvements.

According to my invention I associate with a main conveyer belt of ordinary construction, an improved delivery apparatus which fulfils all the necessary requirements as practical experience has completely demonstrated.

As usual in this class of apparatus, the main conveyer belt is provided with a looped portion or tripper which delivers to a boom conveyer supported on a truck adapted to move longitudinally over the main conveyer belt under its own power, and said boom conveyer is so supported on the truck that it may be turned or adjusted about both vertical and horizontal axes. In these respects the apparatus is similar to those heretofore used, but I have improved such apparatus by providing a frame of novel construction which is supported on the truck in a new way and serves to support the boom and the devices for raising and lowering it. The construction is such that the weight of the boom may be firmly sustained and evenly divided, and other parts of the apparatus are so constructed and arranged as to so distribute the weight and divide the strains as to provide for easy adjustment of the boom under varying conditions.

In the accompanying drawings:—

Figure 1 is a side elevation of an apparatus for conveying and delivering materials constructed in accordance with my invention.

Fig. 2 is a perspective view of the delivery apparatus, some parts of the mechanism being omitted in order that other parts may be better shown.

Fig. 3 is a view on an enlarged scale and in side elevation of the delivery apparatus showing how it is associated with the tripper.

Fig. 4 is a detail view in perspective and largely diagrammatic illustrating the devices for operating the turntable.

Fig. 5 is a view on an enlarged scale and in side elevation of the rear portion of the frame which supports the tripper and is a continuation of that part of the tripper supporting frame shown in Fig. 3.

Fig. 6 is a diagram illustrating the distribution of stresses in the distributing apparatus.

The main conveyer belt A as usual is supported on rollers a and may be of any desired length so as to convey material from a distant source of supply. It is provided with a looped portion or tripper A′ supported on a frame B mounted on a truck C, the wheels c of which traverse a track D running parallel with the main conveyer belt. The belt enters the apparatus at X, traverses the inclined portion b of the frame B, passes over a delivery roller b', thence over bend rollers b^2, b^3, and thence horizontally under the truck in the usual way. The delivery roller discharges into a hopper E, which is supported on and projects from the frame B of the tripper. The hopper delivers to another hopper F supported by the frame of the delivery apparatus. It will be observed that the frame members B′, adjacent the delivery apparatus, are inclined in such manner as to permit parts of the delivery apparatus to extend beneath the hopper and beyond the plane of the hopper. In this way a compact arrangement is afforded and one which gives freedom of movement of the delivery apparatus about a vertical

axis so that material may be delivered at any desired point on either side of the main conveyer belt, and which also permits the rear portion of the boom conveyer hereinafter described to swing freely about its vertical axis.

The truck G of the delivery apparatus is connected at g to the truck C, and its wheels g' traverse the track D. Motor mechanism H on the truck drives the wheels g' and the truck supports a circular platform I on which is mounted a turntable K. Preferably the circular platform I is supported on I beams h in the manner illustrated in Fig. 3. The turntable K is of novel construction. It is provided on its under side with wheels k which traverse a track on the top of the platform I. The turntable extends across the platform and one end k' thereof is extended a considerable distance beyond the platform, and this end carries a counterweight L for a purpose hereinafter described. The turntable revolves about a vertical axis indicated at x in Fig. 3 and it will be observed that the portion k' of the table is located much farther from its axis than the opposite end portion of the table. M indicates a cable which surrounds the base I and is attached thereto at m. This cable extends over pulleys m', m^2 and around a drum N supported on the turntable. N' indicates a motor for operating the drum. The arrangement is such that by turning the drum in one direction the turntable may be moved correspondingly, but when the drum is turned in the opposite direction the turntable is given a movement in the opposite direction. Inasmuch as the base I is stationary, and the cable M is fastened thereto at m when the drum N is turned to wind up the front part of the cable as viewed in Fig. 4, the turntable will be turned anticlockwise, correspondingly turning the drum about a vertical axis, the rear portion of the cable as viewed in Fig. 4 being let out from the opposite end of the drum. When the drum is turned in the opposite direction, the rear portion of the cable will be wound and the table will be turned clockwise. The motor, drum, etc., it will be observed, are located on that side of the axis of the turntable on which the extension k' is located. In Fig. 3, O indicates a controller for the motor N'. It is also connected with a motor O^2 which actuates the drums O' to which the cables for raising and lowering the boom conveyer are connected.

The boom supporting frame P comprises front frame members p which extend diagonally upward from one end of the turntable, and rear frame members p' which extend diagonally upward from the rear end of the extension k' of the turntable. The members p' are inclined to a greater extent than the members p and the upper ends of these members are connected at Q in any suitable way. The front and rear frame members are braced by cross rods q and q' providing a strong but comparatively light structure. The cross rods q of the front frame member are arranged above and below an open space R through which the boom conveyer S extends, and in which it is free to move vertically. A similar space R' is provided between the rear frame members. The boom conveyer S comprises a frame s and a conveyer belt s' which traverses rollers s^2. Near its inner end the boom conveyer frame is pivotally connected at t to turn about a horizontal axis. This pivotal connection is preferably made in a suitable supporting device t' attached to the frame P. The pivotal connection at t is directly below the delivery hopper F so that as the boom swings up and down its relation to the delivery hopper is not so changed as to interfere with the flow of material from the hopper to the belt. The boom frame is extended rearwardly a short distance and it is provided with a rearwardly extending bracket or platform U on which is mounted motor mechanism U', which drives the boom conveyer belt. It will be observed that the platform U and the motor mechanism U' is located between the plane of the hopper F and the front portion of the frame B and it is free to swing in the space provided.

In order to raise and lower the boom conveyer in order that it may deliver at any desired elevation I provide on each side of the frame P a cable W which is attached at w to the upper portion of the frame P, passes over a pulley w' on the boom conveyer intermediate its front and rear ends, and then passes over a pulley w^2 at the upper, outer end of the frame P. Thence the cable passes under an idle pulley w^4 and thence to the drum O' hereinbefore referred to and which is mounted on the turntable K. In this way power for raising and lowering the boom conveyer may be applied to the conveyer a considerable distance from the axis about which it turns. It will be observed that the frame P extends upwardly and outwardly from the table and has its upper, outer end arranged in a vertical plane approximately midway between the horizontal pivot of the boom and the outer end thereof. It will also be observed that the cable W is connected with the boom beneath the upper, outer end of the frame and extends therefrom at an acute angle to the vertical to the upper, outer end of the frame, and thence to the turntable where it is connected with mechanism for operating it. Heretofore in this class of apparatus power has been applied near the inner end of the boom and while such mechanism operates efficiently where the boom is of small dimen-

sions and the weight sustained by the boom is not excessive, very materially improved results are obtained where the power is applied to the boom much nearer to its outer end. Unless provision is made for balancing the strains or properly dividing the weight on the turntable, difficulties are encountered inasmuch as more weight would be applied on one side of the table than on the other and this would tend to tilt the table and impede the easy turning movement about the turntable axis. These difficulties have been overcome by my invention, as the frame P is so constructed, shaped, and arranged and so connected with the turntable that the weight, strain and stresses are equalized or substantially so, about the axis around which the turntable moves.

This part of my invention may be better understood by reference to Fig. 6 of the drawings, which shows a stress diagram indicating the distribution of the stresses occurring in different parts of the apparatus. In this diagram it is assumed that a uniformly distributed load of twenty pounds per unit of length is carried on the boom. This is equivalent to a concentrated load of ten pounds per unit of length at the center point of the boom and is partly balanced by a load of thirty pounds per unit of length at the end of the cantaliver extension of the boom. These loads are equivalent to a load of forty pounds per unit of length at the pivot, which in turn produces loads of 23.8 pounds and 17.2 pounds per unit of boom length on the front and rear of the turntable track. In order to overcome this inequality the turntable is made to overhang at the rear and carries a load of, say, three pounds per unit of boom length which may be assumed to be distributed as loads of —2.1 pounds and 4.1 pounds per unit of boom length at the front and rear of the track respectively. This practically equalizes the front and rear loads as they are 21.7 and 21.3 pounds per unit of boom length respectively.

The frame P also supports a platform V on which an attendant may stand and A^2 indicates a house for an attendant near the delivery end of the tripper.

The weight L assists in balancing the turntable. The weight of the machinery on the turntable is not usually sufficient to counterbalance the weight of the frame and the boom conveyer, but by applying a weight of suitable dimensions to the outer end of the extended portion of the turntable, the necessary balancing effect may be produced.

I claim as my invention:—

1. Apparatus for delivering material, comprising a boom conveyer, and means for supporting and adjusting the boom conveyer about both vertical and horizontal axes, comprising a truck, a turntable thereon, a frame supported on the turntable to which the boom conveyer is pivoted to move about a horizontal axis and which extends upward and outward from the table and has its upper, outer end arranged in a vertical plane approximately midway between the horizontal pivot of the boom and the outer end thereof, a cable connected with the boom beneath the outer end of the frame and extending from the boom at an acute angle to the vertical to the upper, outer end of the frame, and thence to the turntable and means on the turntable for operating said cable.

2. Apparatus for delivering material, comprising a boom conveyer, and means for supporting and adjusting the boom conveyer about vertical and horizontal axes, comprising a truck, a turntable thereon, a skeleton frame supported on the turntable to which the boom conveyer is pivoted to move about a horizontal axis and which extends upward and outward from the table and has its upper, outer end arranged in a vertical plane approximately midway between the horizontal pivot of the boom and the outer end thereof, a cable connected with the boom beneath the outer end of the frame and which extends therefrom upwardly at an acute angle to the vertical to the upper, outer end of the frame and thence to the turntable, and means on the turntable for operating the cable.

3. Apparatus for conveying and delivering material, comprising a main conveyer belt having a looped portion or tripper, a truck-supported frame which carries the tripper, a boom conveyer receiving material from the tripper, and means for supporting and adjusting the boom about both vertical and horizontal axes, comprising a truck adapted to move longitudinally over the main conveyer belt, a turntable thereon mounted to move about a vertical axis and having a portion prolonged to a greater extent on one side of the axis than on the other side, a frame supported on the turntable having its front members attached to the turntable and extending upwardly and forwardly therefrom, and its rear members connected to the extended portion of the turntable and extending upwardly and forwardly therefrom and joining the front members, means for pivotally connecting the boom conveyer with said frame, means for raising and lowering the boom, and means for operating the turntable.

4. Apparatus for delivering material, comprising a boom conveyer, and means for supporting and adjusting the boom conveyer about both vertical and horizontal axes, comprising a truck, a turntable thereon mounted to move about a vertical axis and having a portion prolonged to a greater extent on one side of the axis than on the opposite side, a skeleton frame supported on

the turntable to which the boom conveyer is pivoted to move about a horizontal axis and which extends upward and outward from the table and has its upper, outer end arranged in a vertical plane approximately midway between the horizontal pivot of the boom and the outer end thereof, a cable connected with the boom beneath the outer end of the frame and which extends therefrom upwardly at an acute angle to the vertical to the upper, outer end of the frame and thence to the turntable, and means on the turntable for operating the cable.

5. Apparatus for delivering material, comprising a boom conveyer, a frame on which it is mounted to move about a horizontal axis, a self-propelled truck, a turntable thereon having a front portion to which the boom supporting frame is secured and from which it extends diagonally upward and forward and a counterweighted extended rear portion to which the inclined rear portion of the boom supporting frame is also secured, a cable for raising and lowering the boom, and means supported on the counter-balanced rear portion of the turntable for operating the cable.

6. A stacker or trimmer, comprising a truck, a turntable, a boom conveyer, and a boom supporting frame, in which the turntable has an extended rear portion and the boom supporting frame is inclined upward and forward and has its front members secured to the front portion of the table and its rear members secured to the extended rear portion of the table, which latter carries counterbalancing means, the arrangement being such that the stresses are equally distributed about the axis of the table to insure its easy adjustment.

7. Apparatus for delivering material, comprising a self-propelled truck, a turntable thereon mounted to move about a vertical axis and having a rear portion, the length of which is materially greater than the front portion, a forwardly extending skeleton frame connected to the front and rear portions of the turntable, a boom conveyer mounted on the frame to move about a horizontal axis, and means carried by the frame and turntable for raising and lowering the boom.

8. A stacker or trimmer, comprising a truck, a turntable, a boom conveyer and a boom supporting frame, in which the turntable has an extended rear portion and the boom supporting frame is inclined upward and forward to a vertical plane considerably beyond the front end of the turntable, which latter carries counterbalancing means and motor mechanism for operating the turntable, a cable for raising and lowering the boom conveyer which extends from motor mechanism on the extended end of the table to the overhanging upper end of the boom supporting frame and which is connected with the boom conveyer intermediate its ends and in a plane considerably beyond the front end of the turntable.

In testimony whereof I have hereunto subscribed my name.

FRANCIS LEE STUART.