C. T. THORSSELL & N. K. E. MALMSTEN.

GEARING.

APPLICATION FILED NOV. 10, 1910.

1,030,034.

Patented June 18, 1912.

Fig. 1.

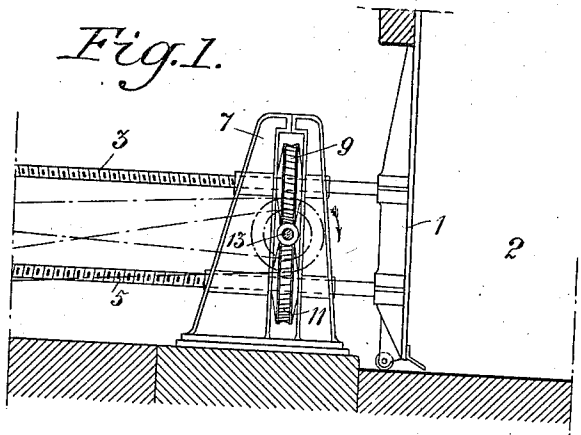


Fig. 2.

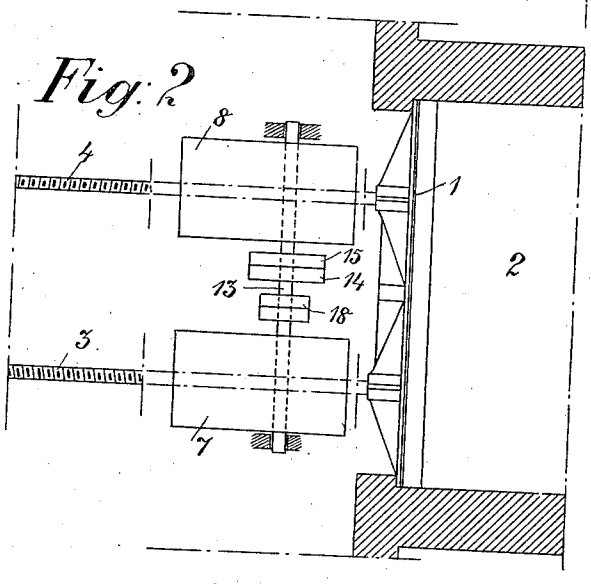
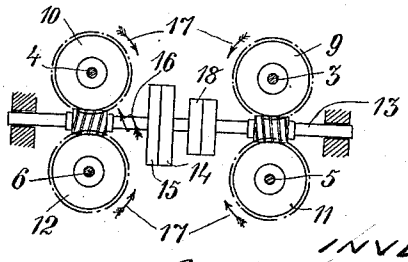


Fig. 3.



WITNESSES

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GEARING.

1,030,034. Specification of Letters Patent. Patented June 18, 1912.

Application filed November 10, 1910. Serial No. 591,536.

To all whom it may concern:

Be it known that we, CARL THEODOR THORSSELL and NILS KRISTIAN EMIL MALMSTEN, subjects of the King of Sweden, residing at Malmö, Sweden, have invented new and useful Improvements in Gearing, of which the following is a specification.

This invention may be applied to various kinds of driving mechanisms where it is desired to convey material by means of screws, but is described merely as applied to superphosphate chambers where the chamber is emptied by pushing the whole block of superphosphate toward the outlet of the chamber by means of a vertical shield or plate actuated by horizontal screws.

In carrying out our invention we construct the chamber provided with a shield of the same breadth as the chamber and having its lower edge resting directly or through the medium of small rollers on the floor and we prefer so to provide that the shield forms the rear wall of the chamber. The shield may be acted upon by only one screw arranged centrally behind it, which screw is pressed forward, without rotating, by means of a rotating nut. By this construction, however, the shield is very liable to yield on account of the high and often non-uniform pressure from the block of superphosphate so that the screw tends to bind or become bent and it has therefore been found necessary to apply more than one screw. Thus it would seem appropriate to use three screws arranged in a triangle but such an arrangement would be unsuitable inasmuch as it is impossible to eliminate the lateral pressures from the mechanism driving the screws. In order to avoid this inequality of pressure we apply to the shield four screws arranged in a rectangle and thus obtain the object of the invention.

In the accompanying drawings illustrating the invention, Figure 1 is a front elevation of the driving mechanism applied to a superphosphate chamber having a vertical slidable shield. Fig. 2 is a plan of the same, and Fig. 3 shows the actuating mechanism seen from behind.

The shield 1 rests on the floor of the chamber 2 and is acted upon by the four parallel and horizontal screws 3, 4, 5 and 6. Of these the upper one 3 at the one side has a right-handed and the upper one 4 a left-handed thread. Each of the two lower screws is threaded in the same way as that diagonally opposite. The forward ends of the screws are carried in suitable brackets or the like on the shield and they rest in bearings on two supports 7 and 8. Each screw is provided with a nut constituting the central portion of a worm wheel 9, 10, 11, 12 which engages in a worm on the shaft 13, journaled in the supports at right angles to the screws and intermediate between the upper and lower screw. A fast and a loose pulley 14 and 15 are mounted on the shaft 13 for causing this to rotate in the direction indicated by the arrow 16 in Fig. 3. Thus the worm wheel will rotate in the directions indicated by the arrows 17 so that each wheel will rotate in the direction opposite to the adjacent wheels and that above or beneath it, and the four screws are driven toward the chamber and press the shield 1 against the block of superphosphate. Another set of fast and loose pulleys 18, in this case preferably of smaller diameters than the pulleys 14, 15, is mounted on the shaft 13 for causing the shaft to rotate in the opposite direction with greater velocity so that the shield may be brought back to the rear wall in a comparatively short time.

In applying this invention to apparatus other than that used for emptying superphosphate chambers a construction similar in all respects to that described may be employed.

An important advantage of the arrangement described and illustrated in the accompanying drawing is due to the fact that the pressures on the worm gears entirely neutralize one another so that the mechanism is not subjected to strains in any direction. This cannot be accomplished by using a smaller number of screws than four or by arranging them in any other way. The worm shaft 13 may also be arranged vertically between the screws with the same effect, only in either case the mechanism must be so arranged that the pressures on the worm gears neutralize one another. To this end the screws must always be threaded in the direction of rotation of the worm wheels and the threads of the worms.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

In apparatus of the class described, in combination, two pairs of horizontally disposed screws, each pair comprising verti-

cally arranged upper and lower screws, the upper screws of each pair being in the same horizontal plane, one of said upper screws being provided with a left hand thread, and the other of said upper screws being provided with a right hand thread, the lower screws of each pair being in the same horizontal plane, one of said lower screws being provided with a right hand thread, and the other of said lower screws being provided with a left hand thread, the upper screw of each pair being threaded in the same direction as the lower screw of the other pair, a rotatable nut upon each screw and engaging the thread thereof, means for preventing said nuts from moving in the direction of the length of the screws, whereby rotation of said nuts will cause said screws to move in a longitudinal direction, and means for rotating said nuts, said parts being so arranged that the nuts associated with the upper screws will rotate in opposite directions, the nuts associated with the lower screws will rotate in opposite directions, and the nut associated with the upper screw of each pair will rotate in the same direction as the nut associated with the lower screw of the other pair.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

CARL THEODOR THORSSELL.
NILS KRISTIAN EMIL MALMSTEN.

Witnesses:
EM. NORDLUND,
T. CHRISTIANSON.