G. N. RAGER.

COMPRESSING MECHANISM.

APPLICATION FILED APR. 11, 1919.

1,394,580. Patented Oct. 25, 1921.

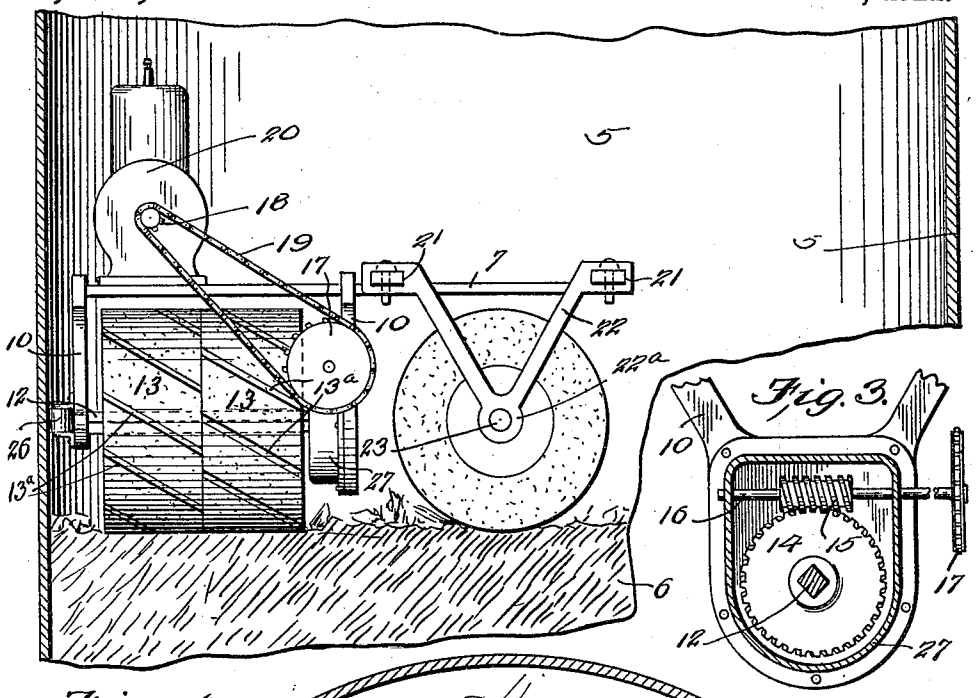


Fig. 1.

Fig. 3.

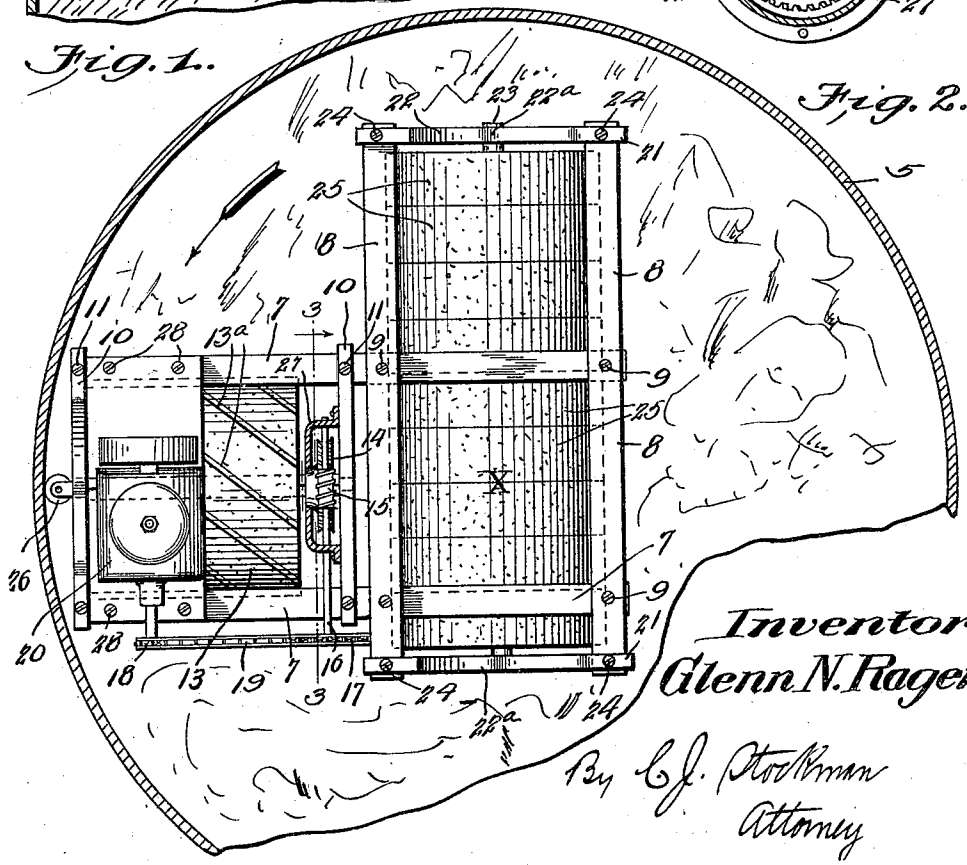


Fig. 2.

Inventor
Glenn N. Rager

By C. J. Stockman
Attorney

UNITED STATES PATENT OFFICE.

GLENN N. RAGER, OF NEAR ROANN, INDIANA.

COMPRESSING MECHANISM.

1,394,580. Specification of Letters Patent. Patented Oct. 25, 1921.

Application filed April 11, 1919. Serial No. 289,341.

To all whom it may concern:

Be it known that I, GLENN N. RAGER, a citizen of the United States, residing near Roann, in the county of Wabash and State of Indiana, have invented certain new and useful Improvements in Compressing Mechanisms, of which the following is a specification.

This invention relates to improvements in that type of compressors which embody rotative packing and guiding elements and a power mechanism, so correlated and combined that in the operation of the compressor the mechanism will automatically rotate about a substantially fixed axis and compress the material within its path. Mechanisms of this general type have been proposed for packing ensilage in silos and its employment for such purpose constitutes a preferred use of the present mechanism. In this type of packing mechanism it has been proposed to employ as the means which engage and compress the ensilage a plurality of drums or rollers having their axes substantially at right angles to each other and to form each drum or roller of a plurality of rotative elements, which are separable from each other and from the frame of the structure to provide for ready assemblage and disassemblage of the parts. The separated parts of such mechanisms may be inserted, through a lower door of the silo, for example, and assembled therein, preparatory to the packing operation and, upon the completion of the packing operation, the mechanism may again be disassembled and the parts separately removed, through an upper door of the silo, for example. While performing their function of packing or compressing the ensilage, the mechanism automatically rotates as before stated, upon the ensilage, about a substantially fixed axis and, being supported by the ensilage, the mechanism rises as the packing operation proceeds, it being understood that fresh supplies of ensilage are delivered to the silo during the packing operation and that the mechanism is supposed to operate substantially continuously to pack the ensilage as fast as it is supplied, the packing or compressing operation commencing at the bottom of the silo and continuing until the silo has been filled to its capacity with the packed ensilage or has received the intended supply of ensilage.

Generally speaking, this invention aims to improve ensilage packing mechanisms of the type set forth in several important respects. More particularly defined, one of its primary purposes is to provide an improved self-contained automatically operating packing means, adapted to be entered through one of the lower doors of a silo and to travel over the upper surface of the ensilage discharged into the silo, rising as the level of the ensilage rises and packing the ensilage so firmly at all points as to prevent the access of air thereto, whereby fermentation of the ensilage is prevented. The invention comprises a structure of the nature indicated that is so constructed as to, of itself, travel about a substantially fixed center, so that the employment of any support or axis in the center of the silo is rendered unnecessary and the ensilage may be as firmly packed at the center of the mass as at any other point. Thus the entry of air to any part of the mass of ensilage is prevented and the wholesomeness of the same is maintained up to the time of use.

A further object of the invention is to provide for an improved drive in a device of the character indicated whereby the action of the packing rollers will be rendered steady, uniform and powerful; and, further, to so combine and correlate the parts as to contribute to compactness and simplicity of construction and to the ease with which the parts may be assembled or disassembled.

With the foregoing general objects in view I have provided a novel construction of ensilage packer comprising a substantially right angular frame, in one part of which a plurality of, preferably, solid and heavy packing rollers, are mounted to revolve about a common axis but independently of each other, while in the other part of the frame are mounted heavy driving and packing rollers having a common axis which lies substantially at right angles to the axis of the first named rollers, the several rollers being so correlated that the axis of the driving and packing rollers will intersect the axis of the packing rollers within the confines of the latter, the axis of turning movement of the mechanism as a whole being about such point of intersection. Hence the packing rollers lie upon each side of such point, whereby the material at the center of the silo will be firmly packed.

The frame carries a gasolene engine, or other suitable motor, connected by a worm

gearing with the driving rollers to impart a steady and powerful motion thereto, which enables the driving rollers to travel over the more or less irregular surface of the ensilage as it is discharged in the usual way into the silo, and to swing the right angular frame around to cause the rollers to further aid in packing the ensilage. The several rollers are preferably made of concrete. The parts are so related that the longitudinal axis of the driving rollers would, if projected, intersect the axis of the freely rotatable rollers, and there would be some of the freely rotatable rollers at each side of said projected axis, as previously stated. Consequently this point of intersection forms a fixed point about which the structure as a whole revolves without the necessity of employing any anchoring means between the silo and the packer.

The foregoing sets forth in general terms the preferred embodiment of the invention and the accompanying figures of drawings illustrate such preferred embodiment in detail.

In the drawing, wherein like reference numerals designate corresponding parts:—

Figure 1 is a fragmentary sectional view of a silo with the packer shown in elevation.

Fig. 2 is a horizontal sectional view of the silo with the packer in plan view; and

Fig. 3 is a detail sectional view illustrating a worm drive hereinafter described.

5 designates a part of the wall of a silo and 6 the ensilage therein. The frame of the compressor includes a plurality of bars 7 and a plurality of bars 8. Bars 7 are disposed at right angles to bars 8 and are connected thereto by pins or like fastenings 9. The bars 7 pass through bearing hangers 10, the latter being connected to said bars by fastenings 11. The bearing hangers 10 constitute a mounting for a main drive shaft 12 which is preferably angular in cross section and engages driving rollers 13. A worm gear 14 is mounted on the shaft 12 and meshes with a worm 15 on a shaft 16. Sprocket wheels 17 and 18 and a sprocket chain 19 provide means for driving worm 15 from a suitable motor 20, as a gasolene engine, for example.

The bars 8 pass through eyes 21 of bearing hangers 22 which are provided with journal bearings 22ª for a shaft 23. The hangers 22 are secured by pins, or like fastening devices 24 to the bars 8. Independent packing rollers 25, are freely rotatable upon the shaft 23 and are so disposed with relation to the driving rollers 13 that some of them lie upon each side of the axis of the driving rollers. Thus it will be seen that there is a point x at which the axes of the driving and the freely rotatable packing rollers intersect and that this point remains substantially fixed during the operation of the packer the remainder of the structure swinging therearound. A bearing roller 26 is carried by one of the hangers 10 and engages the wall of the silo to hold the packer structure in spaced relation to said wall. A housing 27 incloses the worm drive mechanism and protects the same and prevents the ensilage from falling thereinto.

When the silo has been filled it becomes necessary to remove the packer from the top thereof and to lower the same to the ground. The structure herein shown and described is particularly well adapted to permit of this being done with a minimum of trouble. By removing the fastenings 24 the yokes 22 may be slipped from bars 8 and then the rollers 25 may be slipped from shaft 23 and separately lowered. By removing fastenings 11 the left hand bearing hanger (Fig. 2) may be removed from bars 7 and then the rollers 13 may be removed from shaft 12 and separately lowered. By removing fastenings 9 the bars 7 and 8 may be disconnected. By removing fastenings 28 the engine may be removed and lowered as a unit and then the right hand hanger 10 (Fig. 2) may be slipped from bars 7 carrying with it the worm drive and its housing and shaft 12 all of which may remain in assembled relation so that the parts may be quickly assembled again when necessary.

If desired the driving rollers 13 may be provided with cleats 13ª though manifestly this is a matter of choice. It is also apparent that an additional means constituting an attachment to the herein-described packer may be employed to pack the material at the wall of the silo, if considered to be expedient. This additional means or attachment may be a supplemental roller, as has been heretofore proposed in this class of devices. As such roller forms no part of my invention I have considered it to be unnecessary to illustrate it.

While the structure shown efficiently serves the intended purpose it is to be understood that the invention is not limited thereto but that it includes within its scope whatever changes fairly come within either the terms or the spirit of the appended claims.

A distinctive characteristic of the apparatus resides in the fact that, being unrestrained in movement otherwise than by the wall of the silo bounding the area of material to be compressed, it has a tendency through the use of a cylindrical traction roller 13, to progress centrifugally with reference to the center of the bounded area and thus through contact of the guiding or limiting roller 26 with the bounding wall maintain the outermost possible position and path in the confined area, and by having a

packing roller axially disposed at an angle to the axis of the traction roller, or in intersecting relation therewith, and crossing the center of the area, the length of the packing roller being greater than the radius of the area, the movement of the apparatus under the influence of its contained driving means involves a progressive movement of the packing roller over the center of the area, without regard to variations in the diameter of the silo.

Having thus described the invention, what I believe to be new and desire to secure by Letters Patent, and what I therefore claim is:

1. A loose packer of the type indicated for use within a laterally bounded area, having a packing roller and a traction means of which the normal path of the movement is at an angle to the axis of said roller and tangential to the area.

2. A loose packer of the type indicated for use within a laterally bounded area, having a packing roller of a length greater than the radius of the area and a traction roller axially disposed in intersecting relation with that of the packing roller, and having a normal path of movement in centrifugal relation with the center of the area.

3. A loose packer of the type indicated for use within a laterally bounded area, having a packing roller of a length greater than the radius of the area and a cylindrical traction roller axially disposed in intersecting relation with that of the packing roller.

4. A loose packer of the type indicated for use within a laterally bounded area, having a packing roller crossing the center of the area and operating means tending to advance the same centrifugally with relation to the area and restrained and guided by the boundary thereof.

5. In a device of the character described, a frame embodying a pair of spaced bars, a pair of bearing hangers having openings in their upper ends for detachably receiving the spaced bars, removable elements to hold the bars within said openings, a shaft mounted in the hanger bearings, a packing roller carried by the shaft, a driving roller connected with said frame, a motor connected with the frame, and driving connecting means between the motor and driving roller.

6. In a device of the character described, a frame embodying a pair of spaced bars, a pair of bearing hangers provided near their upper ends with openings for detachably receiving the ends of said bars, and near their lower ends with bearings, a shaft having its ends removably held within said bearings, a packing roller carried by the shaft, a second frame connected with the first named frame and extending transversely thereof, a driving roller carried by the second frame, a motor carried by the second frame, and driving connecting means between the motor and driving roller.

7. In a device of the character described the combination with a frame comprising bars arranged in pairs, the pairs overlapping each other at right angles, means for securing the bars together, a pair of bearing hangers traversed by each pair of bars, releasable fastenings for holding the hangers on the bars, a driving shaft mounted in one pair of hangers, a motor on the frame, means for driving the shaft from the motor, a second shaft mounted in the other pair of bearing hangers and a plurality of independently rotatable rollers on the second shaft.

8. In a machine of the character described, a pair of spaced bars, bearing hangers provided at their upper ends with openings to detachably receive the bars, and serving to connect the bars, said bearing hangers being provided at their lower ends with bearings, a shaft having its ends removably held within said bearings, a packing roller carried by the shaft, a second pair of spaced bars extending transversely of the first pair and attached thereto, bearing hangers provided at their upper ends with openings to removably receive the second named bars and provided at their lower ends with bearings, a shaft having its opposite ends removably held within the second named bearings, a driving roller carried by the second named shaft, a motor carried by the second pair of bars, and driving connecting means between the motor and the driving roller.

9. In a device of the character described, a pair of side bars and substantially V-shaped bearing hangers provided at their upper ends with eyes slidably receiving said bars and adapted to be removed from the bars by a movement longitudinally thereof, said bearing hangers being provided at their lower ends with bearings, a shaft having its ends removably mounted within said bearings, and a plurality of rollers mounted upon said shaft to slide longitudinally thereof.

In testimony whereof I affix my signature.

GLENN N. RAGER.