B. M. STEELE.

PORTABLE GRAIN ELEVATOR.

APPLICATION FILED APR. 13, 1907.

1,162,817.

Patented Dec. 7, 1915.

3 SHEETS—SHEET 1.

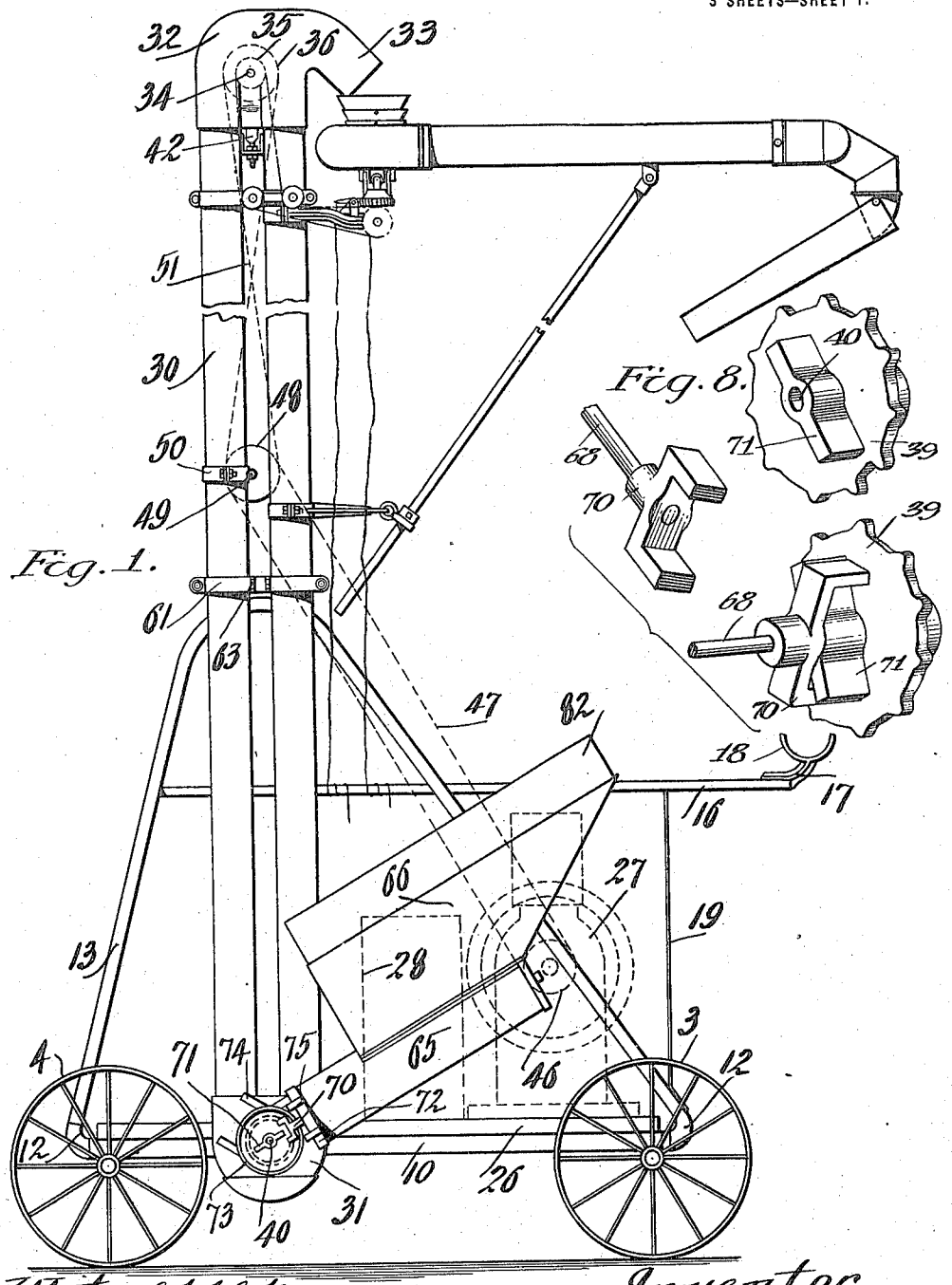

Fig. 1.

Fig. 8.

Witnesses:
Miles B. Fuller
J. M. Anderson.

Inventor.
Benjamin M. Steele
By Chas. H. LaPorte Atty.

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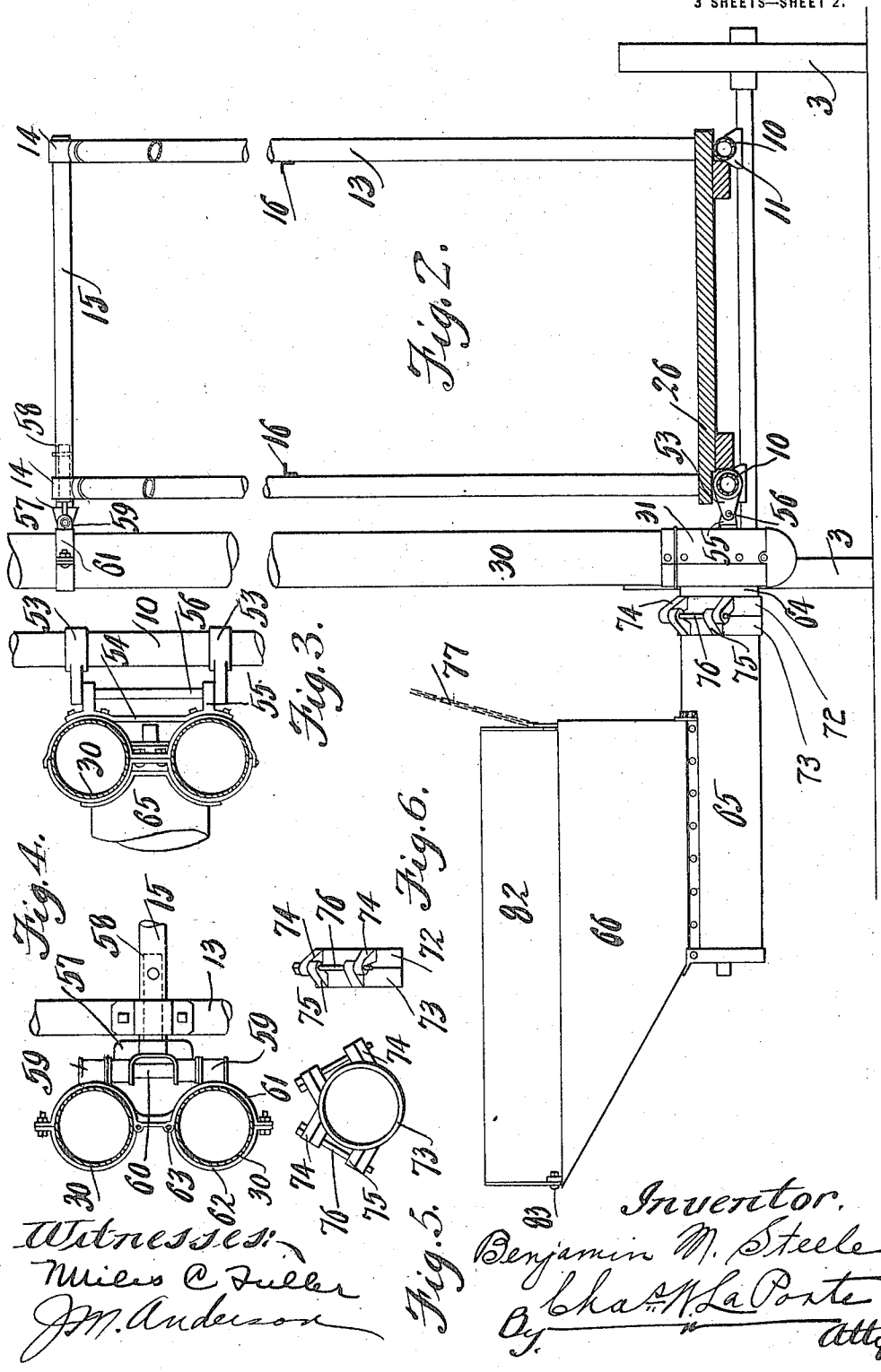

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Miles C. Fuller
J. M. Anderson

Inventor.
Benjamin M. Steele
By Chas. A. LaPorte
Atty.

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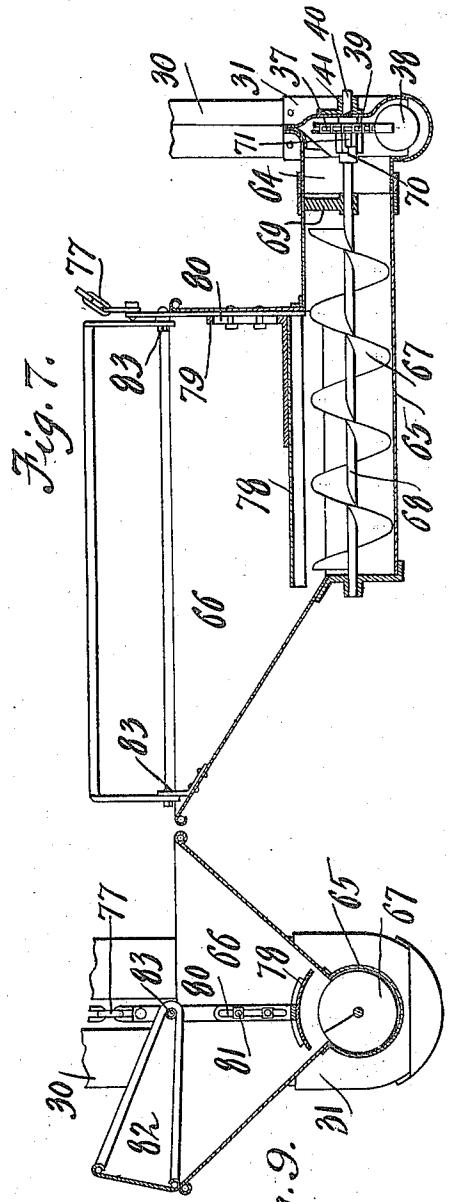

Fig. 7.

Fig. 9.

Witnesses:-
Miles & Fuller
J. M. Anderson

Inventor.
Benjamin M. Steele
By Chas. W. La Ponte
Atty.

UNITED STATES PATENT OFFICE.

BENJAMIN M. STEELE, OF PEORIA, ILLINOIS.

PORTABLE GRAIN-ELEVATOR.

1,162,817. Specification of Letters Patent. Patented Dec. 7, 1915.

Application filed April 13, 1907. Serial No. 368,063.

To all whom it may concern:

Be it known that I, BENJAMIN M. STEELE, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Portable Grain-Elevators; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to a portable grain elevator, relating more particularly to that type of portable elevating devices where grain, seeds and other ground substances are loaded from a wagon into cars or into a granary.

One of the objects of the invention is to construct a portable elevator for the expeditious and economical handling of grain, seeds, and ground substances, as well as for other materials in bulk, wherein is provided a portable support on which may be hinged an elevator to the lower end of which is adapted to be connected a hinged conveyer to have a clutch connection with the conveying means of the elevator, and a swinging conveyer having its receiving end supported below the discharge spout of the elevator and to means for locking the position of said swinging conveyer when once the same has been adjusted with respect to the direction in which it is adapted to convey material received from the elevator.

The invention has for its further object the provision of an elevator to which at its lower receiving end is hinged a conveyer, said conveyer adapted to have a clutch connection with the lower end of the conveying means of said elevator; the hinged connection between the conveyer and elevator being such that said conveyer may be lifted to either side of said elevator from a horizontal position to a diagonally upward position.

For a further and full description of the invention herein and the merits thereof, and also to acquire a knowledge of the details of construction of the means for effecting the result, reference is had to the following description of the drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation of my improved portable elevator, showing the conveyer swung into a position diagonally upward; Fig. 2 is a sectional end view partly broken away of the portable support showing an edge view of the elevator and a side view of the conveyer hinged thereto, the conveyer extending horizontally and at right angles from the lower receiving end of the elevator, the position in which said conveyer will be placed when receiving material from a wagon to be conveyed to the elevator; Fig. 3 is a sectional detail in plan showing the manner of connecting the lower end of the elevator to the portable support; Fig. 4 is a sectional detail in plan showing the hinged connection between the elevator and said portable support; Figs. 5 and 6 show face and edge views respectively of a hinged connection between the feeding conveyer and the elevator; Fig. 7 is a vertical and longitudinal sectional view of the feeding conveyer and receiving hopper supported thereby, also showing the connection between the auger feed of the conveyer and the carrier of the elevator; Fig. 8 is a perspective view of the clutch parts disengaged and engaged; Fig. 9 is a transverse section through the feeding conveyer and hopper supported thereby.

Like numerals of reference indicate corresponding parts throughout the figures.

The portable support to which reference has been made comprises front and rear axles 1 and 2 which are preferably tubular in cross section and on the outer ends of which are carried the ground wheels 3 and 4 to adapt said support to be very easily transported from place to place.

10 denotes a pair of rods, preferably tubular in cross section which are suitably spaced apart, as shown in Fig. 3, and extend from axle to axle of said portable support being suitably secured thereto by means of the brackets 11. To the opposite ends of said rods 10 are suitably secured couplings 12 to which are connected the arched frames 13 which are made preferably from tubular rods; said arched frames being of the height and shape best seen in Fig. 1. To the arches of the frames 13 are secured brackets 14 which form a bearing for the opposite ends of a tubular rod 15, to which, as will be described, is attached a hinged connection for the elevator to be hereinafter more particularly referred to.

Suitably secured to the frames 13, prefer-

ably in the positions seen in Fig. 1 are angle iron bars 16 which extend forwardly of said portable support to a suitable point and to their forward ends are secured brackets 17 provided with the semicircular seat portions 18, for purposes to be described. The outer ends of the bars 16 are braced by the uprights 19 secured at their lower ends to the forward ends of the frames 13 and at their upper ends suitably connected with said bars 16. A housing may be provided for said portable support for the purpose of inclosing a gasolene engine or some similar power mechanism which may be carried on said portable support for imparting power or transmitting motion to the conveying mechanism of the elevator and component parts. In Figs. 1 and 3 the rods 10 support a platform 26, which it is understood forms a part of said housing, and on this platform, particularly in Fig. 1, is shown in dotted lines a gasolene engine 27 and a suitable tank 28. In connection with the said engine and tank there may be provided suitable batteries to complete the gasolene apparatus and hereinafter it will be explained how the gasolene engine is employed for transmitting motion to the elevator and component parts should it be desired to use such an apparatus in lieu of a horse power or similar driving means.

The bars 16, previously referred to, in addition to supporting the brackets 17 are used to support the top of the housing referred to or a covering which is referred to in this instance as 29 serving as a rest for the conveyer when the elevator and component parts have been folded for transportation, as seen in Fig. 2.

The elevator previously referred to is shown consisting of a pair of parallel tubes 30, which may be of any desired height and extensible if it is desired to construct the same in such a manner and the lower ends of said tubes are connected in an end section 31 whereas their upper ends are connected in a head section 32 provided with a discharge spout 33. In the head end 32 is journaled a short shaft 34 on one end of which is carried a sprocket pinion 35 and on the opposite end is carried a pulley 36. On the shaft 34 and within the head 32 is carried a sprocket wheel, not shown, around which travels an endless chain 37 which is best seen in the lower end of the elevator and within the end section 31; this chain travels up through one of the tubes 30 and by means of flights or other suitable carriers 38 elevates material received in the end section 31 and when said material reaches the head section 32 the same is discharged out through the spout 33, the chain and flights continuing on down through the opposite tube 30, for the purpose of receiving material and elevating the same, which operation is continuously carried on so long as power is imparted to the shaft 34. This chain 37 at the lower end of the elevator travels around a sprocket wheel 39 carried on a short shaft 40 which has one end journaled in a bracket 41 secured to the end section 31, as best seen in Fig. 7.

The shaft 34 in the head section 32 may be carried or suitably supported in connection with some suitable chain tightening means for the purpose of producing or taking up slack in the chain 37 and such chain tightening means may consist of a strap 42, only a portion of which is shown in Fig. 1. This strap projects down through the head section 32 and has a threaded end passing through a bracket, nuts being employed for adjustment and locking the position of the strap, as will be understood.

To impart movement to the elevating chain 37 a belt 47 is connected with the pulley 46 on the shaft of the engine 27 and also with a pulley 48 on a short shaft 49 journaled in connection with a strap or bracket 50 secured to one of the tubes 30. Power is transmitted from the shaft 49 to the shaft 34 journaled in the head section of the elevator by means of a belt 51 in connection with a pulley 52, also carried by the short shaft 49 and with the pulley 36 on the shaft 34.

The elevator composed of the tubes 30 has a detachable connection with one of the tubular rods 10 of the portable support and is arranged to have a swingable connection with the rod 15 heretofore referred to as connected with the arch of the frames 13. For detachably connecting the lower end of the elevator or the tubes 30 thereof to the rod 10 I provide the brackets 53 on the rod 10, as shown in plan in Fig. 3, and adapted to be connected with said brackets is a bracket 54 attached to the end section 31, which is provided with the extensions 55 to allow for connecting the bracket 54 with the brackets 53 by means of the pin or short rod 56. When the parts are assembled in the position shown in Fig. 3 the elevator is in a fixed or locked connection with the portable support, but upon disconnecting the stem or rod 56, said elevator may be swung on a hinge which will be described, into the position wherein the elevator and component parts are folded for transportation. For hinging the tubes of the elevator to the rod 15, I have provided the bracket 57 which has a stem 58 adapted to have a telescopic as well as a rotary connection with the rod 15. To this bracket may be connected tubular bearings 59 by means of a stem or short rod 60. The bearings 59 are attached to or formed integral with semicircular sections of a strap 61 which is secured about the tubes 30 by connecting the same with a similar strap 62 which has a pivotal connection at 63 to the strap 61. to

provide for connecting and disconnecting the straps to the tubes; the parts just referred to being seen in Fig. 2 and somewhat better in plan in Fig. 4.

The end section 31 which connects the lower ends of the tubes 30 may be made in any suitable form and of one or more parts as desired, but I have preferred to construct said end section in substantially three parts, two of which partially encircle the lower ends of the tubes and with ends joined together while a cap closes the lower end of the said section. The outside of the two parts forming the end section 31 has attached to or formed integral therewith the circular sleeve or boot 64, best seen in Fig. 7. To this boot or sleeve it is adapted to hinge the feeding conveyer which has been referred to and which will now be described.

The conveyer comprises the substantially circular and elongated trough 65 supporting a hopper 66, preferably of the design and shape shown in Figs. 7 and 9. Rotatably mounted in the circular trough 65 is an auger or screw feed 67, the blades of which may be attached direct to a shaft 68, or to a sleeve secured on the shaft. The outer end of the shaft 68 is journaled in an end section of said trough and the inner end of the said shaft passes through a bracket 69 forming a bearing for the said shaft, which said bracket is secured to the upper wall of said trough, as shown in Fig. 7. On the inner end of the shaft 68 is arranged a clutch member 70 which is adapted to have a clutch connection with a clutch part 71 attached to or formed on the inner end of the short shaft 40. In Fig. 7 the conveyer is in a horizontal position projecting at right angles from the end section 31 with the trough of said conveyer concentric with the axis of the short shaft 40 and the clutch parts 70 and 71 are in clutch engagement whereby if power were transmitted to the elevator chain 37 in the manner hereinbefore described, power would be transmitted through the shaft 40 and the clutch parts just described to the shaft 68; so that any material deposited into the hopper 66 and finding its way into the cross section 65 would be conveyed by the auger or screw 67 into the end section 31 through the boot or sleeve 64 and be gathered up by the flights of the chain 37 and elevated to the head section 32 from which it would be discharged through the discharge spout 33 of said head section. To hinge the conveyer or the trough section thereof to the boot or sleeve 64, I provide the annular rings 72 and 73, the former secured about the outer end of the boot or sleeve 64 and the latter secured about the inner end of the trough section 65, the parts being so arranged that when the trough section is in the position shown in Fig. 7, the inner end thereof would abut with the inner end of the sleeve or boot 64, which would be substantially the same position with the annular rings 72 and 73. The ring 72 is provided with two pairs of lugs 74 which project radially upwardly from said ring as best seen in Figs. 5 and 6, and the ring 73 is provided with two pairs of similarly arranged lugs 75 although they are not spaced quite as far apart, which allows the lugs of the ring 73 to lie in between the lugs on the ring 72 and to have a detachable hinged connection therewith through the agency of stems or short rods 76. When the conveyer is in a horizontal position extending outwardly at right angles from the lower end of the elevator, as shown in Fig. 7, the two rings 72 and 73 may have their lugs connected in the manner shown in Fig. 5 by slipping through the same, the stems or short rods 76, either of which may serve as a hinge on which said conveyer may be swung when it is desired to lift the same out of the way of a wagon which may be driven up along the side of the elevator and then replaced into its horizontal position for dumping or shoveling the load of the wagon into said conveyer for conveying the same to the elevator. In Fig. 1 the conveyer is shown raised up out of the way in one direction, although it is understood that if it is desired and necessary said conveyer may be raised up and out of the way in the opposite direction. To place said conveyer into the position shown in Fig. 1 the stem or short rod 76 connecting the lugs of the rings 72 and 73 on the left side of said rings when looking at Fig. 1 or Fig. 5 is disconnected from said lugs, when the conveyer may be raised up into the position shown in Fig. 1 on the rod 76 on the right side of said rings which serve as a hinge or pintle for connecting the lugs of the two rings in making a complete hinge on which said conveyer may be swung.

Arranging the hinged connection for the conveyer with the elevator in the manner which I have, it will be seen that when the conveyer is raised on either of the stems or rods 76 said conveyer will be moved from a substantially horizontal and right angle position with the elevator upwardly and diagonally from such previous position, releasing the clutch 70 on the shaft 68 from the clutch part 71 on the short shaft 40, which will naturally stop the rotation of the auger 67 and when said conveyer is lowered to its horizontal position with respect to said elevator, the clutch parts just referred to will be again connected regardless of whether the chain of the elevator is being elevated or not.

To sustain the feeding conveyer in the position shown in Fig. 2 and for the purposes of taking the strain off of the connection between said conveyer and the elevator

a chain or cable 77 is provided which is secured to the hopper 66 and at its opposite end secured to the connection between the straps 61 and 62 or in some other manner.

In the hopper 66 is provided a regulator which I have referred to as 78 adapted to overlie that portion of the screw 67 which operates beneath the opening between the hopper and the trough 65 and said regulator is made adjustable vertically for the purpose of controlling the quantity of material which may pass from the hopper into the trough and be conveyed into the elevator. I accomplish this adjustment by attaching or making the regulator integral with a plate 79 which is provided with a vertical slot 80 and through this slot passes bolts 81 for securing the plate to the inner end wall of the hopper, as best seen in Figs. 7 and 9. I also provide in connection with the hopper a shield which is indicated as 82 pivotally connected with the hopper at 83. This shield is adapted to be swung from side to side according to the location of the wagon from which material is being dumped into the hopper, the shield serving to prevent material being discharged over the side of the hopper, as will be understood.

Having thus fully described my invention, what I claim and desire to secure by Letters Patent of the United States, is:—

1. In an apparatus of the character described, the combination of an elevator, having a boot at its lower end, a conveyer having a hinged connection with said boot, and clutch devices connected with said elevator and the conveyer for uniting the same to operate in unison.

2. In an apparatus of the character described, the combination of an elevator comprising upright tubes connected at top and bottom, conveying means in said tubes composed of chains and flights, a conveyer having a hinged connection with the lower end of said elevator, comprising a casing and an auger mounted therein, and clutch devices in connection with said conveying means of the elevator and auger for uniting the parts to operate in unison.

3. In an apparatus of the character described, the combination of an elevator, and a plurality of oppositely disposed obliquely arranged pivotal members carried thereby, a conveyer changeably hinged to said pivotal members and adapted to be raised obliquely upward, and clutch devices in connection with said elevator and conveyer for uniting the same to operate in unison.

4. In an apparatus of the character described, the combination of an elevator, an auger conveyer hinged to said elevator, clutching devices for connecting the elevator and auger, and a hopper supported above and communicating with a portion of said auger.

5. In an apparatus of the character described, the combination of an elevator having an end section, a conveyer coupled at two different points with said end section, either end of which may serve as a hinge to adapt said conveyer to be raised obliquely upward, a hopper supported by said conveyer, and means for regulating the feed of material from the hopper to the conveyer.

6. In a device of the character described, an elevator, a power shaft for driving said elevator, a shaft carried by said elevator and geared to said power shaft, a conveyer pivoted to said elevator and movable to a position to receive the discharge of a wagon, and a drive shaft for said conveyer adapted to engage the shaft carried by the elevator upon moving the conveyer into operative position.

7. In a device of the character described, an elevator, a power shaft for driving the elevator, a laterally swinging conveyer positioned at the lower end of the elevator and gearing adapted to connect the said conveyer and said power shaft upon moving the conveyer into operative position.

8. In a device of the character described, an elevator, a power shaft for driving said elevator, a laterally swinging conveyer pivoted to the lower end of said elevator and movable to a position to receive the discharge of a wagon, a drive shaft for said conveyer, and means operable upon the moving of said conveyer into position for connecting the drive shaft thereof with said power shaft.

9. In a device of the character described, a power shaft, a screw conveyer movable to a position to receive the discharge of a wagon, and means operative upon the moving of said screw conveyer into position for connecting the drive shaft thereof with said power shaft.

10. In a device of the character described, an elevator, a power shaft for actuating the same, a screw conveyer movably secured to said elevator, and means for detachably connecting the drive shaft of said screw conveyer with said power shaft.

11. In a device of the character described, an elevator, a power shaft for actuating the same, a laterally swinging screw conveyer secured to the lower end of said elevator, and means detachably connecting the drive shaft of said screw conveyer and said power shaft.

12. In a device of the character described, an elevator, a power shaft for actuating the same, a laterally swinging screw conveyer pivotally secured to the lower end of said elevator, and movable to a position to receive the discharge of a wagon, and gearing serving to connect the shaft of the screw conveyer and the power shaft when the conveyer is moved to its operative position.

13. In a device of the character described, an elevator provided with an opening in the boot thereof, a power shaft for said elevator, a laterally swinging conveyer trough secured to the lower end of the elevator and movable to a position to receive the discharge of a wagon, one end of said trough being arranged to enter the opening in the elevator boot when the trough is moved to its operative position, a screw mounted in said trough, and means operable upon the moving of said trough into position for connecting said screw with said power shaft.

14. In a device of the character described, an elevator, a power shaft for actuating the same, a conveyer trough pivoted to said elevator and movable to a position to receive the discharge of a wagon, a shaft journaled in one end of said conveyer trough, a screw carried by said shaft, means for supporting the other end of said shaft, and means operable upon the moving of said trough into position for connecting the shaft therein and the power shaft.

15. In a machine of the kind described, the combination with an elevator leg and a conveyer working therein, of a receiving spout pivotally mounted at its inner end in the vicinity of said elevator leg, a conveyer working in said receiving spout, and driving connections for said conveyer arranged to be coupled and uncoupled by pivotal movements of said spout.

16. In a machine of the kind described, the combination with an elevator leg and a conveyer working therein, of an approximately horizontal receiving spout pivotally supported at its inner end in the vicinity of the lower end of said elevator leg, and arranged to deliver thereto when turned to operative position, a hopper on the free end of said spout, a conveyer working in said spout, and a driving connection to said conveyer including clutch members arranged to be engaged and disengaged by pivotal movements of said receiving spout.

17. In a portable grain elevator, the combination of a supporting frame, an elevator carried by the frame, and having a right angular extension, a conveyer pivotally secured to the right angular extension, a hopper adapted to deliver to said conveyer, and means for operably connecting the conveyer with the elevator when the conveyer is moved upon said pivots.

18. In a portable grain elevator, a supporting frame, an elevator, means for driving the elevator, a conveyer for delivering material to said elevator, said conveyer being pivotally secured to the elevator and adapted to swing into and out of operative position with respect thereto, and means carried by the conveyer and engaging means on the elevator for driving the conveyer when same is moved to its operative position.

In testimony whereof I affix my signature, in presence of two witnesses.

BENJAMIN M. STEELE.

Witnesses:
ROBT. N. MCCORMICK,
CHAS. W. LA PORTE.