Aug. 16, 1927. 1,639,346

W. K. LIGGETT

LOADING APPARATUS

Filed Sept. 17, 1920 2 Sheets-Sheet 1

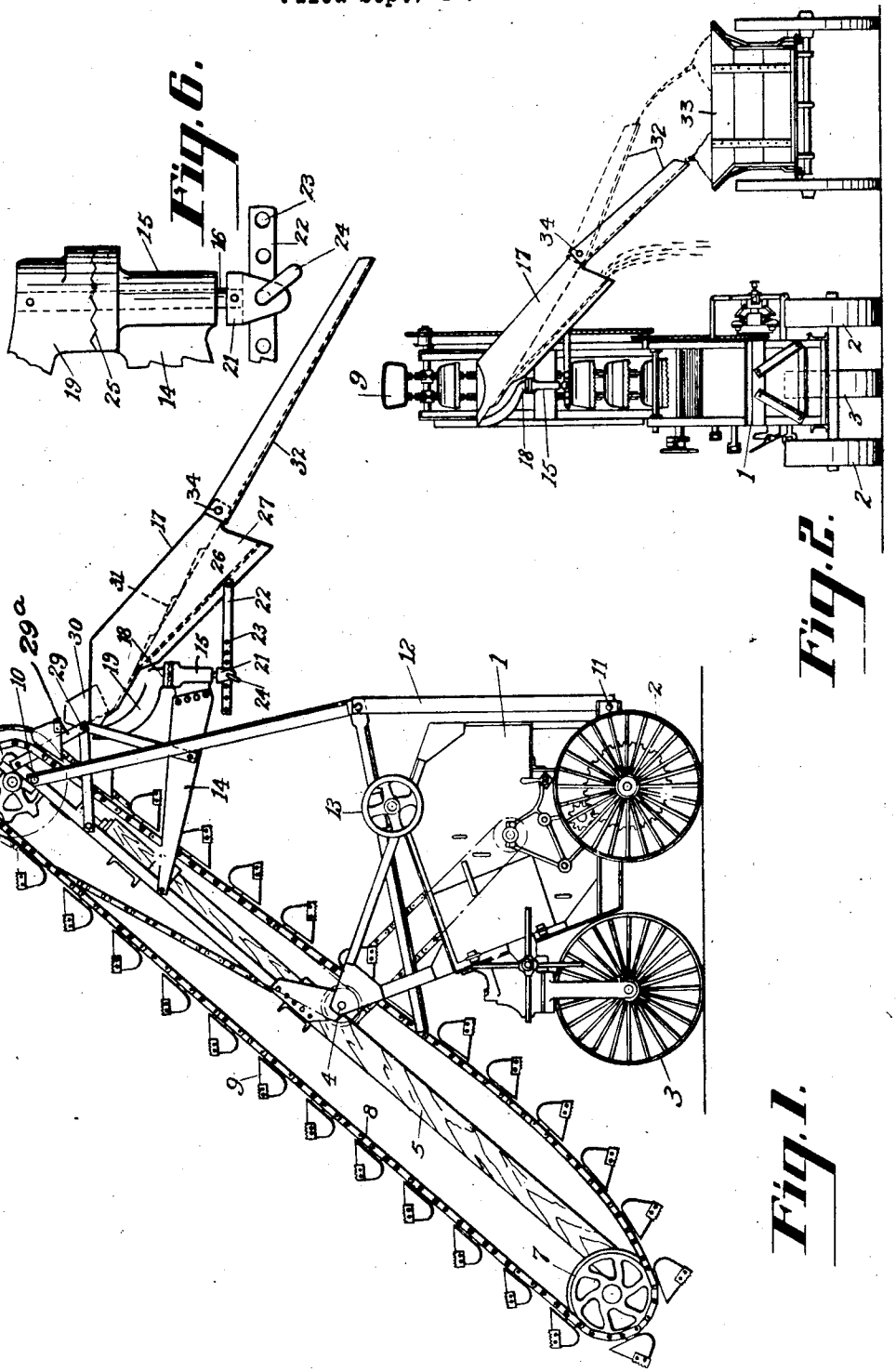


Fig. 6.

Fig. 2.

Fig. 1.

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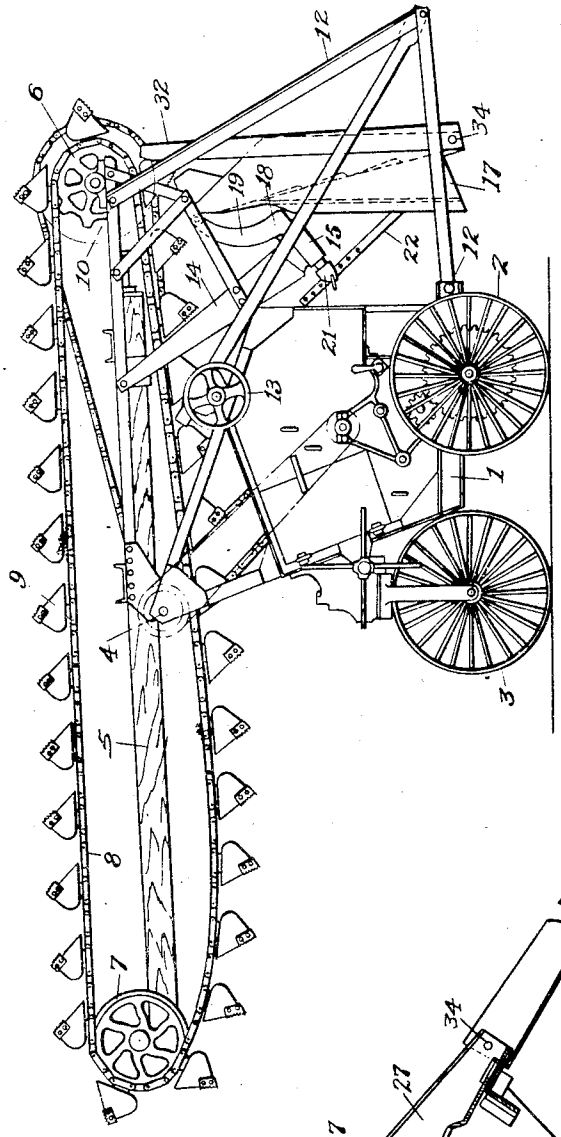


Fig. 3

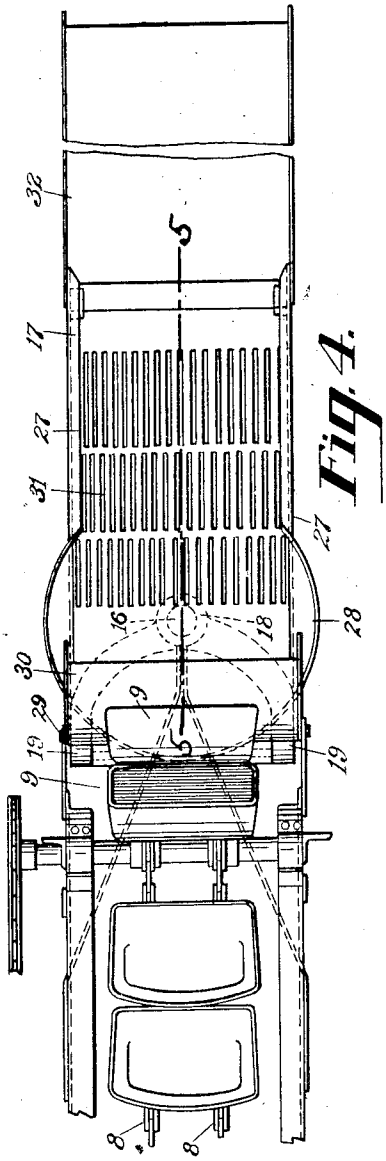


Fig. 4.

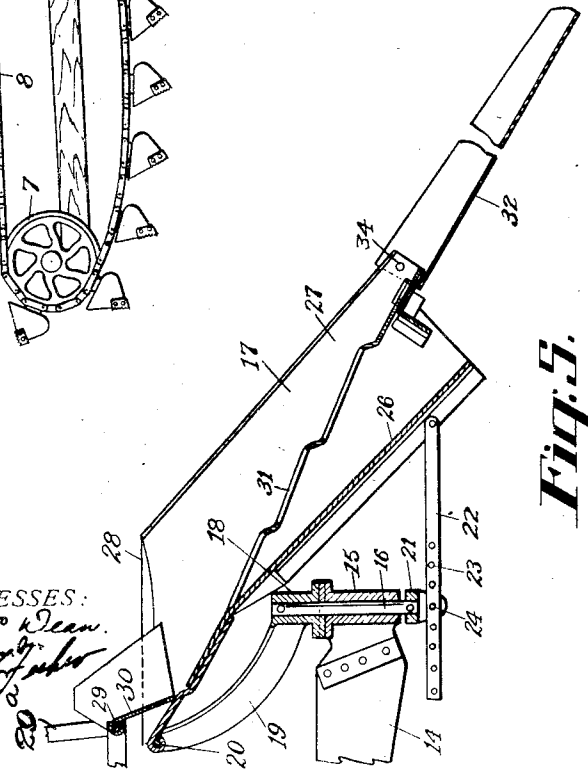


Fig. 5.

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UNITED STATES PATENT OFFICE.

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LOADING APPARATUS.

Application filed September 17, 1920. Serial No. 410,968.

The present invention relates to certain new and useful improvements in loading apparatus, and especially to that type of loading apparatus which is adapted to reclaim material from a storage pile or natural deposit and deliver it to conveniently placed receptacles for transportation.

The especial object of this invention is to provide, in a machine of the class described, means to classify the reclaimed material, to load a selected portion, and to reject the residue.

A further object is to provide, in a machine of the class described, adjustable delivery devices whereby material may be delivered into receptacles at any one of several positions about the machine.

The means by which I attain these objects are fully set forth in the following specification, reference being had to the accompanying drawings of which—

Fig. 1 is a side elevation of the preferred embodiment of my invention adjusted to operative position.

Fig. 2 is a rear elevation of the machine illustrated in Fig. 1 arranged to deliver material to a wagon placed at one side of the machine.

Fig. 3 is a side elevation of the machine illustrated in Fig. 1 adjusted for traveling from one location to another.

Fig. 4 is a fragmentary plan view of the delivery end of my machine.

Fig. 5 is a longitudinal section taken along the line 5—5 of Fig. 4.

Fig. 6 is an enlarged detail of the pivotal support for the delivery chute.

Like numerals refer to similar parts in the several figures.

In the drawings the numeral 1 indicates a main supporting frame which is mounted upon the traction wheels 2 and the steering or guiding wheel 3. Pivotally mounted upon a horizontal axis 4 on the main frame is an elevator comprising an elongated frame work 5 at the ends of which are mounted the head sprocket wheels 6 and the foot wheels 7. Around the wheels 6 and 7 travel the endless chains 8 to which are attached elevator buckets 9 adapted to gather material as they pass around the foot wheels 7 and discharge it as they pass around the head wheels 6. Pivotally connected at 10 with the elevator frame 5, and at 11 with the supporting frame 1, is a system of toggle levers 12 connected by suitable mechanism with the hand wheel 13 by the manipulation of which the elevator frame may be swung to the inclined operative position illustrated in Fig. 1, or to the horizontal traveling position illustrated in Fig. 3. The supporting frame 1 constitutes a housing in which is mounted the power devices for the actuation of the machine, and suitable transmission devices are provided to connect these power devices with the several elements of the machine and to control the operation of these devices. As the machine above described is fully set forth in my Patent No. 1,398,195, November 22, 1921, application filed February 3rd, 1920, and as the details of its construction form no part in the present invention, further description of them at this time is not thought to be required.

Attached to the elevator frame 5 is a rearwardly extending bracket 14 which supports, in the central longitudinal vertical plane of the machine, a journal bearing 15 arranged to assume a substantially vertical position when the elevator is adjusted to its inclined operative position. The bracket 14 may be braced and held by truss rods as shown. A shaft 16 journaled in the bearing 15 affords a pivot about which the delivery chute 17 may be turned to deliver material received from the elevator to receptacles placed at any one of several positions about the machine. Rigidly secured to the upper end of the shaft 16 is a carrier 18 having upwardly extending arms 19 to the ends of which are secured the hinge rod 20 on which the upper end of the chute 17 is pivotally supported. To the lower end of the shaft 16 is fixed a collar 21 arranged to limit upward movement of the shaft 16. Formed in the collar 21 is a transverse slot in which is slidable the thrust rod 22. The rod 22 is pivotally connected to the chute 17 near its lower end and is provided with a series of apertures 23 any one of which

may be engaged by a coupling pin 24 extending through a suitable aperture in the collar 21, affording means to adjust the angle of the chute 17 relative to the shaft 16. Formed on the upper face of the journal bearing 15 and on the lower face of the carrier 18 are co-operating, radially extending, corrugations 25 having gently inclined abutting surfaces adapted to slide upon each other with sufficient freedom to permit convenient adjustment of the angular relation of the chute 17 about the pivot shaft 16, while affording a sufficient resistance to such rotary movement as to counteract the tendency of the chute to swing in the wind or by the vibration of the machine.

The chute 17 is formed of the bottom plate 26 and side plates 27 and is shaped at its upper end to form a circular hopper 28 or material receiving portion adapted to receive material from the buckets 9 as they pass around the head wheel 6. Attached to the bracket 29ª, which is built upon and projects rearwardly from the upper end of the conveyor frame, is a transverse hinge rod 29 upon which is supported an apron 30, closely approaching the path of the elevator buckets, and over-lapping the sides of the hopper to guard against the spilling of material between the buckets 9 and hopper 28. 31 is a screen attached to the side plates 27. It will be seen that the apron or material directing portion 30 projects into the hopper or enlarged receiving portion 28, so as always to direct the material to the chute. The enlarged hopper end 28 of the chute permits the chute to be radially adjusted relative to the apron 30 without interference. The apron or material directing member 30 is hinged, as shown on the horizontal pivot 29, so as to permit its swinging in vertical planes to accommodate itself to the vertically adjusted positions of the chute. It will be observed, further, that the relation of the parts is such that the part 30 automatically accommodates itself to any position of vertical adjustment that may be given to the chute. For the purpose of illustration I have shown a screen of the well known type adapted to screening coal, sand, gravel, etc., comprising a stepped metal plate perforated with elongated longitudinal slots. but it is to be understood that any preferred type of screen may be used which is adapted to the characteristics of the material to be loaded. The screen 31 is arranged to receive the material from the hopper 28, pass the finer particles through to the bottom plate 26 and deliver the oversized material onto the extension chute 32. The extension chute 32 is attached to the side plates 27, by the hinge bolts 34, and may be arranged to receive and conduct material from the screen 31 when the elevator is in the operative position shown in Fig. 1 or it may be folded upon the chute 17 when said elevator is in the traveling position illustrated in Fig. 3.

When the above described machine is used to reclaim material from a relatively shallow pile upon the ground, and load it into a wagon 33, it may be necessary to advance through a considerable distance in order to secure the desired amount of material. In such case the delivery chute 17 may be turned to substantially a right angle with the longitudinal lines of the machine and the wagon 33 placed at one side so as to advance with the machine during the loading operation. If fine material is to be loaded the wagon may be placed so close to the machine that it will receive the material from the bottom plate 26 while the over sized material will be carried beyond the wagon bed by the extension chute 32. If, on the other hand, larger material is to be loaded, the wagon will be placed at such a distance from the machine as to receive the material from the extension chute 32 and avoid material from the bottom plate 26.

When gathering material from a high storage pile, or from a natural deposit such as a sand or gravel bank, the forward movement of the gathering end of the elevator may be relatively small, or in a curved path extending transversely of the longitudinal lines of the machine. In such cases it may be more convenient to position the wagon at the rear of the machine. The chute 17 may be turned to the appropriate angle to permit the placing of the wagon in any desired position, and the intermeshing corrugations of the bearings 15 and carrier 18 will maintain said chute in the desired position of adjustment.

As the loading progresses an operator stationed upon the wagon may move the chute 32 either horizontally about the vertical axis 16 or vertically about the horizontal axis 34 to direct the flow of material thereby distributing the load to any desired portion of the wagon bed irrespective of the relative position or movements of the loading machine and wagons.

What I claim is:

1. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute angularly adjustable in a horizontal plane relative to said conveyor to receive material therefrom, and an interlocking connection between said chute and a fixed part of the machine normally locked by the weight of said chute to maintain the chute in any predetermined position of adjustment.

2. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute pivotally mounted and angularly adjustable in a hori-

zontal plane relative to said conveyor to receive material therefrom, and an interlocking connection between said pivotally mounted chute and a fixed part of the machine normally locked by the weight of said chute to maintain the chute in any predetermined radial position of adjustment.

3. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute to receive the material from said conveyor, a vertical pivot mounting for said chute, and an interlocking connection between said pivot mounting and a fixed part of the machine normally locked by the weight of said chute to maintain the chute in any predetermined radial position of adjustment.

4. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute to receive material from said conveyor, a vertical pivot mounting for said chute comprising a fixed part of the machine and a relatively rotatable member carried by said chute, and an interlocking connection between said pivot members normally locked by the weight of said chute to maintain the chute in any predetermined radial position of adjustment.

5. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute to receive material from said conveyor, a vertical pivot mounting for said chute comprising a fixed part of the machine and a relatively rotatable member carried by said chute, and an interlocking double ratchet connection between said pivot members normally locked by the weight of said chute to maintain the chute in any predetermined radial position of adjustment.

6. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute to receive material from said conveyor, a fixed pivot sleeve on the machine, a rotatable pivot sleeve carried by said chute, and an interlocking connection between said sleeves normally locked by the weight of said chute to maintain the chute in any predetermined radial position of adjustment.

7. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute to receive material from said conveyor, a fixed pivot sleeve on the machine, a rotatable pivot sleeve carried by said chute, and an interlocking double ratchet connection between the ends of said sleeves normally locked by the weight of said chute to maintain the chute in any predetermined radial position of adjustment.

8. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute to receive material from said conveyor, a fixed pivot sleeve on the machine, a rotatable pivot sleeve carried by said chute, a vertically disposed pivot pin traversing said sleeves, and an interlocking connection between said sleeves normally locked by the weight of said chute to maintain the chute in any predetermined radial position of adjustment.

9. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute to receive material from said conveyor, a fixed pivot sleeve on the machine, a rotatable pivot sleeve carried by said chute, a vertically disposed pivot pin traversing said sleeves, an interlocking connection between said sleeves normally locked by the weight of said chute to maintain the chute in any predetermined radial position of adjustment, and an adjustable connection between the lower end of said pivot pin and said sleeve to adjust said chute in a vertical plane.

10. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute pivotally mounted and angularly adjustable in a horizontal plane relative to said conveyor to receive material therefrom, an interlocking connection between said chute and a fixed part of the machine normally locked by the weight of said chute to maintain the chute in any predetermined position of adjustment, and means to adjust said chute in a vertical plane.

11. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute pivotally mounted and angularly adjustable in a horizontal plane relative to said conveyor to receive material therefrom, an interlocking connection between said chute and a fixed part of the machine normally locked by the weight of said chute to maintain the chute in any predetermined position of adjustment, and means extending radially from said pivotal point to adjust said chute in a vertical plane.

12. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute angularly adjustable in a vertical plane relative to said conveyor to receive material therefrom, and a non-rotatable vertically adjustable material directing means between said conveyor and said chute and having its weight imposed upon said chute to partake of the vertical movement thereof.

13. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute angularly adjustable in horizontal and vertical planes relative to said conveyor to receive material therefrom, and a non-rotatable vertically adjustable material directing means between said conveyor and said chute, and having its weight imposed upon said chute to partake

of vertical movement thereof while permitting independent horizontal movement of said chute.

14. In a machine of the class described, the combination of a supporting frame, a conveyor on said frame, a chute angularly adjustable in horizontal and vertical planes relative to said conveyor to receive material therefrom, and a nonrotatable vertically adjustable material directing means pivoted on a horizontal axis between said conveyor and chute and having its free end resting upon said chute to partake of vertical movement thereof while permitting independent horizontal movement of said chute.

15. In a machine of the class described, the combination with a wheel supported frame, of a longitudinally extending conveyor supported upon said frame and adapted to gather material from points in advance thereof and convey it rearwardly to elevated discharge points, a chute pivotally mounted upon said frame and adapted to receive material from said conveyor and discharge it laterally and rearwardly of the machine, and means made effective by its weight tending to retain said chute in one of several predetermined radial positions relative to its pivot.

16. In a machine of the class described, the combination with a wheel supported frame, of a longitudinally extending conveyor supported upon said frame and adapted to gather material from points in advance thereof and convey it rearwardly to elevated discharge points, a chute pivotally mounted upon said frame and adapted to receive material from said conveyor and discharge it laterally or rearwardly of the machine, and means associated with said pivot and made effective by the weight of said chute tending to retain said chute in one of several predetermined radial positions relative to said pivot.

17. In a machine of the class described, the combination with a wheel supported frame, of a longitudinally extending conveyor supported upon said frame and adapted to gather material from points in advance thereof and convey it rearwardly to elevated discharge points, a hopper pivotally supported upon said frame adapted to receive material from said conveyor and having a chute through which material may be discharged, and means associated with the pivotal support and made effective by the weight of said hopper tending to retain said chute in one of several predetermined directions laterally or rearwardly of the machine.

18. In a machine of the class described, the combination with an elevating conveyor, of a support mounted for rotation about a vertical axis adjacent the delivery end of said conveyor, a chute mounted for rotation about a horizontal axis on said support and in position to receive material from said conveyor, and means to hold said chute in any preferred angular relation with the vertical axis of said support.

19. In a machine of the class described, the combination with an elevating conveyor, of a support mounted for rotation about a vertical axis adjacent the delivery end of said conveyor, a chute mounted for rotation about a horizontal axis on said support and in position to receive material from said conveyor, means made effective by its weight to hold said chute in any preferred angular relation with the vertical axis of said support, and a spout arranged to receive material from said chute and adapted to vertical angular adjustment relative thereto.

20. In a machine of the class described, the combination with an elevating conveyor, of a support mounted for rotation about a vertical axis adjacent the delivery end of said conveyor, a chute mounted for rotation about a horizontal axis on said support, and a spout hinged to said chute and adapted to vertical angular adjustment relative thereto.

21. In a machine of the class described, the combination with an elevating conveyor, a chute pivotally mounted upon said frame and adapted to receive material from said conveyor and discharge it laterally or rearwardly of the machine, and a spout arranged to receive material from said chute and adapted to vertical angular adjustment relative thereto.

22. In combination a distributing chute pivotally mounted for rotation about a vertical axis in position to receive the material to be distributed, and a spout hinged to said chute to receive material therefrom and adapted to vertical angular adjustment relative thereto.

23. In combination a distributing chute pivotally mounted for rotation about a vertical axis in position to receive the material to be distributed, means to adjust the angular relation between said chute and its vertical axis, and a spout hinged to said chute to receive material therefrom and adapted to vertical angular adjustment relative thereto.

24. In a machine of the class described, the combination with a wheel supported frame, of a longitudinally extending conveyor supported upon said frame and adapted to gather material from points in advance thereof and convey it rearwardly to elevated discharge points, a chute pivotally mounted upon said frame and adapted to receive material from said conveyor and discharge it laterally or rearwardly of the machine, and means made effective by its weight tending to move said chute into and retain it in one of several predetermined radial positions relative to its pivot.

25. In a machine of the class described,

the combination with a wheel supported frame, of a longitudinally extending conveyor supported upon said frame and adapted to gather material from points in advance thereof and convey it rearwardly to elevated discharge points, a chute pivotally mounted upon said frame and adapted to receive material from said conveyor and discharge it laterally or rearwardly of the machine, and means made effective by its weight associated with said pivot tending to move said chute into and retain it in one of several predetermined radial positions relative to said pivot.

In testimony whereof I affix my signature.

WILLIAM K. LIGGETT.