To all whom it may concern:

Be it known that I, PETER JACOB LYBACK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Concrete Mixers and Spreaders, of which the following is a specification.

This invention has for its principal objects:

1. The provision of apparatus of the character specified adapted to be moved with facility from one place to another, or to be moved slowly along a roadway so as to spread the mixed materials in a substantially even thickness along such roadway; to receive a number of different kinds of materials, and thoroughly mix and discharge them where it may be desired, the entire operation of the machine being practically accomplished with a minimum amount of hand manipulation, at a minimum cost, and with a minimum amount of auxiliary apparatus.

Another object of the invention is the provision of a machine of the character described which will handle materials of all kinds with the greatest facility, insure a thorough mixture thereof, and spread the mixture over large surfaces comprised within the scope of the operation of the machine.

The above as well as such other objects as may hereinafter appear, are attained by means of a construction which I have illustrated in a form of the machine adapted for the purpose of mixing and spreading concrete, in the accompanying drawings, wherein:

Figure 1, is a plan view, showing a machine embodying my improvements;

Figure 2, is a side elevation of the machine partly in section;

Figure 3, is a rear elevation of the machine;

Figure 4, is a view showing certain details of the mixing mechanism on a larger scale;

Figure 5, is a cross-sectional view of the details shown in Figure 4;

Figure 6, is a plan view of the means employed for holding and sustaining in position certain parts of the mixing device;

Figure 7, is a view showing certain details of clutch shifting mechanism on an enlarged scale; and

Figure 8, is a side elevation of the parts shown in plan view in Figure 7.

Referring now more particularly to Figures 1, 2, and 3, it will be seen that in carrying out my invention I provide first, a movable body frame-work or truck 1, mounted upon wheels 2, adapted to run upon an ordinary roadway or the uneven surface of the roadbed in the making, and provided with means for driving the movable frame-work, comprising primarily an engine 3, (driven by steam from boiler 4,) which by means of suitable belt 5, drives the countershaft 6, from which, by means of another belt or chain 7, another countershaft 8, is driven, the latter in turn forming means for driving the chain or belt drive 9 and thence the wheels 2, as clearly indicated in Figures 1, and 2.

As a convenient means for throwing the above described wheel driving mechanism into and out of operation I provide a suitable clutch device 10 on the shaft 6, which may be actuated from a convenient hand lever 11, so arranged that it may be readily grasped by the operator when it is desired to disconnect such drive mechanism or to put it into operation to set the apparatus into motion.

The movable truck or frame 1, is constructed with uprights 12-12, carrying cross pieces, 13, and having adjustable pulleys 14, and 15, upon which run the conveyor chains 16, and 17, carrying a series of buckets 18 and 19 respectively. The pulleys 14 and 15 are preferably carried on brackets secured to the uprights as indicated in Figure 3. The conveyor chain 17 passes around a pulley 20 at its lower end (Figure 3), the shaft of which is extended and provided with sprockets driven by the sprocket chains 21 passing up over the sprockets 21 on the shaft 20. The conveyor chain 16 passes around a pulley 20' at its lower end (Figure 3), the shaft of which is extended and provided with sprockets driven by the sprocket chains 20' passing up over the sprockets 20' on the shaft 20. The conveyor chain 16 passes around a pulley (Figure 3), the shaft of which is extended and provided with sprockets driven by the sprocket chains 21 passing up over the sprockets 21 on the shaft 21, such shaft 21 being driven from the shaft 20 by means of the sprocket chain 22 as indicated in Figure 1. The third conveyor op.
erates at right angles to the other two and comprises the chain 24 provided with buckets 25 (Figure 2). The chain passes around the pulleys 23 and 26, the latter of which has its shaft extended and provided with a pair of sprockets driven by chains 26a from the sprockets 26b on the shaft 26, which shaft is driven from the shaft 20 by means of the bevel gears shown in Figure 1. 14a (Figure 1) is a transverse frame member.

Referring now more particularly to Figure 3, it will be observed that I have indicated my improved apparatus, as it stands ready for operation when materials are to be taken for mixing and spreading. Arranged transversely of the frame, as shown in Figures 1, and 3, I provide a movable carrier 27, having a hopper 28, into which the broken stone, or other road material may be fed, said carrier being so disposed that the material carried by it is discharged into the boot 25a, in which the lower ends of the flight of buckets 25, is arranged. On the opposite side of the machine, I arrange transversely of the frame a carrier 29, provided with a hopper 30, into which sand may be fed, said carrier being so disposed that the material carried thereby will be supplied to a boot 19a, in which the lower end of the flights of buckets 19, is arranged. I also arrange on the frame 1, a hopper 31, which acts as a boot for the buckets 16, the said boot being so placed that when material is supplied thereto, such material is taken up by buckets 18.

From Figures 1, and 3, it will be noted that the conveyor 27, is driven from the shaft 33, which in turn is driven by the shaft 21, by means of the gears 36, and 37, mounted respectively on the shafts 21, and 35. The conveyor 29, is driven from the shaft 20, by means of the gears 38, on said shaft, which in turn drives the chain 39, and connected gearing.

The shaft 20, also carries the sprocket 59, which by means of the chain 60, drives the sprocket 61, on the shaft 62, (Figure 1.) On referring particularly to Figures 2, 4, and 6, wherein I have illustrated the details of the mixing apparatus forming part of my present invention, it will be observed that in order to secure opposite rotation on the oppositely revolving series of mixer devices 63, and 64, the members 63, are keyed to the shaft 62, as indicated at 65, and revolve therewith, whereas the members 64, are caused to revolve in an opposite direction by means of interposed bevel gears 65, carried upon a bracket on the shaft 62, and which gears being driven by the members 63, impart movement in an opposite direction to the members 64. It is to be noted that the members 63, and 64, are provided with a plurality of oppositely disposed blades 69 of contours similar to those of plowshares whereby the materials are shifted from one set of blades to the next opposing set and a thorough maceration and admixture of such materials secured.

As will appear from Figures 4, and 6, each bevel gear 65, is mounted upon an upright spindle 66, carried by a bracket 67, encircling the shaft 62, and adapted for attachment by flanges 68, to the sides of the trough 70, within which the mixing apparatus operates. Each of the blades 69, on the members 63, and 64, are separated from the adjacent blades a distance sufficient to permit the mixed material from one series of blades to pass to the adjacent set in the direction indicated by the arrow.

It will be noted that the three flights of conveyors carrying the buckets 17, 18, and 25, are all so arranged that they will discharge the material carried by them from their upper ends into the mixing chamber 32, (see Figure 2.) For the purpose of insuring a thorough preliminary mixing of the dry materials, the said chamber 32, is provided with a series of oppositely disposed baffle plates 33--33 arranged with the lower ends of those on each side staggered relatively to those on the other side so that the material after it strikes one of the plates drops upon another thereof, and continues this agitated movement until it reaches the bottom 34, of the chamber 32, when it is discharged into the trough 70, which is supplied with water from a tank 71, by a perforated pipe 71a, and that therefore and in view of the operation of the mixing apparatus as above described a thoroughly mixed mass of concrete ready for spreading and tamping into place will be discharged from the mixer into the chute 72, and thence upon the belt of the discharging conveyor 49.

Referring to Figures 1, 2, and 3, it will be seen that the shaft 20, carries a gear 40, which by means of the chain 41, drives the sprocket 42, and thence the shaft 43, carrying the bevel gear 44, engaging with the gear 45, which in turn drives the train of gears 46, 47, and 48, whereby the discharging conveyor 49, is operated.

Referring to Figures 1, and 2, it will be observed that the shaft 21, carries a sprocket 50, which by means of the chain 51, drives a gear 52, mounted on a shaft 53, carrying at its opposite end a bevel gear 54, driving the gears 55, and 56, and as will more fully appear from Figures 7, and 8, the gears 55, and 56, are mounted loosely on the shaft 57, and respectively carry the clutch jaw members 78, and 79, adapted to engage the opposing jaw members 80, and 81, feathered on the shaft 57. The shaft 57, is provided with a worm 82, engaging the gear 83, which is provided on the conveyor 49, in order that said conveyor may be swung by the rotation of said worm from one side of the machine to the other side thereof. As will appear in
Figures 7, and 8, most plainly, the gear 83, is provided adjacent its ends with upstanding movable stops 84, and 85, adapted respectively to contact with the cooperating stop 86, carried on the bar 87, which is provided with forks 88, and 89, rotatively engaging respectively with slots on the clutch members 80, and 81, whereby the members 78, and 80, may be caused to engage, and 79, and 81, disengage, and vice-versa. The stops 84 and 85 are bolted to the gear 83, a plurality of bolt holes being provided on an arc of a circle as shown in Figure 7, whereby the position of the stops may be varied. By the adjustment of the stops 84, and 85, the movement of the conveyor 49, and the point of the reversal of such movement may be limited as may be desired.

In operating my invention, the engineer stands upon any convenient part of the floor of the frame 1, within convenient reach of the throttle, reversing gear, (not shown) clutch shifting levers, etc., and by regulating the action of the several parts as hereinabove described, and the supply of materials to the hoppers 28, 30, 31, etc., is enabled to completely control the mixture and the spreading of the materials mixed, and the depth to which such materials are spread, etc.

For use at such times as it may be desired to move the machine from place to place without at the same time driving the conveyers and mixing apparatus, I provide as a convenient means for throwing the driving mechanism for such parts of the machine into and out of operation, a suitable clutch device 90, which may be actuated from a convenient hand lever 91, so arranged that it may be readily grasped by the operator when he desires to disconnect the drives between the shafts 10 and 20. When so moving the machine, the conveyers 27, 29, and 49, are preferably raised, to a substantially vertical position, parallel to the sides of the machine, instead of being allowed to slide or drag along the roadway on the shoes 92, and 93.

It will be apparent that by varying the sizes of the sprockets driving the conveyers 16, 17, and 24, their rate of movement, and consequently the amount of material carried by them to the mixer may be varied as may be desired. Similarly if the hoppers at the bases of the conveyers are kept full, the relative proportion of the various materials may be readily controlled by varying the rate of movement of the conveyers.

While I have illustrated and described my invention as adapted to the mixing and spreading of concrete upon a roadway, it is obvious that it is adaptable for the mixing or spreading of ballast, fertilizers, and other materials, and by mere adaptation and amplification to mixture or spreading of many other kinds of materials. Such embodiments are comprehended within the scope of my invention, and are intended to be covered by my claims.

Having thus described my invention, and illustrated its use, what I claim as new and desire to secure by Letters Patent is the following:

1. In a portable concrete mixer, a frame, an upright mixing receptacle upon the frame, a plurality of receiving boots mounted upon the frame adjacent the lower portion of the mixing receptacle, upright conveyers with their lower ends in the boots and with their upper ends in position to discharge into the mixer, and downwardly and laterally extending pivoted conveyers with receiving hoppers at their lower ends adjacent the ground and having their upper ends in position to discharge into the boots.

2. In a portable concrete mixer, a frame, an upright mixing receptacle upon the frame, a plurality of receiving boots mounted upon the frame adjacent the lower portion of the mixing receptacle, upright conveyers with their lower ends in the boots and with their upper ends in position to discharge into the mixer, downwardly and laterally extending pivoted conveyers with receiving hoppers at their lower ends adjacent the ground and having their upper ends in position to discharge into the boots, and means whereby the speed of the upright conveyers may be adjusted independently of each other.

3. An apparatus of the class described, comprising in combination a movable truck, a device for mixing material on said truck, a discharge conveyer for said mixing device adapted to swing from side to side, driving means for swinging the conveyer back and forth, and automatic means for securing the reversal of the driving means when the conveyer reaches its extreme positions.

4. In an apparatus of the class described, a mixing device comprising a shaft, means for rotating said shaft, a series of mixer members carrying a plurality of plates, on said shaft and revolving therewith, and a second series of mixer members on the shaft, and means whereby the second series of members are rotated in a direction opposite to that of the first set.

5. In an apparatus of the character described, a mixing device comprising a shaft, means for rotating the shaft, a series of mixing members mounted for rotation upon the shaft, and means whereby the adjacent members of the series are moved in opposite directions and alternate members in the same direction.

6. In an apparatus of the class described, a mixing device comprising a shaft, means for rotating said shaft, a series of mixer members carrying a plurality of plates, on said shaft and revolving therewith, a second series of mixer members, provided with op-
positely disposed plates, the said second set of mixer members being likewise mounted on said shaft, and arranged to rotate in an opposite direction, and a pinion interposed between each opposing pair of members of the first and second series whereby the two series are caused to rotate in opposite directions.

In testimony whereof, I have hereunto signed my name in the presence of the two subscribed witnesses.

PETER JACOB LYBACK.

Witnesses:

JANE CARPENTER,
R. W. HICKS.