

July 31, 1923.

1,463,221

O. MITCHELL

TRAMPER

Filed May 4, 1921

3 Sheets-Sheet 1

Fig. 1

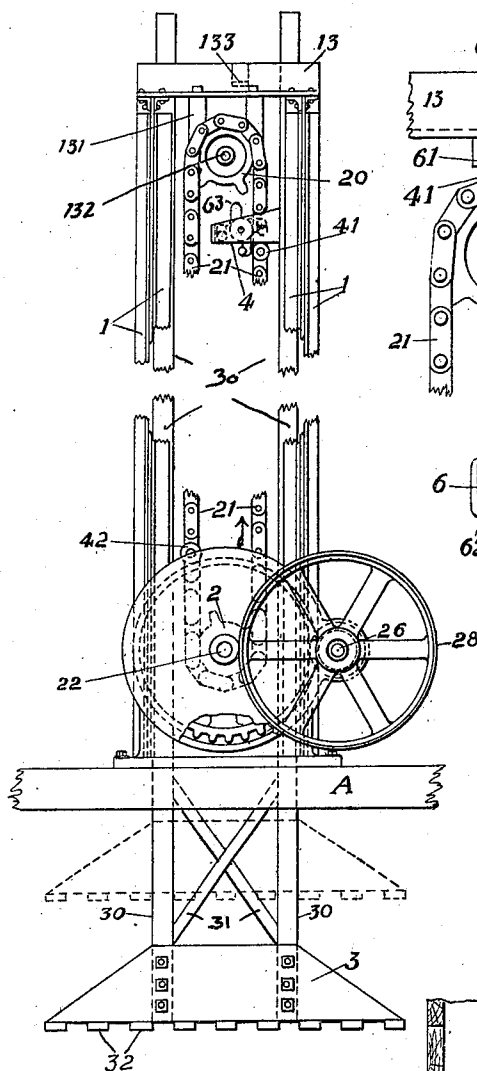


Fig. 2.

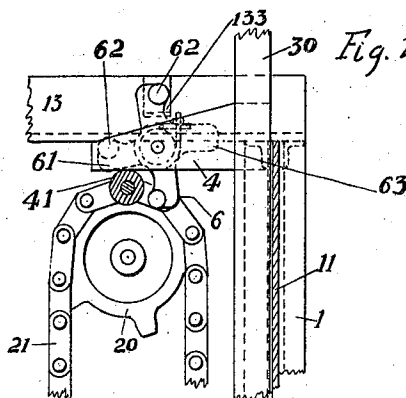


Fig. 3

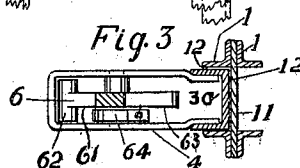


Fig. 4

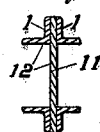
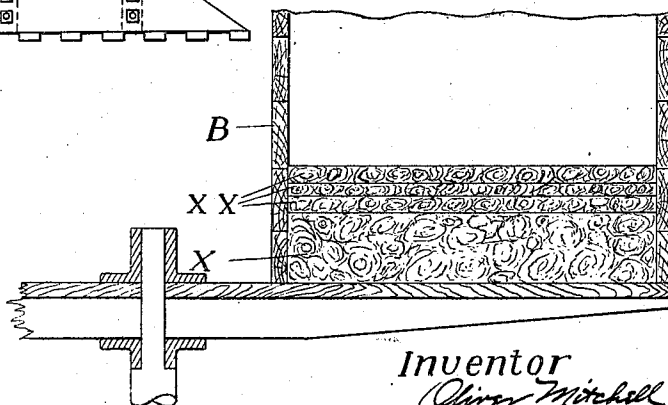


Fig. 10



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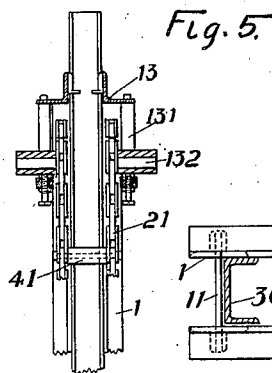
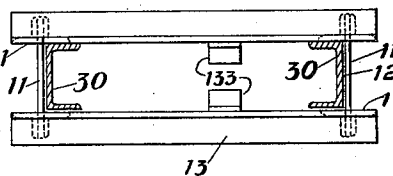
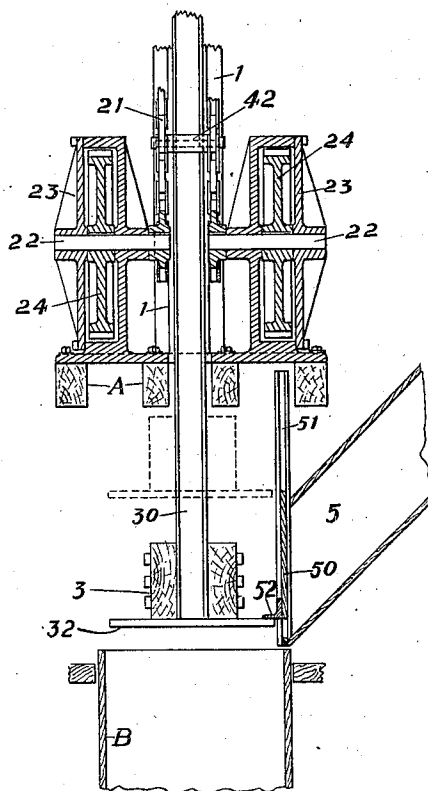


Fig. 6



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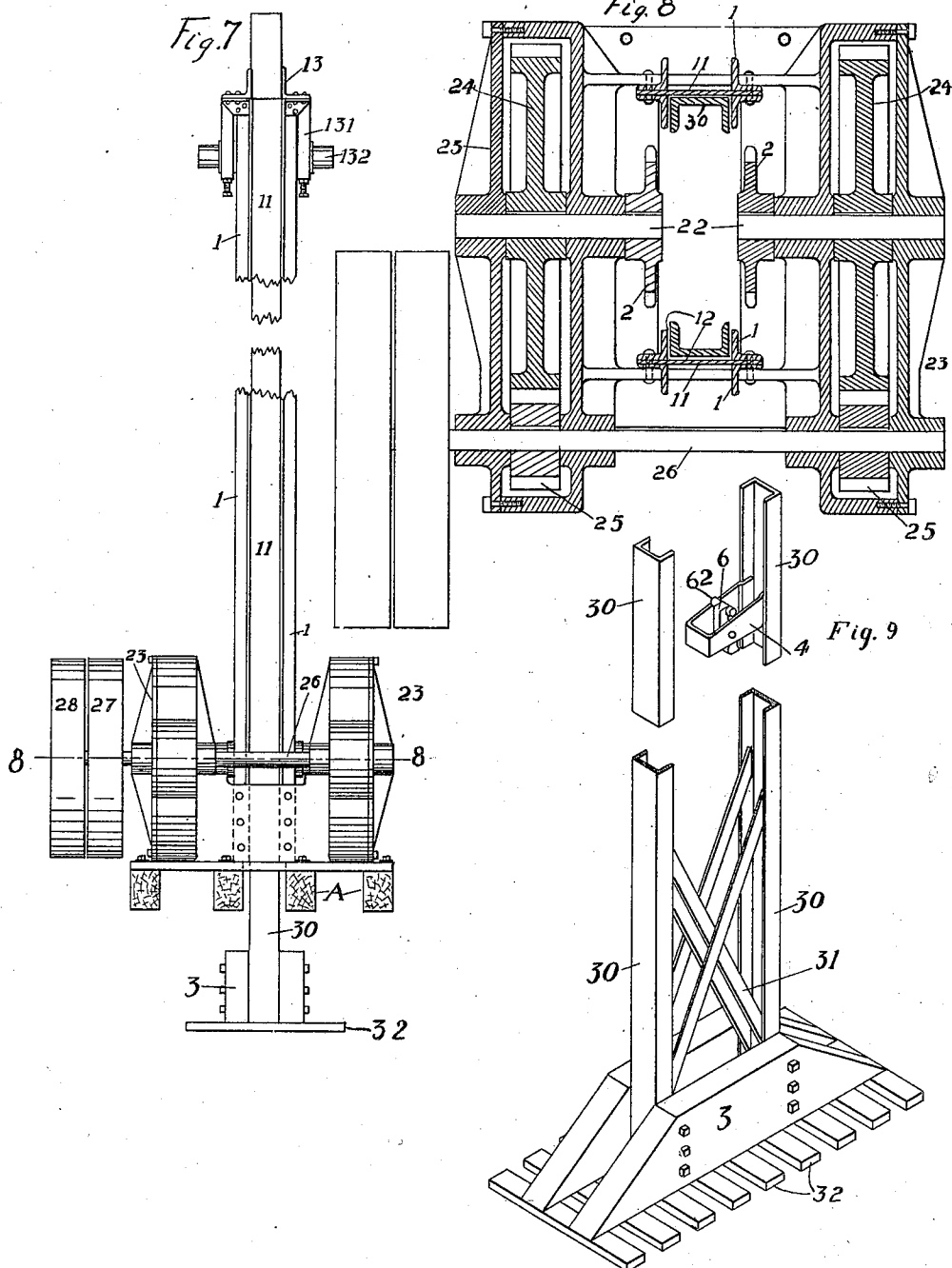
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1,463,221

TRAMPER

Filed May 4, 1921

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

OLIVER MITCHELL, OF BROOKLINE, MASSACHUSETTS, ASSIGNOR TO THE MURRAY COMPANY, OF DALLAS, TEXAS, A CORPORATION OF TEXAS.

TRAMPER.

Application filed May 4, 1921. Serial No. 466,828.

To all whom it may concern:

Be it known that I, OLIVER MITCHELL, citizen of the United States, residing at Brookline, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Trampers, of which the following is a specification.

My invention relates to cotton handling apparatus and particularly to "trampers", so called, such as are employed in gin outfits to tramp or pack the loose lint as it is fed into the baling box of a cotton baling press in order to express the air from the cotton, preparatory to its compression into a bale by a baling press.

Trampers for cotton presses comprise a power operated, reciprocating plunger, movable into and out of the baling box, a charge of loose cotton or lint being fed into the baling box each time the plunger is withdrawn from the latter, and each charge of lint, so fed, is pushed toward the bottom of the box by the plunger when the latter is moved toward the bottom of the box again. As heretofore constructed the plunger of the machine trumper had a fixed stroke, and consequently the lower limit of the stroke was the upper limit of the compressed cotton in the box. The first effect of the operation of the plunger was merely to push down the loose cotton lint toward the bottom of the box and as the cotton accumulated, it was still forced down below the lower limit of the plunger stroke. The result was that little pressure was applied to the cotton until a considerable mass of cotton was accumulated in the box, and the pressure, when applied, was applied to a mass of cotton.

The problem of cotton trampers is a problem of air expression, to condense the loose cotton by expressing the air from between the fibers, in preparation for the compression into a bale, in the ordinary way. No means is provided in any trumper for retaining any compression that may be given to the cotton lint.

It is obvious that the expression of air from the innumerable cells and spaces formed between the fibers, will be increasingly difficult the larger the mass is that is operated upon and it is obvious that to attain a certain standard of air expression by mass compression a relatively large power

must be applied. It will also be obvious that in all mechanical trampers having a fixed stroke plunger, the compressive action necessary to attain the desired air expression can only be had by mass compression.

My new mechanical trumper aims to express the air from relatively small charges or layers of cotton by incremental compression as opposed to mass compression, and in so doing makes possible the use of a small power or force, frequently applied, in detail, rather than the use of large power or force, applied at longer intervals to an accumulation of increments forming a mass of cotton.

In the drawings:

Figure 1 is a front view of my improved trumper;

Figure 2 is a detail on an enlarged scale of the upper end of the trumper;

Figure 3 is a detail in plan of the dog and star wheel of Figure 2, on the upper side of the dog, the upper spoke of the star wheel being in section;

Figure 4 is a cross section of the frame side member, shown also in Figure 3;

Figure 5 is a central sectional elevation, viewed from the right of Figure 1;

Figure 6 is a plan view of the upper end of the main frame;

Figure 7 is a view in elevation, viewed from the right in Figure 1;

Figure 8 is a cross-section, on an enlarged scale, on line 8—8 of Figure 7;

Figure 9 is a perspective view of the plunger; and

Figure 10 indicates the incremental nature of the successive charges.

I shall describe and illustrate in this specification the principle of my mechanism in the best mode in which I have contemplated applying that principle.

A feature of my new mechanical trumper is that it avails of the principle of kinetic energy, using a relatively light weight plunger, requiring relatively little power to lift it at relatively slow speed, and upon the air expressing stroke developing great power by moving the plunger by gravity into the bale box at high speed, the air expressing function being achieved by applying to a small increment of cotton the force of a relatively light weight plunger moving at high speed against the cotton.

Owing to the utilization of these prin-

ciples it is feasible to make the entire mechanism of relatively light construction, with consequent low cost, low up-keep and low cost of operation.

- 5 Another feature is that by the employment of novel mechanism the head room required for installation of my apparatus is less than that required by trampers as heretofore constructed.
- 10 Another feature is that my novel mechanism permits an arrangement and control of the cycle of operation of the plunger, whereby the plunger is in the box only a proportionately short time and out of the
- 15 box a proportionately long time, the significance of which is, that after the air is expressed from a charge of cotton the quicker the plunger is removed from the bale box the sooner can a new charge be delivered
- 20 into the bale box and further, that as the placing of a charge of light cotton in the box requires a certain time interval, it is necessary that the plunger be out of the box, in retracted position, for a relatively
- 25 long time.

In Figure 1 is shown a front view of my trumper. The main beams A support the trumper over the bale box B (Figure 5). Upon the beams A is suitably secured and

30 supported the main frame of the mechanism, made up of two side members spaced apart, and suitably secured in relative position by bolting to the gear unit, which is secured to the supporting beams and by

35 cross-members at the upper end of the side members and by a web between the side members of each side.

The side members as shown are made up of vertical angle irons 1 connected by a web

40 11 of sheet metal. This construction provides a rigid side member and forms a vertical channel 12. The opposite side members are also connected by cross members 13, which connect the upper ends of the

45 side members and carry upon their under sides hangers 131, which hangers respectively carry stub shafts 132, axially aligned but separated, as shown, each shaft having mounted thereon sprocket wheels 20.

50 Around each sprocket wheel 20 passes an endless sprocket chain 21 which extends downwardly around another sprocket wheel 2. The sprockets 2 are mounted upon

two axially aligned shafts 22 mounted in

55 bearing-housings, 23, bolted at the lower ends to side members 1, and the supporting beams, the inner ends of the shafts being preferably separated, in the same manner as the inner ends of the shafts 132, so that

60 a space is left between the ends of shafts 22. The shafts 22 also each carry a main gear 24 driven by a pinion 25, the two pinions 25 being fast on a shaft 26 mounted in bearings in the bearing-housing 23, which

65 shaft 26 is continuously driven by a belt

(not shown) engaging a pulley 27 fast on said shaft. A loose pulley 28 is provided upon which the belt can be shifted when it is desired to stop the machine.

The plunger is made up of a head 3, 70 from which rise two stem members 30. Fast upon one of the stem members 30 and extending transversely toward the other stem member is a dog 4. Cross braces 31 connect the two plunger stem members 75 30, to give rigidity to the structure and the bottom of the head is formed of slats 32. The plunger stem members 30 are fitted to slide within the channels 12 formed in the side members (see Figures 3 and 4), the

80 dog 4 moving with the plunger in a fixed path and passing between the opposed ends of the stub shafts 132 at the upper end of the vertical travel of the dog and plunger, when the trumper is in operation. The dog

85 4 is preferably made up of two sides bolted or otherwise secured to the stem 30, and between these sides is mounted for rotation a star-wheel 6 the spokes 61 of which at their free ends carry cross or hook members, 62. 90 One spoke 63, carries no hook member. A brake band 64 surrounds the hub of the star wheel 6, and holds the wheel against accidental motion, the adjustment being calculated to cause the star wheel to turn

95 stiffly and to stop and remain in position, except as it may be forced to move by the application of a designed actuating force. Secured upon the inner side of cross-members 13 and directly above the star wheel

100 6 are hooks or detents 133.

The two chains 21 carry, mounted between them, actuating bearing 41, and when the machine is operating the bearing is revolving continuously in an endless path be- 105 tween the endless paths of the chains in the direction indicated by the arrow in Figure 1. In the preferred form of my machine, which I have shown in the drawings, the chains also carry between them a second

110 actuating bearing 42, diametrically spaced along the length of the chains from bearing 41.

At one side of the trumper is a source of cotton supply, usually the condenser into 115 which the ginned cotton passes from the gins, and from this supply a chute, 5, leads to the upper end of the bale box B, down which chute the cotton slides into the bale box. At the lower end of the chute

120 a gate 50 is provided, moving in side guides 51 and provided with dogs 52 which project above the plunger head 3, into the path of the head, so that, when the head is raised, it picks up the dogs 52 and gate

125 50 and raises the gate to permit the delivery of cotton into the bale box B below the plunger head and, as the plunger descends on its air expressing stroke, the gate is lowered to close the lower end of the chute 130

while the plunger is in the bale box, the gate stopping when the chute is closed and being picked up and lifted when the plunger rises.

5 The operation is as follows: The machine being assembled, with stem 30 of the plunger fitting within the channels 12 of the frame 1, and the head 3 below the beams A and over the bale box B, the dog 4 will project
10 between the chains 21 and in the upward path of the actuating bearings 41, 42, mounted between the chains. The plunger being in elevated position with the gate 50 raised, cotton passes down the chute 5 into the
15 bale box B. The first charge is preferably relatively large, to provide a cushion to receive the impact of the first stroke of the plunger. The belt is then shifted from loose pulley 28 to fast pulley 27 and the actuating
20 gears and sprocket chains 21 are caused to revolve. An actuating roller will accordingly travel upward, as indicated by the arrow in Figure 1, and as it turns around the upper sprockets 20 it will contact with the
25 dog 4 and slightly lift it, and as it wipes along the underside of the dog, will encounter a spoke of the star wheel, which projects below the underside of the dog 4 and will turn the star wheel 90° against the frictional
30 resistance of the brake band 64. As the actuating roller passes downward, the dog will be lowered and the hook 62 on a spoke 61 which has, by the turning of the wheel, been brought into vertical position
35 will engage detents 133 fast to cross members 13 of the frame and at the same time another spoke will project below the underside of the dog. An actuating roller again lifts and wipes along the under side of the
40 dog and the operation is repeated until the turning of the wheel brings into vertical position between the hooks or detents 133, spoke 63 of the star wheel, which carried no hook 62. The results is, that when the
45 actuating roller passes away from the dog and downward, dropping the dog, there will be no engagement between the star wheel and the frame hooks or detents 133 and the plunger being unsupported will fall by
50 gravity into the bale box. As the plunger drops, the gate 50 which is supported upon the upper side of plunger head 3, by the dogs 52, will drop with it, closing the end of chute 5. The fall of plunger 3, 30, will
55 bring the dog 4 to the lower limit of its travel, somewhat above the lower sprockets. An actuating roller will presently engage the dog 4 and lift the plunger to its upper position, the hookless spoke 63 being still in
60 vertical position will pass between the detents 133 and as the actuating roller wipes along the under side of the dog, as it travels about the upper sprockets, it will turn the star wheel 90° and bring into vertical position
65 a hooked spoke 61 and as the dog is

lowered by the descending actuating bearing, a hook 62 will engage detent 133 and hang up the plunger. In the lifting of the plunger the gate 50 will be lifted and the chute 5 opened to deliver cotton into the bale
70 box below the plunger. Successive actuating bearings will successively turn the star wheel 90° until hookless spoke 63 is again vertical, when the plunger will again drop.

I have shown in the drawings two actuating bearings 41, 42, which are diametrically spaced along the sprocket chains. It will be obvious that when one bearing is passing
75 down on upper sprockets 20 the other is just passing up on lower sprockets 2 and will almost immediately engage the dog 4 to lift the plunger. This is a great advantage as little time is lost after the plunger has done its work.

In thus utilizing the force of gravity a
85 great advantage is gained, since a comparatively light plunger may be employed, requiring only a small power to lift it to its upper position, and when the plunger is released the kinetic energy due to the continuous
90 acceleration throughout its fall, is very considerable. The plunger being light the entire mechanism may be made of light construction in consonance with the light weight of the plunger element, since, as is
95 obvious, when the air expressing stroke of the plunger is delivered, the plunger is not positively connected with the other mechanical elements and no strain is put upon them, by way of reaction, by the impact of
100 the plunger.

It will be noted that as above described it is preferred, before the initial stroke of the plunger, that a relatively large charge
105 of cotton shall be placed in the bale box. The initial stroke of the plunger is obviously the most powerful as the drop on this stroke is the greatest and the energy of impact developed is therefore greatest. The large charge serves as a cushion at the out
110 set and the great energy of the stroke is such that the air is thoroughly expressed from the first charge. Succeeding charges are of substantially uniform and relatively small quantity and the plunger, as the increments are successively operated upon, is
115 stopped by the gradual accretion with a shorter and still shorter stroke. The first and succeeding layers, in the preferred mode of operation are indicated in Figure 10,
120 where x is the first charge and xx successive increments, each of which is separately and successively subjected to the air expressing action of the plunger. It will be observed that the lower end of the plunger is formed
125 by slats 32, spaced apart, through which spaces the air within the increments of cotton escapes as pressure is applied.

I have shown and described a star-wheel as a means for engaging the frame detents,
130

and this mechanical element I consider the simplest and most certain means for the purpose, but it is obvious that other mechanical means might be substituted to accomplish the desired result. It is also obvious that a star wheel of less or more than four spokes, such as is shown and described, might be employed. I have also described a main frame for my machine made up of two opposed sides, each carrying one of a pair of chains, but while this construction is preferred I do not intend to limit myself to such a double structure, as the lifting and release of a gravity plunger might be accomplished by the use of a single standard and a single chain or a double standard and a single chain or a single standard and a double chain.

The gist of my invention lies in the employment of a gravity plunger operating upon a small amount of cotton, with a constantly decreasing length of stroke, the effect being that the cotton is tramped in detail rather than in mass and the tramped mass in the bale box, at the completion of the tramping operation, is of substantially uniform density from the bottom to the top of the mass.

I claim:

1. In a gravity tramper; a standard; a plunger movable longitudinally with relation to that standard and having an engaging device thereon; a rotatable wheel mounted at the lower end of the standard; a rotatable wheel mounted at the upper end of the standard; an endless belt member connecting the rotatable wheels; an actuating bearing mounted upon the endless belt member to engage the engaging device on the plunger by the upward moving reach of the endless belt; a detent to hold the plunger at the top of its stroke; means to release the plunger from the detent, to fall by gravity.

2. In a gravity tramper, a standard, a sprocket wheel mounted at the lower end of the standard; a sprocket wheel mounted at the upper end of the standard; an endless

sprocket chain connecting the sprocket wheels, an actuating bearing mounted upon the sprocket chain; a plunger having an upstanding stem; a dog upon that stem extending into the upward path only of the actuating bearing.

3. In a gravity tramper, a standard; a sprocket wheel mounted at the lower end of the standard; a sprocket wheel mounted at the upper end of the standard; an endless sprocket chain connecting the sprocket wheels; a pair of actuating bearings mounted diametrically upon the sprocket chain; a plunger having an upstanding stem; a dog upon that stem extending into the upward path only of the actuating bearings.

4. In a gravity tramper, a frame made up of vertical, opposed sides; a sprocket wheel mounted at the lower end of each side opposite and in axial alignment with the other sprocket wheel; a sprocket wheel separately mounted at the other end of each side opposite and in axial alignment with the other separately mounted sprocket wheels on each side; an actuating bearing between and connecting the sprocket chains; a plunger having an upstanding stem; a dog upon that stem, extending between the chains and into the upward path only of the actuating bearing.

5. In a gravity tramper, a frame; a sprocket wheel mounted at the lower end of the frame; a sprocket wheel mounted at the upper end of the frame; a detent at the upper end of the frame; an endless sprocket chain connecting the sprocket wheels; an actuating bearing mounted upon the sprocket chain; a plunger having an upstanding stem; a dog upon that stem extending into the upward path only of the actuating bearing; a star wheel mounted upon the dog and having a hooked spoke to co-operate with the detent on the frame and also a hookless spoke.

Signed at Boston, Mass., this second day of May, 1921.

OLIVER MITCHELL.