This invention relates to concrete mixing and distributing apparatus of the type forming the subject matter of the co-pending application of Frederick E. Bager, Serial No. 491,496, filed October 27, 1930.

Apparatus of this type is especially useful on projects which extend over considerable distances and where it is desirable to elevate the concrete for distribution; and comprises generally a portable mixer with a distributing tower mounted thereon. As in the aforesaid application, the hoisting tower is equipped with concrete elevating and distributing means, and the tower is movable from an upright operative position to a lowered inoperative position disposed over the mixer for portability.

It is a particular object of the present invention to provide improved means for raising and lowering the tower.

In past constructions, it has been recognized to be advantageous to employ the power unit of the mixer for raising and lowering the tower, and various methods of utilizing this driving force have been employed with varying degrees of success.

The present invention contemplates an extremely simple manner of utilizing the motive power of the mixer for raising and lowering the tower and accomplishes this object by connecting the lower end of the tower with the traction units of the mixer when it is desired to raise or lower the tower, so that forward or backward motion of the mixer, causes the tower to swing between raised and lowered positions.

With the above and other objects in view which will appear as the description proceeds, our invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described, and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereinafter disclosed invention may be made as come within the scope of the claims.

In the accompanying drawings, we have illustrated one complete example of the physical embodiment of our invention constructed according to the best mode we have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a side elevation illustrating the complete unit set up for use;

Figure 2 is a side elevation illustrating the manner of lowering the tower;

Figure 3 is a side elevation illustrating the unit ready for transportation; and

Figure 4 is a cross section view looking down on top of the machine, said view being taken on the plane of the line 4—4 of Figure 1.

Referring now more particularly to the accompanying drawings, in which like numerals indicate like parts throughout the several views, the numeral 5 indicates generally a concrete mixing machine of the type commonly known as a paver, and which is portable mounted on a pair of conventional creeping or self-laying traction members 6. The mixing machine comprises a frame 7, in which a mixing drum 8 is rotatably mounted to be driven from a power unit 9.

The mixing drum is adapted to be charged with materials to be mixed by a loading skip 10 pivotally mounted from the frame, and is adapted to discharge its contents into a chute 11, which directs the mixed materials into a bucket 12. The bucket 12 is mounted to travel along a tower 13 associated with the machine to elevate the mixed materials to a hopper 14 mounted on the tower at a desired elevation. Conventional tripping mechanism (not shown) is provided to automatically trip the bucket 12 as it reaches the hopper 14 so that its contents are automatically discharged into the hopper.

The hopper 14, as is customary, is provided with a discharge gate 15, which, when open, allows its contents to drop down onto a chute 16, which is of sectional construction, and is adjustably mounted on the tower by suitable supports 17 and 18. The outer section 19 of the chute is arranged to be moved about to direct the discharge of the materials as desired.

The tower 13 is supported from the mixing machine to be movable therewith in its upright operative position to allow the entire equipment to be advanced as the job progresses, and when collapsed, to be supported by the machine in a horizontal position to permit more rapid transportation.

The specific tower employed is of the three sided type having only a front and two sides, the rearmost portions 20 of the sides forming tracks to guide the elevation and descent of the bucket 12. It is, of course, understood that proper holding cables are provided to raise and lower the bucket and that these cables are wound upon drums (not shown) carried by the mixing machine and driven from the power unit 9.

For reasons hereinafter to be more fully set forth, the tower is of sectional construction and comprises an upper section 21 and a lower section 22, hingedly connected as at 23. At the point of hinged connection of the tower sections...
the tower is also hingedly connected to supports 24 carried by the frame 1 of the mixing machine. When in upright operative position, and during the erection and lowering of the tower, its upper and lower sections are bolted together as at 22', but when the tower is completely collapsed, as illustrated in Figure 3, the sections are detached from each other and the lower section folded down to its vertical position to decrease the overall length of the unit and thus facilitate its transporta-

tion.

To add to the rigidity of the structure when the tower is in its upright operative position, braces 25 are disposed so as to support the tower to the supporting structure 24. These braces, when the tower is folded down to its position illustrated in Figure 3, are also used to support the overhang-
ing end of the tower by being attached to the tower as at 28 and to the frame of the machine as at 27.

It is noted from Figure 1, that when the tower is in its raised operative position, its lower end rests on pillow blocks 28, which are removed when the unit is to be advanced.

Manner of raising and lowering the tower

Assuming that the tower is in its raised operative position, and that it is desired to lower the same to its position shown in Figure 3, the distributing chutes 16 and 19 with their supporting brackets 11 and 18, are first lowered and then detached. Then the hopper 14 is lowered and secured to the lower section 22.

To facilitate raising and lowering of the hopper, a cable 30 is provided, one end of which is attached to the hopper and the other end trained over suitable sheaves and connected to any makeup mechanism (not shown). The bucket 12 is also brought to its lowestmost position so that the hopper and bucket serve to partially counterbalance the extended upper end portion of the tower during the actual lowering and raising. The braces 25 are then removed and the tower is ready to be lowered.

To lower the tower, its extreme lowermost end portion is connected by links 31 to the creeping traction units 6. One of these links 31 is attached on each side of the unit as shown in Figure 4, and when the tower is upright, the connection of the links to the traction units is at their remotest portions as illustrated in Figure 1.

With the links 31 firmly connected to the lower end of the tower and to the creeping traction units, and the tower properly freed from the frame 1 of the machine, the machine is moved backwardly which has the effect of carrying the hinge point 23 to the right with respect to Figures 1 and 2, and of holding the lower end of the tower stationary. Obviously, this action causes the tower to descend and owing to the vast supply of power and easy control of the traction units, the descent of the tower is at all times under perfect control and is effected without strain upon any part of the structure.

The point of attachment of the links to the lower end of the tower as to its distance from the hinge point 23, is so located with respect to the length of the traction units, that the proper degree of movement on the part of the tower is obtained.

After the tower has been completely lowered, as illustrated in dotted lines in Figure 2, the bolts 22' holding the upper and lower sections of the tower together, are removed and then by a forward movement of the machine, the lower section is returned to its vertical position shown in Figure 3. The links 31 are then removed, and with the overhanging upper end of the tower supported by the braces 25, the entire unit is ready for transport.

To raise the tower to its position of use, it is only necessary to reverse the procedure described, that is, first the lower section is raised to a hori-

zontal position through the medium of the traction units and the links 31, and then after the tower sections are connected, the entire tower may be swung to its vertical position by a reverse movement on the part of the machine.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art, that this invention affords a simple and very effective manner of raising and lowering the tower of a combined concrete mixing and distributing unit.

What we claim as our invention is:

1. In a mixing and distributing apparatus, the combination of a mixing machine, a traction member portably mounting the machine, a distributing tower movably supported from the machine for movement between an upright operative position and a lowered inoperative position, and means cooperating between said traction member and the tower for raising and lowering the tower.

2. In a combined material mixing and distributing apparatus, a mixing machine including a frame, a traction unit to portably mount the machine, a distributing tower pivotally mounted on the frame for movement from an upright operative position to a lowered inoperative position, and means cooperating between the traction unit and the tower for raising and lowering the tower.

3. In a combined material mixing and distribut-

ing apparatus comprising, a mixing machine, an endless traction unit to portably mount the machine, a tower movable mounted from the machine, and means cooperating between the tower and the endless traction unit to raise and lower the tower.

4. A combined material mixing and distribut-

ing apparatus comprising, a mixing machine, an endless traction unit to portably mount the ma-

chine, a distributing tower pivotally connected with the machine for movement from an upright operative position to a lowered inoperative position, and means to connect the endless traction unit with the tower so that movement of the machine by the endless traction unit effects the raising and lowering of the tower.

5. A combined material mixing and distribut-

ing apparatus comprising a mixing machine, ground engaging means to portably mount the mixing machine, a tower hinged to the machine, and means to connect the tower with the ground engaging means so that movement of the mixing machine by the ground engaging means moves the tower about its hinged mounting.

6. A combined material mixing and distribut-

apparatus comprising a mixing machine, ground engaging means to portably mount the mixing machine, a tower hingedly mounted from the mixing machine at a point intermediate its ends and adjacent the lower end thereof, and means to connect the tower at a point beneath its hinged mounting with the ground engaging means so that forward and backward movement of the machine by its ground engaging means swings the tower about its hinged mounting.
7. A combined material mixing and distributing apparatus comprising, a mixing machine, ground engaging means to portably mount the mixing machine, a tower hingedly mounted from the mixing machine at a point substantially elevated from the ground, and means to connect the tower at a distance from its hinged connection with the machine with said ground engaging means so that the tower is swung about its hinged connection with the machine as the machine is moved forward or backward by the ground engaging means.

8. In a combined material mixing and distributing apparatus, a mixing machine including a frame, ground engaging means to portably mount the machine, a distributing tower, means to hingedly connect the distributing tower with the frame of the machine for swinging movement between an upright operative position and a lowered inoperative position, and a connection between the ground engaging means and the tower at a point spaced from its hinged connection with the frame for swinging the tower about its hinged connection with the frame by moving the machine forward or backward on its ground engaging means.

9. In a combined material mixing and distributing apparatus, a mixing machine, an endless traction unit to portably mount the machine, a distributing tower, means to hingedly mount the distributing tower from the mixing machine for swinging movement between an upright operative position and a lowered inoperative position, and a rigid connecting link connecting the tower at a point spaced from its hinged mounting with the endless traction unit, whereby backward or forward motion of the machine by its endless traction unit induces swinging movement on the part of the tower.

10. In a combined material mixing and distributing apparatus, a mixing machine having a frame, ground engaging means to portably mount the machine, a distributing tower hingedly mounted on the frame and comprising an upper section and a lower section adapted to be connected in alignment and to be separated for movement to positions angularly disposed with respect to each other, means to raise and lower the tower comprising, a connection between the ground engaging means and the lower tower section, whereby forward or backward movement of the machine swings the tower while its sections are connected to and from raised and lowered positions, and whereby the lower section is movable to and from a position aligned with the upper section when the sections are separated, and the upper section is in its lowermost position.

11. In a combined concrete mixing and distributing apparatus, a mixing machine including a frame, a traction unit to portably mount the machine, a distributing tower hingedly mounted on the machine and comprising an upper and a lower section hingedly connected, means to hold the tower sections in alignment, said means being detachable to permit the sections to assume positions at angles with respect to each other, the lower section serving to counterbalance the upper section during raising and lowering of the tower about its hinged connection with the machine, and a connection between the lower section and the traction unit through which the tower is raised and lowered when the tower sections are connected upon forward or backward movement of the machine by its traction unit and whereby the lower section is raised and lowered to and from alignment with the upper section when the upper section is in its lowered position upon backward or forward movement of the machine by the traction unit.

12. In a combined material mixing and distributing unit, a mixing machine, a distributing tower hingedly mounted on the mixing machine, and comprising hingedly connected sections adapted to be moved from positions of alignment to positions angularly disposed with respect to each other, and common means to raise and lower the tower when the sections are rigidly connected in alignment and to move one section to and from alignment with the other section when disconnected.

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