C. E. McMANUS.

COMPRESSING AND PACKING MACHINE.

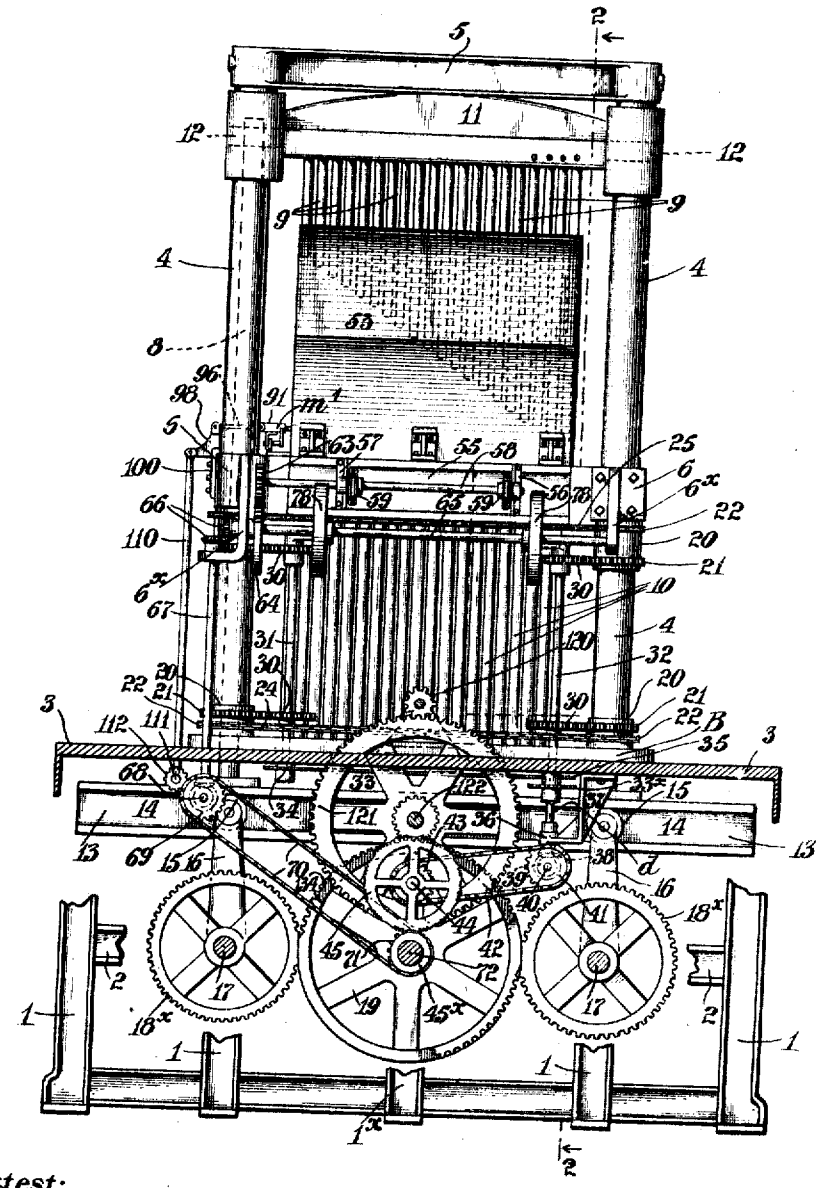
APPLICATION FILED JAN. 22, 1916.

1,298,749.

Patented Apr. 1, 1919.

6 SHEETS—SHEET 1.

Fig. 1.



Attest:

H. L. Helms

Inventor:

by Charles E. McManus

Gibbard & Bull Attys

C. E. McMANUS.

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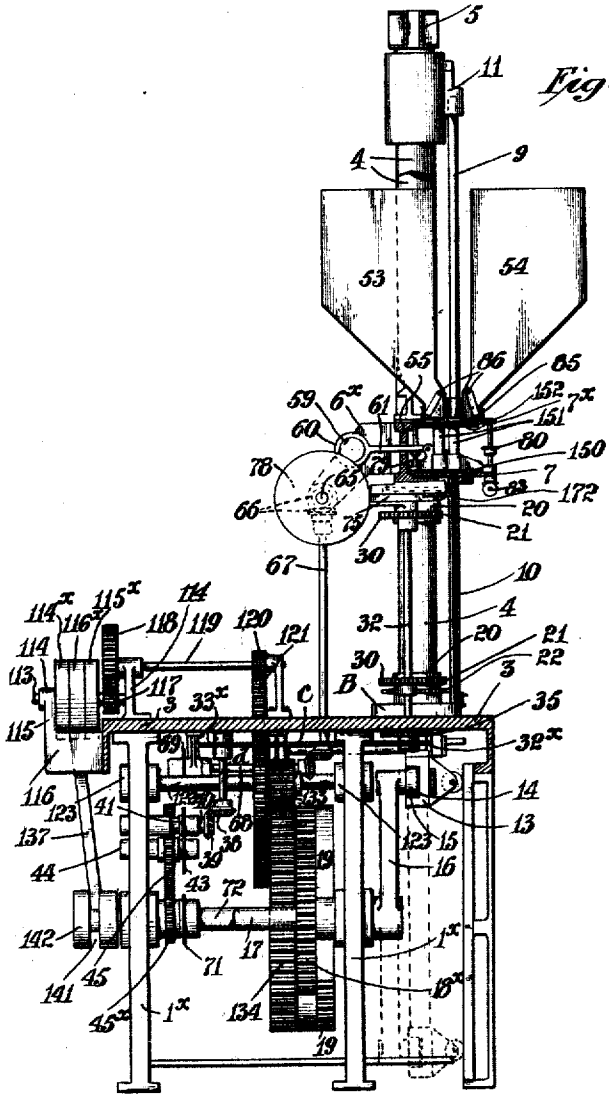
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6 SHEETS—SHEET 2.

Fig. 2.



Attest:

S. B. Mitchell

H. Lee Stelle

Inventor:

by Charles E. McManus

Eppes & Bell Attys

C. E. McMANUS.

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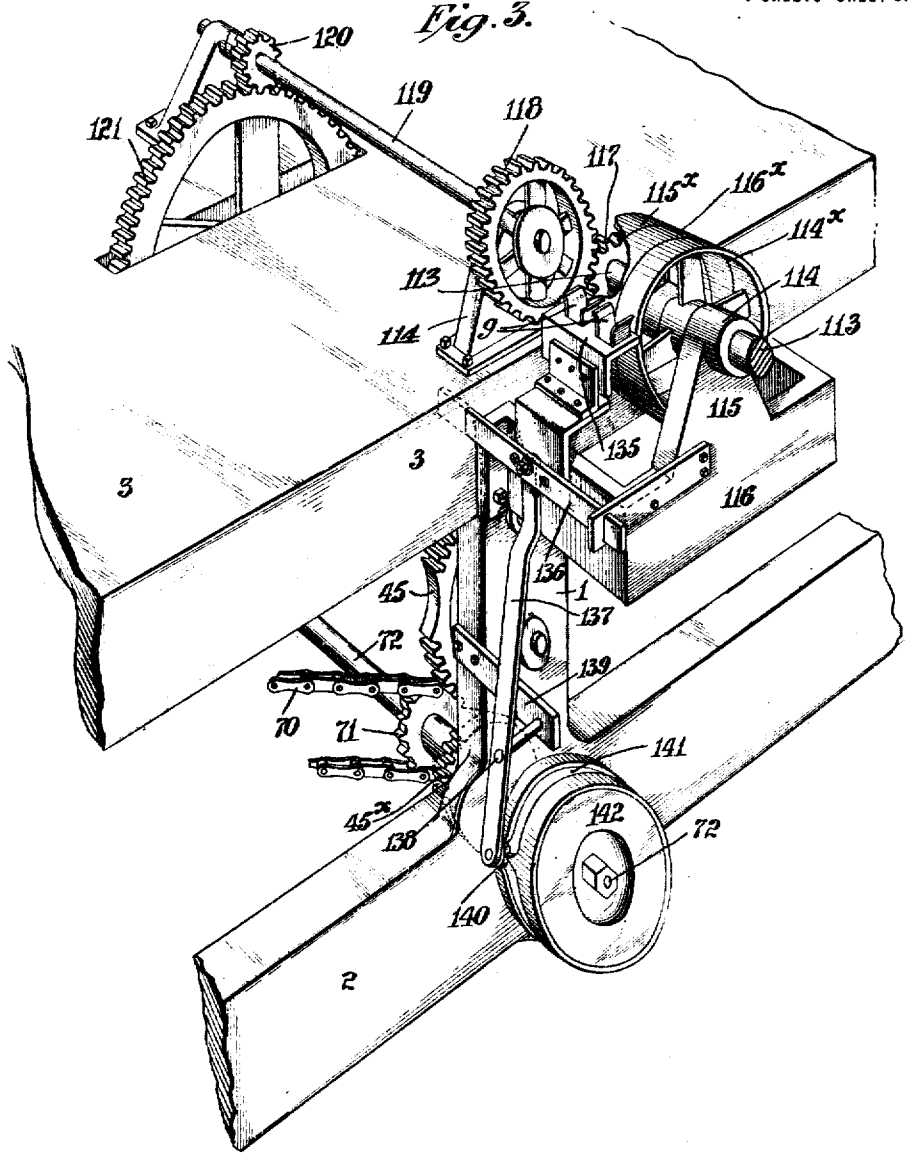
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6 SHEETS—SHEET 3.

Fig. 3.



Attest:

H. Lee Stelmer

Inventor:

Charles E. McManus

by Gifford & Bull Attys

C. E. McMANUS.

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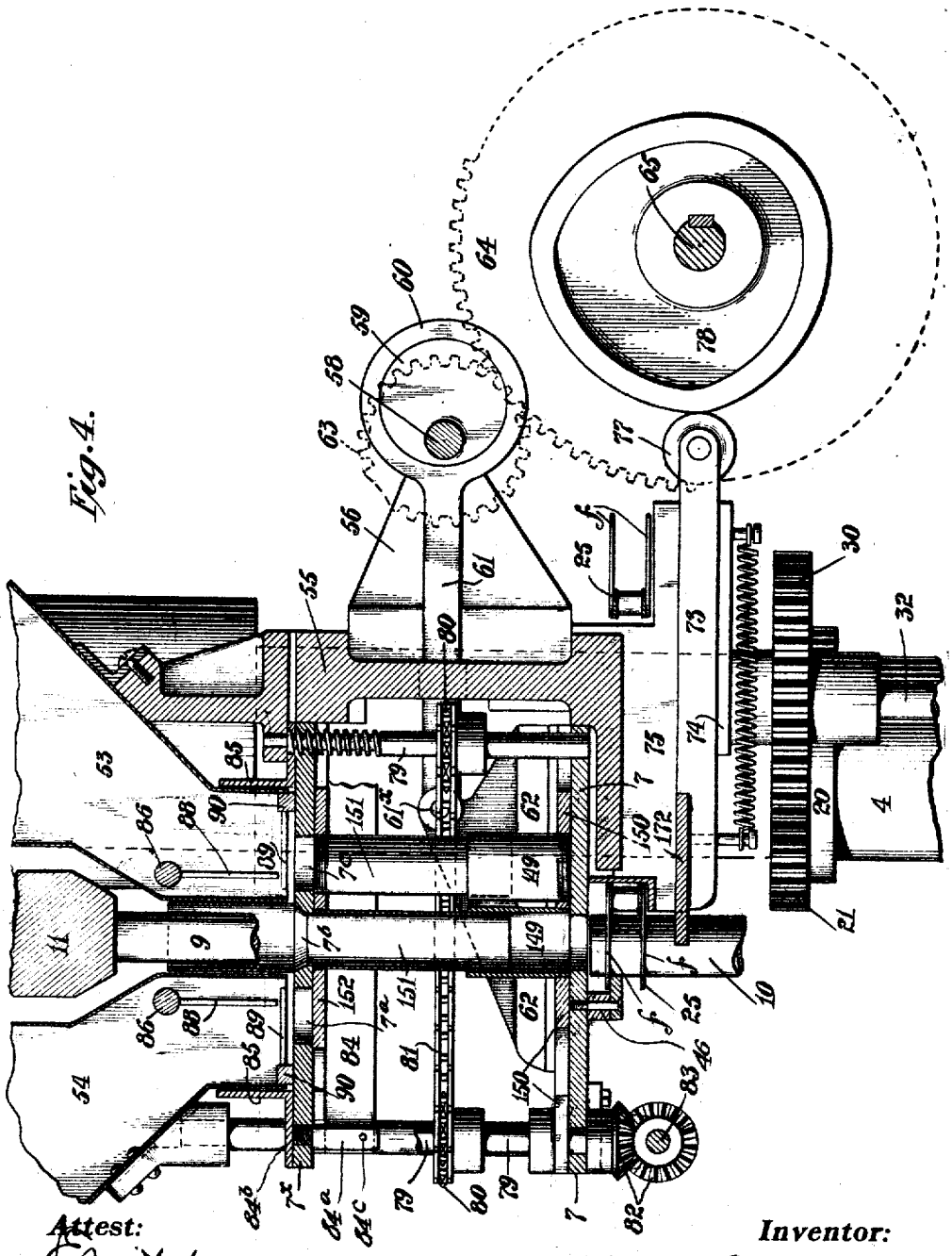
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6 SHEETS—SHEET 4.

Fig. 4.



Attest:

H. Lee Helms

Inventor:

by Charles E. McManus

Gifford & Bell Attys

C. E. McMANUS.

COMPRESSING AND PACKING MACHINE.

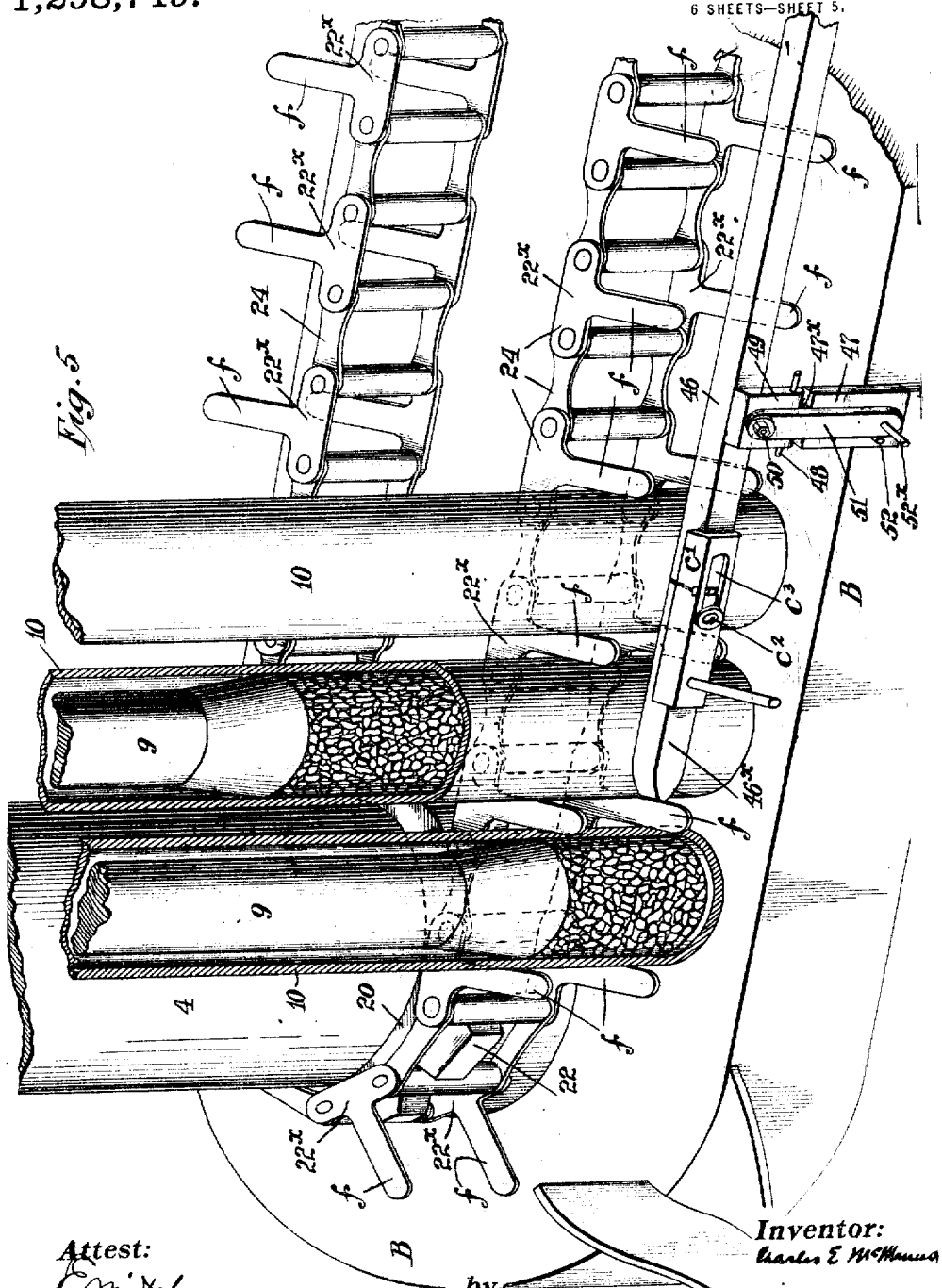
APPLICATION FILED JAN. 22, 1916.

1,298,749.

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6 SHEETS—SHEET 5.

Fig. 5



Attest:

E. Mitchell

H. Lee Helms

Inventor:

Charles E. McManus

by

Gifford & Bull Attys

C. E. McMANUS.

COMPRESSING AND PACKING MACHINE.

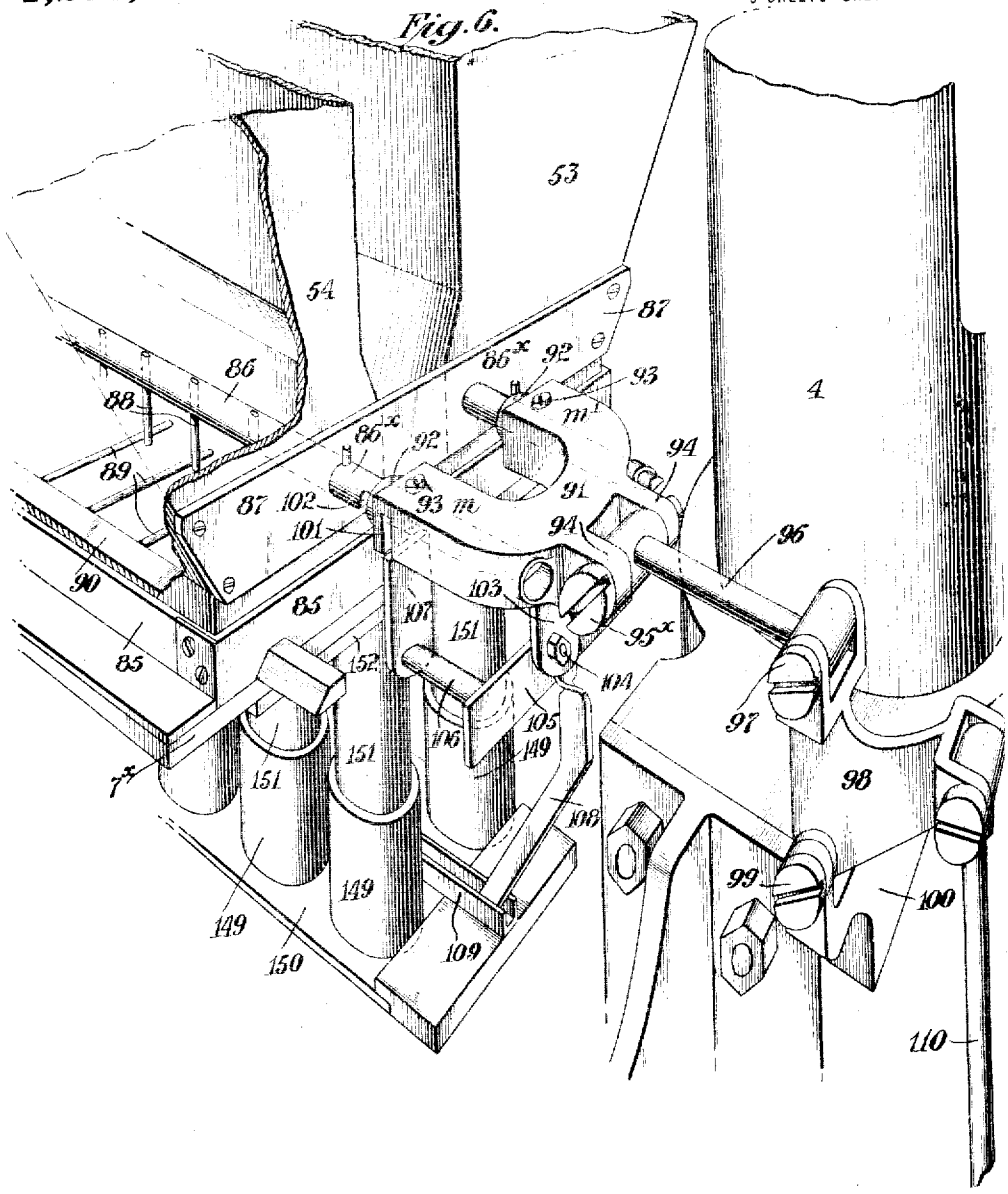
APPLICATION FILED JAN. 22, 1916.

1,298,749.

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6 SHEETS—SHEET 6.

Fig. 6.



Attest:

H. Lee Stetson

Inventor:

Charles E. McManus

by Gifford & Bull Atty

UNITED STATES PATENT OFFICE.

CHARLES E. McMANUS, OF NEW YORK, N. Y.

COMPRESSING AND PACKING MACHINE.

1,298,749. Specification of Letters Patent. Patented Apr. 1, 1919.

Application filed January 22, 1916. Serial No. 73,515.

To all whom it may concern:

Be it known that I, CHARLES E. McMANUS, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Compressing and Packing Machines, of which the following is a specification.

This invention relates to improvements in compressing and packing machines for granulated cork and the like, and in its preferred embodiment comprises a machine in which a tubular chamber or container for the material to be compressed receives the material in successive charges, and the material after each charging operation will be subjected to plunger means of successively decreasing range of movement in the chamber to compensate for the gradually increasing amounts of material within the chamber.

In the accompanying drawings Figure 1 is a rear end elevation, partly in section, of a machine embodying my improvements; Fig. 2 is a sectional side elevation of the machine on the lines 2—2, Fig. 1; Fig. 3 is a perspective view, partly in section, of the main power shaft and certain driving connections connected therewith; Fig. 4 is a transverse section through the cork-hoppers and flask mechanism; and Figs. 5 and 6 are detail perspective views, partly in section, of the feeding mechanism for the cork-holding tubes, and the cork agitating mechanism, respectively.

The machine is constructed with a rigid frame comprising the uprights 1 and the transverse beams 2, the uprights supporting at their upper end a horizontal table 3 upon which is rigidly secured the two hollow posts 4, connected at their upper ends by means of the cross-beam 5 and midway of their length connected by means of the horizontal beam 55, supporting upper and lower plates 7 and 7^x between which are slidably fitted certain flask devices hereinafter described.

Within the hollow posts 4 are vertically reciprocable shafts 8 by means of which reciprocatory movements are imparted to the plunger rods 9 which serve to compress the charges of cork fed to the tubular chambers or containers, preferably in the form of tubes 10. Each plunger rod 9 is fitted within a socket formed in frame 11, the latter being provided at each end with a flat projection 12 fitted between guide walls afforded by a vertical clearance slot formed in each post 4, each projection 12 being secured to a shaft 8 in any suitable manner. The shafts 8 project below the table 3 and are secured to a horizontal cross bar 13 formed with a longitudinal channelway 14 within which is fitted two friction wheels 15, journaled respectively on the end of each of two spaced crank arms 16. Each crank arm is connected with a shaft 17, each of which has fixed thereto a mutilated gear wheel 18^x, said gear wheels being operatively engaged by a large intermediate mutilated gear wheel 19.

The active and inactive surfaces on the gear wheels 18^x and 19 are so arranged that the frame 11 and its connected plungers are held motionless or for a period of rest after each descent and rise thereof to permit a shifting movement of the tubes 10, relative to the plungers and a corresponding movement of a flask device to bring a new charge of cork into register with each tube 10.

It will be seen from an inspection of Fig. 1 that the plungers 9 are of successively decreasing length from the right toward the left of the machine, and therefore are adapted in succession to compress a successively greater amount of material in a tube 10 laterally shifted into register with each plunger at the proper time. The operation of the machine is such that after the extreme right hand end tube receives a charge of cork and the same is compressed by the descent of the extreme right hand plunger within the tube, the latter is given a movement to the left and into register with the second plunger which is delayed in its descent through the tube until a second charge is presented to the latter, the operation continuing until the tube passes beyond the row of plungers and, completely filled, is removed from the machine. The means for imparting the necessary lateral movements to the tubes 10 will now be described.

Mounted for rotation upon each post 4 are two spaced sleeves 20 each carrying a pinion 21 and sprocket teeth 22. The lower sleeves are connected through the said sprocket teeth by means of a chain 24 and the upper sleeves are connected through the said sprocket teeth by means of a chain 25.

Each pinion 21 engages a pinion 30 mounted on the ends of the vertical shafts 31 and 32. Shaft 31 is operatively connected with shaft 32 by means of a chain 33 moving below the table 3 on sprocket wheel 34 carried by shaft 31 and sprocket wheel 35 carried by shaft 32. Shaft 32 below the table 3 is provided with a sprocket wheel 32^{x} connected by chain c with a sprocket wheel 33^{x} on a vertical shaft d (see Fig. 2) journaled at its upper end in a bearing within table 3 and at its lower end within boss 36 of a bracket member 37 bolted upon the lower face of table 3 (see Fig. 1). Shaft d near its lower end is provided with a beveled gear 38 meshing with a second gear 39 fixed upon a shaft 40 which also has fixed thereon a sprocket wheel 41 connected by means of a chain 42 with a second sprocket wheel 43 fixed upon a shaft 44 upon which is fixed a mutilated gear wheel 45 which receives motion from a second mutilated gear wheel 45^{x} on shaft 72.

Through the mutilated gear wheel 45 intermittent partial rotations are imparted to the shaft 32 which, through the connections above described, imparts intermittent movements to the sleeves 20 and hence chains 24 and 25. The chains 24 and 25 are utilized to impart successive lateral movements to the tubes or chambers 10. To this end alternate links 22^{x} of each chain are provided with projecting fingers f, and inasmuch as each chain is composed of parallel series of links, the tube is engaged near each end by four fingers, as shown in Fig. 5, which illustrate the lower chain, and the manner in which the tubes are engaged by each chain. By the foregoing means a tube placed in proper position with respect to the chains 24 and 25 at the righthand end of the machine shown in Fig. 1, is fed by intermittent steps into register with each of the plungers 9 until, when filled with compressed cork, it comes into position to be removed from the machine at its left-hand end, simultaneously with the insertion of a new tube at the right-hand end of the machine.

To hold the tubes against displacement from the engaging fingers of the feeding chains, upper and lower retaining bars are provided. Inasmuch as the bars may be alike, a description of the lower bar, shown in Fig. 5, will suffice. The upper bar is shown in section in Fig. 4. The bar 46 is provided with multiple hinged supporting members, of which one is shown in Fig. 5. The said supporting member comprises the bracket piece 47 fixed upon a suitable base member B secured to table 3 and upon which the tubes 10 rest. The bracket piece 47 is provided with an upwardly extending lug 47^{x} upon which is pivoted, by means of a pin 48, the depending yoke 49 which straddles the lug 47^{x}, and which is secured to bar 46. Pivotally secured to yoke 49 by means of the pivot pin 50 is a latch 51 held in active position by means of a stop pin 52 on bracket piece 47. The latch is provided with a thumb piece 52^{x} by means of which it may be swung upwardly above the bracket piece 47 to permit bar 46 to be moved downwardly upon its pivot 48 and thus out of engagement with the tubes 10, whenever desired. If it becomes necessary to remove a tube from the machine before it has progressed beyond the first few plungers, the forepart of each bar may be swung outwardly, being formed as a hinged section 46^{x}, normally held rigid by means of a sliding channel-shaped latch member c' as shown in Fig. 5.

The member c' is slidable longitudinally of the bar 46 and hinged portion 46^{x}, and is guided in its movement by a pin c^{2} projecting from the part 46^{x} and through a slot c^{3} in the latch member. The latch member is shown in position in Fig. 5 to hold the part 46^{x} rigidly in alinement with the bar 46. When it is desired to have the part 46^{x} swing on its hinge to release a tube, the latch member c' is moved toward the left of Fig. 5 until the rear end of said member clears the hinge joint between said parts 46 and 46^{x}.

As hereinbefore stated, the flask mechanism is slidably fitted between plates 7 and 7^{x} supported by the cross-beam 55. Two flasks are provided for each tube and adapted to be alternately projected over the upper ends of the latter. In the present case twenty tubes are employed for simultaneous compression of their charges by the plungers 9, and therefore two rows of twenty flasks each are mounted for movement in unison between the plates 7 and 7^{x}.

When the tubes are shifted laterally the feed chains 24, 25 are held motionless while a filled row of two rows of flasks, moves into register with the tubes, and their corresponding plungers. The flask mechanism is such that the movement of the row of filled flasks into register with the tubes serves to carry the second and empty row of flasks from discharging position into register with a hopper for the granulated cork. Each flask comprises a lower vertical tube 149, fixed within a slide plate 150, resting upon plate 7, and within which tube is fitted a tube 151 of slightly smaller diameter, secured at its upper end within a slide plate 152. The plate 7^{x} affords a bottom for the two hoppers 53 and 54 between which operate the plungers 9, and the said plate 7^{x} is provided with three rows of apertures 7^{a}, 7^{b}, 7^{c}, the intermediate row of apertures 7^{b} being clearance openings for the plungers 9 and the outer rows of apertures 7^{a}, 7^{c} permitting the discharge of granulated cork from each hopper alternately into a row of flasks. The plate 152 at each side of the flasks 151 is formed with an unbroken surface so as to af-

ford a closure for one hopper opening in whatever direction the flasks are shifted.

From an inspection of Fig. 4 it will be seen that when a filled row of flasks is shifted into register with the row of plungers 9 the second row of flasks will be placed into register with a row of discharge openings 7^a or 7^c leading from one of the hoppers, and that after the reciprocatory movement of the row of plungers a reverse movement of the flasks will bring the empty row thereof into register with the second hopper and the filled row of flasks into register with the tubes and plungers for a succeeding active movement of the latter. This shifting of the flasks is accomplished by means of the following instrumentalities: Supported upon beam 55 are two spaced bracket members 56 and 57, formed with alined apertured bosses to receive a shaft 58 carrying two eccentrics, indicated by the numerals 59 (see Figs. 1 and 4). Each eccentric is embraced by the strap 60 of an eccentric rod 61 projecting through an opening formed in the beam 55 and pivotally connected at 61^x with a bracket 62 rigidly secured to the bottom slide plate 150 in which the flask members are secured. Shaft 58 is given intermittent partial rotations through the engagement of a mutilated gear 63 fixed thereon meshing with a second and mutilated gear 64 fixed upon a shaft 65 mounted in bearing apertures formed in depending arms 6^x of brackets 6 on beam 55. Shaft 65 is connected by means of beveled gears 66 with a vertical shaft 67 also connected by means of beveled gears with a shaft 68 carrying the sprocket wheel 69 driven by means of chain belt 70 from sprocket wheel 71 on shaft 72 which supports also mutilated gear wheels 19 and 45^x. Shaft 65 and gear 64 are given a continuous rotation, but inasmuch as only a portion of the toothed surface of said gear is active, the eccentrics 59 are alternately active and inactive, so that when a row of empty flasks is moved out of register with the plungers and the second filled row of flasks is substituted, the latter are retained in position until the plungers descend and rise again sufficiently to clear the top of each flask.

To hold each tube 10 in proper register with the plunger which it receives, a centering or detent device is employed. This device comprises a bar 172 formed with a V-shaped opening for each tube. The bar, near each end thereof is secured upon one of two transverse bars 73 slidingly mounted upon the horizontal base portion 74 of a bracket extension 75 depending from beam 55, one of the said bars 73 being shown in Fig. 4. At its outer end, each bar carries a friction wheel 77 engaged by the periphery of a cam wheel 78 upon shaft 65 and given intermittent partial rotations therewith. The detent bar moves forward at the end of each tube shifting movement and serves to properly center the tubes, the said bar being retracted as the plungers 9 rise.

The degree of compression of a charge of granulated cork will vary according to quality and size of the cork particles. In the present machine an adjustment may be made to compensate for changes in the quality of the material. To this end, hopper closure plate 7^x is directly engaged by a series of vertical worm shafts 79 having bearing seats in plate 7, two of the worm shafts being shown in Fig. 4. The worm shafts are connected through sprocket wheels 80 and chain belts 81, and one worm shaft (at the left-hand of Fig. 4) projects below plate 7 and is connected by means of beveled gears 82 with a shaft 83 which may be rotated by means of a suitable hand crank to adjust plate 7^x to its proper height. Connected with plate 7^x, but spaced therefrom, are a plurality of supports or lifting bars 84 upon which the upper flask plate 152 rests, and therefore the adjustment of plate 7^x will simultaneously adjust the position of flask plate 152 and the telescopic flask members. The ends of the bars 84 are rigidly connected with the plate 7^x in any suitable manner, for example, by means of pins 84^a threaded into the plate 7^x, as at 84^b (see Fig. 4). The ends of the bars preferably pass through slots in said pins and are held in position by a pin 84^c. It will be understood that there is a pin 84^a at each end of a bar 84, although but one of such pins is shown in Fig. 4. For clearness the bars 84 are omitted from Figs. 1 and 2. To compensate for changes in the distance between the hopper closure plate 7^x and the lower hopper walls, the former has secured on its upper surface the upright plates 85 in contact with the lower walls of each hopper.

Means are provided for agitating the cork within and near the delivery end of each hopper. The primary agitator member is a rod 86 within each hopper, having its end 86^x projecting beyond a supporting plate 87 secured to each hopper at one end thereof, the rod carrying a series of spaced fingers 88 intermediate a second series of rigid fingers 89 carried by a bar 90 within and extending lengthwise of the hopper. When one row of flasks is shifted into register with hopper 54 an operating member for the agitator rod within said hopper is connected with said rod and is released from the agitator rod in the other hopper. The operating member 91 is formed with two parallel arms m and m', each arm being formed with an aperture to receive a sleeve 92 held in place by set screws 93 and adapted to receive the projecting end 86^x of one agitator rod. The operating member is formed at its rear end with spaced lugs 94 between

which is pivoted by pin 95ˣ one end of a link 96 connected at its opposite end by means of pin 97 with one end of an elbow lever 98. The elbow lever 98 is fulcrumed at 99 upon a bracket 100 carried by the cross-beam 55. Each projecting arm m and m' and the sleeve 92 therein is provided with a lower vertical slot 101 corresponding with a similar slot 102 formed in each of the agitator bar projections 86ˣ. As so far described the operating member 91 would reciprocate without action upon either of the agitator bars. However, member 91 is formed with a depending lug 103 upon which is fulcrumed at 104 a lever 105 carrying at each end a projecting pin 106 which supports an upwardly projecting latch bar 107. The lever 105 has a depending arm 108 fitted within a channel bar 109 carried by the slide plate 150 of the flask mechanism. It will be understood that a shifting movement of the flask slide plate 150 to the left from the position shown in Fig. 6 will rock lever 105 on its fulcrum and thereby elevate latch bar 107 until it passes within slot 101, and, in the forward movement of member 91, projects within slot 102 of the agitator bar 86, thus locking the agitator bar to reciprocatory member 91, and at the same time the second latch bar 107 is withdrawn from the other agitator member. Elbow lever 98 is operated through a rod 110, given endwise movements from a crank or eccentric on a shaft 111, the latter having fixed thereon a pinion 112 meshing with a pinion on shaft 68 (Fig. 1).

The main power shaft 113, illustrated in Fig. 3, is journaled within bearing bosses 114 one of which is mounted at the upper end of arm 115 of bracket 116 secured to the table 3, and the other of which is mounted on the table 3. The shaft 113 has fixed thereon two spaced belt pulleys 114ˣ and 115ˣ and supports an intermediate loose pulley 116ˣ. At its inner end the shaft 113 carries a pinion 117 meshing with a pinion 118 on the actuating shaft 119, which is provided with a second pinion 120 meshing with a reducing gear-wheel 121 on shaft 122 journaled in bearing bosses 123 in the upright frame beams 1ˣ. Fixed upon shaft 122 (see Figs. 1 and 2) is a pinion 133 meshing with a gear wheel 134 on shaft 72 which carries the mutilated gear wheel 19 for operating the plungers. Two belts (not shown) are used in connection with the pulleys 114ˣ, 115ˣ and 116ˣ, one belt only being operative at a time. One belt leads from a large pulley (not shown) to one of said pulleys 114ˣ, 115ˣ for rotating the shaft 113 at high speed and the second belt leads from a smaller pulley to rotate the shaft 113 at low speed. The foregoing arrangement permits the teeth of mutilated gears 18ˣ and 19 to engage each other at low speed, to avoid the stripping or breaking of the teeth and unnecessary jar of the machine which would take place if these teeth were suddenly thrown into mesh at the normal high speed of operation.

Means are provided for automatically shifting the high-speed belt from a fast pulley to a loose pulley 116ˣ and for simultaneously shifting the low speed belt from the loose pulley to a fast pulley, and vice versa. For the said purpose, a belt shipper 135 is employed, the two belts passing through guides g projecting upwardly from the shipper. The shipper is carried by a slide bar 136 supported upon the bracket 116, and is automatically operated through a lever 137 fulcrumed at 138 upon a rigid bar 139 carried by the frame. Lever 137 is provided at its lower end with a friction wheel 140 fitted within the peripheral slot 141 of a cam wheel 142 carried at the end of shaft 72, hereinbefore referred to.

In the operation of the machine, the plunger rods being in their elevated position, as shown in Fig. 1, and the row of filled flasks having moved into register with the tubes, cam wheel 142, through its operative connections with shipper 135 will transfer the high speed belt from a fast pulley to loose pulley 116ˣ and the low speed belt from the loose pulley to a fast pulley, whereupon shaft 119, through pinions and gears 120, 121, 133 and 134 will commence the rotation of shaft 72 at low speed, and the latter through mutilated gears 19 and 18ˣ will operate the crank arms 16 to impart a slow downward movement to the plungers 9 until a reverse shifting movement is given to the belts and the plungers move downward at high speed until they compress the charges of cork within tubes 10. When the plungers have reached their extreme lower position they will be elevated at normal high speed until they reach almost the height of their movement when they are slowed down as the gears are moved out of mesh. When the lowermost plunger rises above the plate 7ˣ, the toothed portion of gear 45ˣ will act upon mutilated gear 45, and, through sprocket and chain connections 43, 42 and 41 and beveled gears 38 and 39, will turn chain actuating shaft 32 so that the latter, through its connections with sprocket sleeves 20, will impart a movement to chains 24 and 25, the tubes thus being shifted to a new position. At this point of the operation of the machine the toothed portion of mutilated gear wheel 64 (see Fig. 4) acts upon mutilated pinion 63 and, through shaft 58, actuates eccentrics 59 and the rods 61 are moved endwise to shift the empty row of flasks into register with a hopper and filled row of flasks into register with the plungers and tubes. At the same time, the active portions of cam wheels 78 on the shaft 65 move the bars 73 and carry detent bars 72 into engagement with the

tubes to center the same and hold them motionless during the succeeding downward movement of the plunger rods.

It will be understood that various modifications may be made in the structural form and arrangement of the various elements herein shown and described, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent of the United States:—

1. In a machine of the character described, a plurality of plungers adapted to enter a chamber to compress material therein, said plungers having different extent of movement within the chamber, and means for causing said plungers to successively enter said chamber.

2. In a machine of the character described, a plurality of plungers adapted to enter a chamber to compress material therein, said plungers successively having different extent of movement in the chamber, and means for causing a relative movement between the chamber and plungers to bring the chamber in line with said plungers successively.

3. In a machine of the character described, a plurality of plungers adapted to enter a chamber to compress material therein, said plungers successively having different extent of movement in the chamber, means for causing a relative movement between the chamber and plungers to bring the chamber in line with said plungers successively, and means for depositing a charge of material in the chamber after the compression action of each plunger.

4. In a machine of the character described, a plurality of plungers adapted to individually enter a chamber to compress material therein, said plungers being successively of different lengths, and means for causing a relative movement between the chamber and the plungers to cause the latter to successively enter the chamber.

5. In a machine of the character described, a plurality of plungers adapted to individually enter a chamber to compress material therein, said plungers being of successively different lengths, and means to move the chamber in line with the plungers successively to permit the latter to successively enter the chamber.

6. In a machine of the character described, a plurality of plungers adapted to individually enter a chamber to compress the material therein, said plungers being successively of different lengths, means for relatively moving the chamber and the plungers to permit the latter to successively enter the chamber, and means for feeding material to the chamber between the successive compression actions of the plungers.

7. In a machine of the character described, a plurality of plungers adapted to individually enter a chamber to compress material therein, said plungers being successively of different lengths and in fixed relation to each other, means for moving the chamber successively into line with said plungers, and means for moving the plungers to cause one of the same to enter the chamber.

8. In a machine of the character described, means adapted to propel a plurality of chambers, a plurality of plungers adapted to enter the chambers carried by said means, said plungers having successively different extent of movement within the chambers.

9. In a machine of the character described, means adapted to propel a plurality of chambers with a step by step movement, a plurality of plungers adapted to enter the chambers carried by said means, said plungers having successively different extent of movement.

10. In a machine of the character described, means adapted to propel a plurality of chambers, a plurality of plungers adapted to enter the chambers, means to feed a charge to each of said chambers, and means to move the plungers into said chambers subsequent to the operation of said feeding means.

11. In a machine of the character described, means adapted to propel a plurality of chambers, a plurality of plungers adapted to enter the chambers, means to feed a charge to each of said chambers, means to move the plungers into said chambers subsequent to the operation of said feeding means, and means whereby the propelling means advances the chambers when the plungers are withdrawn from the latter.

12. In a machine of the character described, means adapted to propel a plurality of tubular chambers, a plurality of plungers in fixed relation to each other and of successively varying lengths, and means for moving said propelling means to bring the tubular chambers carried thereby successively in line with said plungers.

13. In a machine of the character described, means adapted to propel a plurality of chambers, a plurality of plungers adapted to individually enter said chambers, and means whereby the extent of movement of the plungers in the chambers is successively decreased individually.

14. In a machine of the character described, means adapted to propel a plurality of tubular chambers, a plurality of plunger rods of varying lengths adapted to individually enter said chambers simultaneously.

15. In a machine of the character described, means adapted to propel a plurality of tubular chambers, a plurality of rods of varying lengths adapted to individually enter said chambers simultaneously, and means to cause a relative step by step movement between the plungers and the chambers to position the latter in line with the plungers.

16. In a machine of the character described, means adapted to propel a plurality of tubular chambers and support the same, and a plurality of compression rods adapted to individually enter said chambers, said rods being successively of decreasing length.

17. In a machine of the character described, means for propelling a plurality of tubular chambers and supporting the same, a cross head, a plurality of plunger rods rigidly supported on the cross head and adapted to individually enter the tubular chambers, and means whereby the extent of movement of the rods successively decreases within the chambers.

18. In a machine of the character described, means adapted to propel a plurality of tubular chambers and support the same, a feeding hopper, measuring devices adapted to receive material from the hopper and deliver it individually to said chambers, and a plurality of plungers of successively decreasing lengths adapted to individually compress the material in the chambers.

19. In a machine of the character described, means adapted to propel a plurality of tubular chambers and support the same, a hopper, measuring devices adapted to receive material from the hopper and take position over the ends of said chambers, and a plurality of plunger rods reciprocable through said measuring devices and adapted to individually enter said chamber, said rods being successively of decreasing lengths.

20. In a machine of the character described, means adapted to propel a plurality of tubular chambers and support the same, two feeding hoppers, a pair of measuring devices individual to each chamber and adapted to receive material, one at a time, from said hoppers, means to move the supplied measuring device of a pair into line with a chamber, and the other measuring device of the pair into line with the outlet from a hopper, a plurality of rods reciprocable through the measuring device in line with the chamber and force the material therefrom into the chamber, said rods being of successively decreasing lengths.

21. In a machine of the character described, means adapted to propel a plurality of tubular chambers and support the same, two feed hoppers arranged on opposite sides of the path of movement of said chambers, a pair of measuring devices reciprocable across the upper end of each chamber whereby one of said devices is positioned over the chamber while the other is being filled from one of the hoppers, plunger rods reciprocable through the measuring devices over the end of the chambers and adapted to compress the material in the chambers, said rods having successively decreasing extent of movement in the individual chambers.

22. In a machine of the character described, means adapted to propel a plurality of tubular chambers intermittently with periods of rest, means for feeding material to said chambers, a plurality of plunger rods adapted to enter said chambers while the latter are at rest, said rods individually having decreasing extent of movement in the individual chambers.

23. In a machine of the character described, spaced chains adapted to propel a plurality of tubular chambers and support the same, an abutment against which one end of each chamber moves, means for intermittently driving said chains with periods of rest, a plurality of plunger rods to individually enter said chambers, said rods being individually and successively of decreasing lengths, and means for moving said plungers into said chambers during said periods of rest.

24. In a machine of the character described, a plurality of plungers adapted to individually enter a chamber to compress material therein, a hopper adapted to contain the material, a measuring flask and means for moving said flask into register with the hopper and said chamber alternately.

25. In a machine of the character described, a plurality of plungers adapted to individually enter a chamber to compress material therein, said plungers having successively different extent of movement within the chamber, means for leading a supply of the material to ports at opposite sides of the plungers, a plurality of measuring flasks, and means for simultaneously moving an empty flask out of register with said chamber and into register with one of said ports, and a filled flask out of register with one of said ports and into register with said chamber.

26. In a machine of the character described, a plurality of plungers adapted to individually enter a chamber to compress the material therein, said plungers having successively different extent of movement within the chamber, means for conveying the material to a plurality of ports, a plurality of measuring flasks, and means for shifting the said flasks into and out of register with said ports and the chamber, and means for adjusting the size of said measuring flasks.

27. In a machine of the character described, a plurality of plungers adapted to individually enter a chamber to compress the material therein, a hopper for the material, a telescopic flask intermediate the hopper and the chamber, means for shifting the flask into and out of register with the hopper and the chamber, spaced slide plates each supporting one member of the telescopic flask, a plurality of adjusting screws adapted to vary the distance between the

said slide plates, and means for operating the adjusting screws simultaneously.

28. In a machine of the character described, a plurality of plungers adapted to individually enter a chamber to compress material therein, said plungers having successively different extent of movement within the chamber, a hopper for the material, a slidable flask intermediate the hopper and the chamber, means for moving said flask out of register with said hopper and into register with the chamber and a plunger and for effecting a dwell of the flask during the operation of the plunger, and means for operating the plunger and for effecting a dwell thereof during the movement of the flask.

29. In a machine of the character described, a plurality of plungers adapted to enter a plurality of chambers to compress material therein, said plungers successively having different extent of movement in the chambers, means for moving the chambers step by step to carry each chamber into register with each plunger successively, and a centering device acting after each movement of the chambers to position the same with respect to the plungers.

30. In a machine of the character described, a feeding hopper, a plurality of plungers adapted to individually enter a plurality of chambers, said plungers having successively different extent of movement within the chambers, means for imparting a step by step movement to the chambers to bring each chamber into register with each plunger successively, a centering bar adapted to be moved into and out of engagement with said chambers, and cam-controlled operating means for said centering bar.

31. In a machine of the character described, a frame, a hopper supported by said frame, means for supporting a plurality of chambers, a measuring flask intermediate the hopper and said chambers, a plurality of plungers adapted to individually enter said chambers, means whereby the extent of movement of the plungers in the chambers is successively decreased individually, means including a plurality of mutilated gear wheels for operating said plungers with alternate reciprocation and dwell, and means whereby the active portions of said gear wheels are interengaged at low speed and are thereafter operated at a higher speed.

32. In a machine of the character described, means adapted to propel a plurality of chambers, means adapted to feed a charge of material to each of said chambers, a plurality of plungers adapted to enter the chambers, said plungers having successively different extent of movement within the chambers, and means for moving said plungers at low speed and for automatically increasing their speed of movement.

33. In a machine of the character described, a plunger adapted to enter a chamber to compress material therein, means for leading a supply of the material to ports at opposite sides of the plungers, an agitator above each of said ports, an actuator for said agitators, a plurality of measuring flasks, means for simultaneously moving an empty flask out of register with said chamber and into register with one of said ports and thereafter shifting the flask in filled condition into register with said chamber and a second empty flask into register with a second of said ports, and means for operatively connecting an agitator with said actuator only when an empty flask is below said agitator.

34. In a machine of the character described, a plurality of plungers adapted to individually enter a chamber to compress the material therein, and plungers having successively different extent of movement within the chamber, means for conveying the material to ports at opposite sides of the plungers, a plurality of measuring flasks, means for simultaneously moving an empty flask out of register with said chamber and into register with one of said ports, a plurality of agitators one above each port, and means for actuating said agitator when an empty flask moves into register therewith.

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

CHARLES E. McMANUS.

Witnesses:
C. G. HEYLMUN,
M. E. McNINCH.

Correction in Letters Patent No. 1,298,749.

It is hereby certified that in Letters Patent No. 1,298,749, granted April 1, 1919, upon the application of Charles E. McManus, of New York, N. Y., for an improvement in "Compressing and Packing Machines," an error appears in the printed specification requiring correction as follows: Page 4, line 61, after the word "pulley" insert (*not shown*), *to the other of said pulleys* 114^{x}, 115^{x}; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22d day of April, A. D., 1919.

[SEAL.]

F. W. H. CLAY,

Acting Commissioner of Patents.

Cl. 100—57.