No. 698,566. Patented Apr. 29, 1902.

R. SHIRREFFS.

SNOW COMPRESSING MACHINE.

(Application filed Feb. 23, 1901.)

(No Model.) 2 Sheets—Sheet 1.

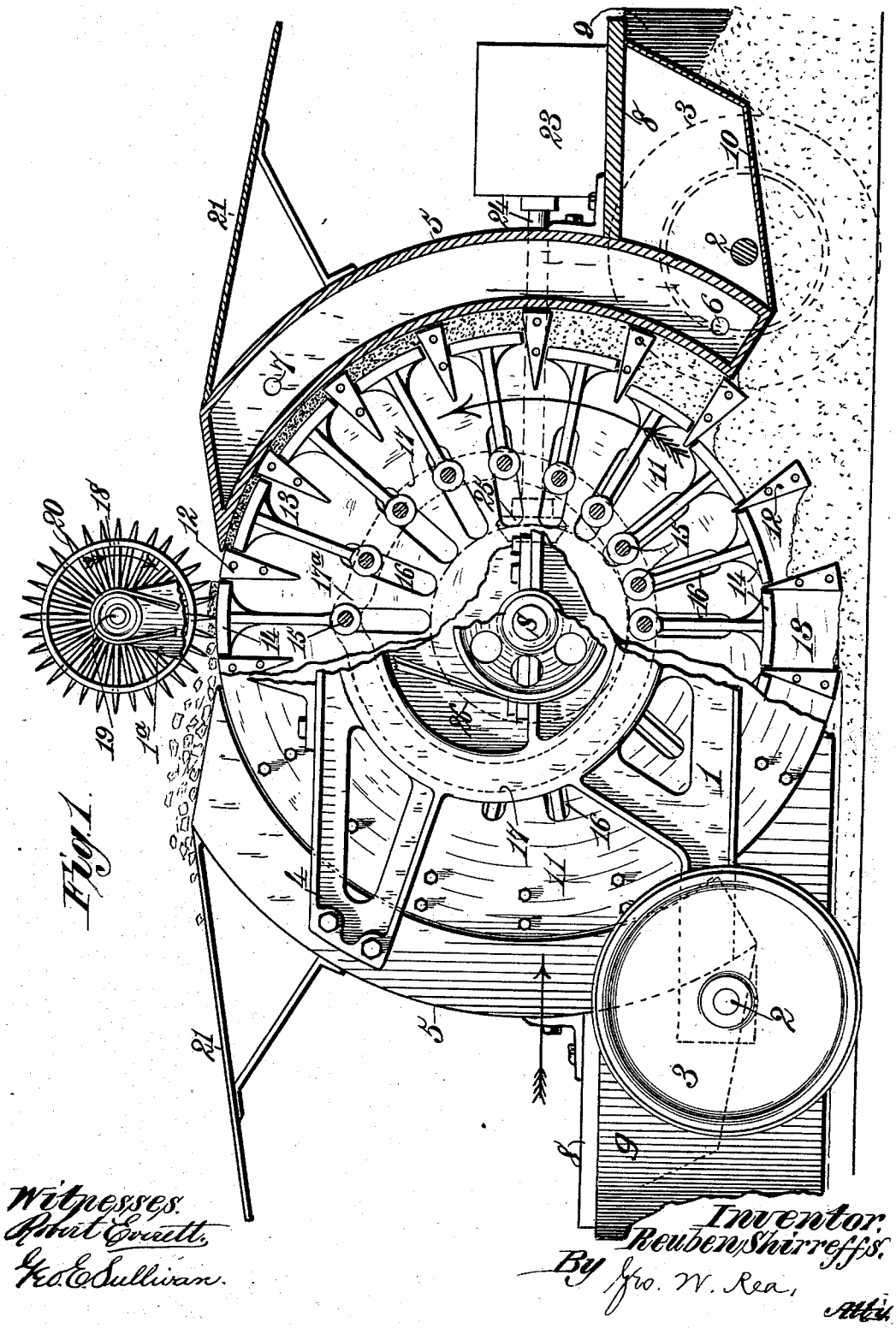


Fig. 1.

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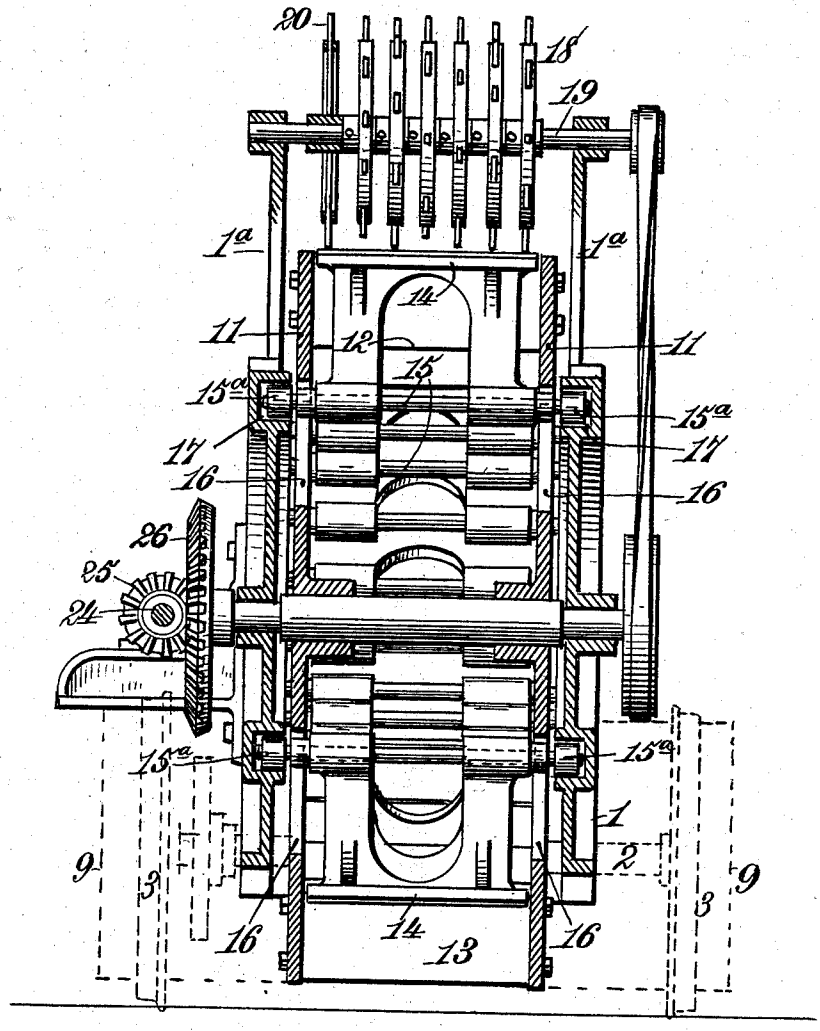
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Fig. 2.



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UNITED STATES PATENT OFFICE.

REUBEN SHIRREFFS, OF RICHMOND, VIRGINIA.

SNOW-COMPRESSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 698,566, dated April 29, 1902.

Application filed February 23, 1901. Serial No. 48,491. (No model.)

To all whom it may concern:

Be it known that I, REUBEN SHIRREFFS, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented new and useful Improvements in Snow-Compressing Machines, of which the following is a specification.

My invention relates to improvements in snow-compressing machines, and has for its objects, first, to provide a novel compressing mechanism and mode of operation, and, secondly, to provide in connection therewith a breaking-up device.

To the ends stated my invention results in a machine embodying the features and mode of operation hereinafter described, and illustrated in the drawings.

That which I regard as new will be set forth in the clauses of claim appended to this specification.

In the accompanying drawings, in which I have illustrated a preferred form of machine embodying my invention, Figure 1 is a view the left-hand part of which is in side elevation, and the right-hand side partly in section and partly in elevation, with parts broken away to show the interior construction; and Fig. 2, a transverse section.

In the said drawings the reference-numeral 1 indicates a suitable frame, in which axles 2, carrying ground or traveling wheels 3, are supported. I have shown this frame as of skeleton formation in the drawings, although it may be of any suitable formation and material. Supported by this frame—for instance, in the manner 4, shown at the left of Fig. 1 of the drawings—are stationary thrust-resisting elements 5, which conform to the shape of the cylindrical carrier hereinafter referred to. These thrust-resisting elements are preferably in the form of hollow plates; into which steam or other heat may be introduced from any suitable source, (not shown,) an inlet, such as 6, and an outlet, as 7, being provided therefor, as illustrated in the drawings. The said elements 5 support in a suitable manner platforms 8, to which are secured guides or deflectors 9 for directing the snow into the path of the snow gathering and carrying apparatus, and to said platforms are secured snow-levelers 10 for the purpose of partially packing the snow before it reaches such snow gathering and carrying mechanism.

The snow gathering and carrying arrangement consists of a drum-like structure rotating upon a shaft S, and comprises circular side plates 11, between which, at their peripheries, extend partitions 12, forming a series of peripheral snow gathering and carrying chambers 13, the walls of which are formed by said partitions. The said chambers in the rotation of the drum-like structure pass in succession across the face of each thrust resisting or receiving element 5 and present the snow in front of said element in position to be acted upon by the plungers hereinafter described. Within this drum-like structure are arranged a series of radial snow compressing or densifying plungers 14, one for each chamber 13. The plungers are mounted on cross-arms 15, which are adapted to play within slots 16 provided therefor in the side plates 11 of the drum-like structure, the ends of said cross-arms projecting outside of the side plates 11, and preferably provided with antifriction-rolls 15^a, entering cam-races 17, with which the frame 1 is provided, whereby during the rotation of the drum the said plungers are forced outwardly in their respective chambers 13, compressing or densifying the snow contained therein while said chambers are passing in front of the thrust resisting or receiving elements 5, as graphically pictured at the right hand of Fig. 1 of the drawings. The form and arrangement of the cam-races 17 may be varied, as may be desired; but I prefer to use a form such as shown, so that the initial action of the plungers shall be rapid, or, in other words, the stroke comparatively long, as the snow contained in the chambers prior to the action of the plungers is comparatively loose and may be compressed or densified to a considerable extent by the initial stroke of the plungers. The eccentricity of the cam-races decreases after the initial stroke has been completed and as the compression or densification of the snow increases, offering greater resistance. Furthermore, the cam-races are preferably formed with an abrupt eccentricity, as shown at 17^a, at the point in the travel of the plungers where the snow has been compressed or densified to the maximum capac-

ity of the machine, so that the plunger carrying a compressed or densified quantity of snow is thrown quickly outward to its limit, presenting the densified mass to the action of the breaking-up or disintegrating device, which will now be described. This device in the form in the drawings consists of adjustable spaced-apart rings 18, mounted upon a shaft 19, supported in extensions 1^a of the frame 1 and provided with a series of teeth with spikes or sharp points 20, which act to break up or disintegrate the compressed masses of snow as the same are presented thereto in the operation of the machine. This breaking-up device or disintegrator is a desirable auxiliary of the machine, whereby the compressed snow is delivered in small dense quantities, which may be handled with greater facility than a single large mass of the densified or compacted snow. The disintegrated or broken-up densified or compacted snow is delivered onto shelves or chutes 21, which may deliver the same at any suitable point, as at the side of the machine or into accompanying depositories, by which it may be carried away.

The snow gathering and carrying arrangement is journaled in the frame 1 by means of an axle S and may be driven or rotated in any suitable manner. In the example shown in the drawings it is driven by an electric motor, (shown conventionally at 23,) which drives a shaft 24, carrying a pinion 25, in mesh with a bevel-wheel 26, carried by the axle of the drum-like structure.

The disintegrator or breaking-up device, as shown, rotates at a greater surface speed than that of the snow gathering and carrying mechanism, as obviously it must in the illustrated example, in order to disintegrate or break up the snow. In addition to its breaking-up function the disintegrator throws the snow out upon the chutes 21. It may be differently arranged and may be driven in any suitable manner, a convenient means being that illustrated in the drawings, wherein it is rotated by means of a crossed belt from the shaft S.

The machine illustrated in the drawings is arranged with similar snow guides and levelers at each end, and the two thrust resisting or receiving elements are provided, so that the machine will work equally well when moving in one or other direction, as will be apparent; but I do not restrict my invention to a double-header machine.

Many changes in construction and arrangement may be made within the scope of the following claims without departing from my invention.

The operation of a machine embodying my invention will be readily understood from the drawings and description.

When the machine is moving in the direction indicated by the arrows, Fig. 1, the snow is guided into the path of the gathering and carrying arrangement, being packed somewhat by the leveler, and is gathered in by the rotating chambers and carried therein across the face of the thrust resisting or receiving element, during which the plungers act in the manner described to compress or densify the snow. When a gentle heat is imparted to the thrust-resisting plate, the contacting snow is softened, enabling it to slip easily. After compression the snow is subjected to the supplementary action of the disintegrator, which breaks or tears it into small dense lumps or masses and throws it out onto the shelves or chutes, which drop it, as convenience or conditions dictate.

By properly regulating the speed of the motor 23 the machine may be controlled so that the gathering-chambers shall take in a full measure or only a partial charge of snow, according to the lightness or heaviness of the fall of snow. It may be desirable to have the snow delivered by the machines of a given uniform density, in which case if the snow is light the revolution of the snow-gathering chambers will be made slow and the chambers take in a full charge. On the other hand, if the snow be of a heavy nature the speed of revolution may be suitably increased, so that a partial charge only will be taken by said chambers.

Having thus described my invention, what I claim is—

1. In a snow-compressing machine the combination with a stationary thrust-resisting element, of means for presenting snow in front of the same, mechanism for moving said snow-presenting means across the face of the thrust-resisting element, a plunger, and means for actuating the same to compress the snow against said element, substantially as described.

2. In a snow-compressing machine the combination with a stationary thrust-resisting element, of means for presenting snow in front of the same, a plurality of plungers, and means for actuating the same to compress the snow against said element, substantially as described.

3. In a snow-compressing machine the combination with a stationary thrust-resisting element, of a rotating carrier for presenting snow in front of said element, a series of rotating plungers, and means for actuating the same to compress the snow against said element, substantially as described.

4. In a snow-compressing machine the combination with a thrust-resisting element, of a rotating device provided with chambers for gathering snow and presenting it in front of said element, a series of plungers arranged to work in said chambers, and means for actuating said plungers to compress the snow against said element, substantially as described.

5. In a snow-compressing machine the combination with a thrust-resisting element, of a rotating device provided with chambers for gathering snow and conveying it across the

face of said element, a series of plungers arranged to work in said chambers, and means for actuating said plungers to progressively compress the snow against said element in its transit thereacross, substantially as described.

6. In a snow-compressing machine the combination with a thrust-resisting element, of a rotating device provided with chambers for gathering and carrying snow across the face of said element, plungers carried by said rotating device and arranged to work in said chambers, and means for actuating said plungers to compress the snow against the face of the thrust-resisting element, substantially as described.

7. In a snow-compressing machine the combination with a frame provided with cam-races, and a thrust-resisting element, of a rotating device provided with chambers for gathering snow and carrying it across the face of said element, plungers carried by said rotating device arranged to work in said chambers and having means engaging the cam-races whereby said plungers are actuated to compress the snow against the face of the thrust-resisting element, substantially as described.

8. In a snow-compressing machine the combination with a frame provided with cam-races, and a thrust-resisting element, of a rotating device provided with peripheral chambers for gathering snow and carrying it across the face of said element, and provided also with radial slots, a series of plungers arranged to work in said chambers, and cross-arms on which said plungers are mounted, said cross-arms engaging the cam-races and adapted to move in said slots, substantially as described.

9. In a snow-compressing machine the combination with a frame provided with cam-races, and a thrust-resisting element, of a rotating drum-like structure comprising end plates, a series of partitions extending between the said plates and forming a series of peripheral snow gathering and carrying chambers, said plates provided with radial slots, and a series of plungers arranged to work in said peripheral chambers and mounted on cross-arms which engage the cam-races, substantially as described.

10. In a snow-compressing machine the combination with thrust-resisting elements, of a rotating carrier mounted between said elements and adapted to convey the snow across the face thereof, of a series of plungers carried by said rotating device, and means for actuating the same to compress the snow, substantially as described.

11. In a snow-compressing machine the combination with thrust-resisting elements, of a rotating device mounted between said elements and provided with snow gathering and carrying chambers, of a series of plungers arranged to work in said chambers, and means for actuating the plungers to compress the snow, substantially as described.

12. The combination with a frame provided with snow guides and levelers, of a thrust-resisting element, a rotating snow gathering and carrying device for presenting the snow in front of said element, plungers, and means for actuating said plungers to compress the snow against said element, substantially as described.

13. The combination of snow-compressing mechanism and a snow-disintegrator, substantially as described.

14. The combination with a rotating snow-compressing mechanism, of a rotating snow-disintegrator, substantially as described.

15. The combination with snow-compressing mechanism comprising a thrust-resisting element, a rotating snow-carrying device, and plungers for compressing the snow, of a rotating snow-disintegrator, substantially as described.

16. The combination in a snow-compressing machine of a thrust-resisting element, a rotating device provided with snow gathering and carrying chambers, a series of plungers arranged to work in said chambers, means for actuating said plungers, and a rotating snow-disintegrator, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

REUBEN SHIRREFFS.

Witnesses:
CARY P. CARR,
E. C. DEYARNUTT,