(No Model.) 3 Sheets—Sheet 1.

E. M. THOMPSON.

BRAN PACKER.

No. 435,467. Patented Sept. 2, 1890.

Fig. 1.

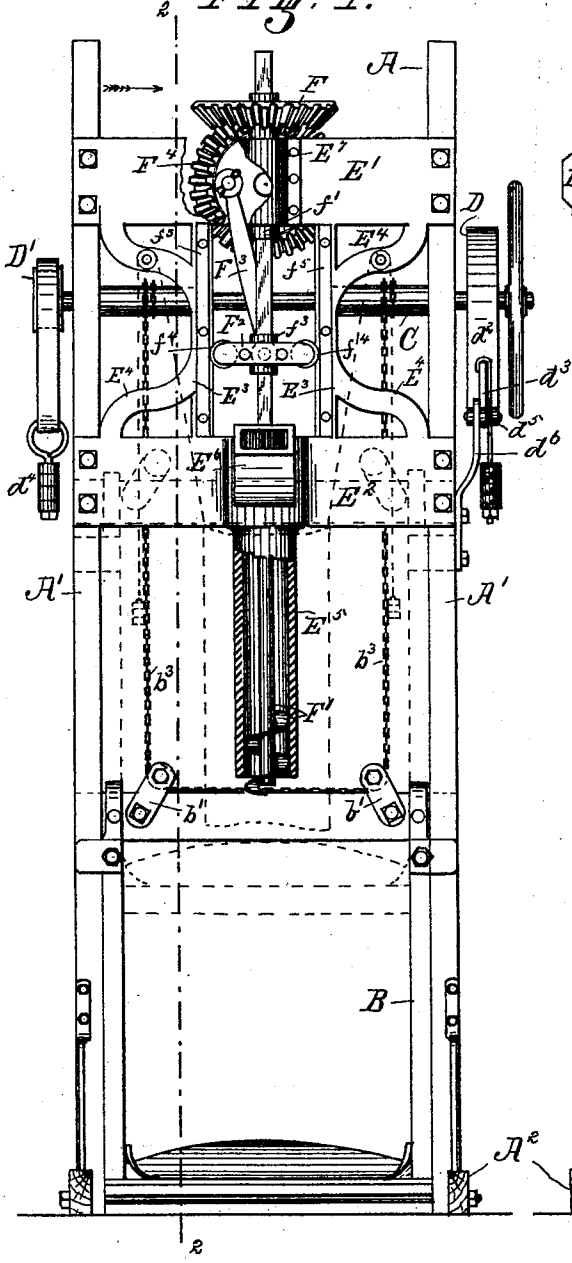
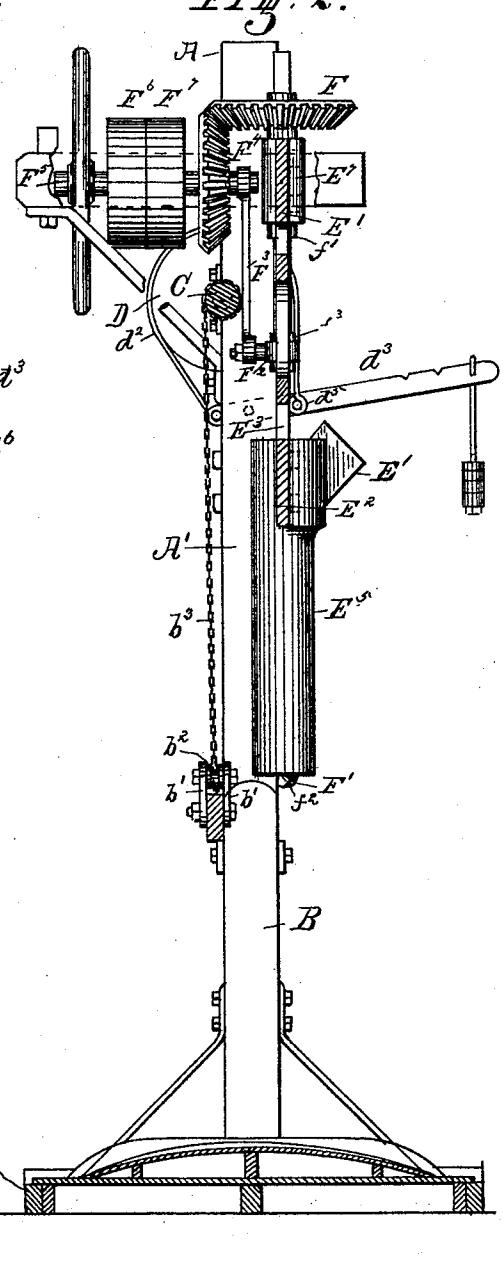


Fig. 2.



Witnesses.

N. E. C. Whitney

E. B. Ropkey.

Inventor.

Everett M. Thompson

by Joseph A. Minturn

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

E. M. THOMPSON.

BRAN PACKER.

No. 435,467. Patented Sept. 2, 1890.

Fig. 3.

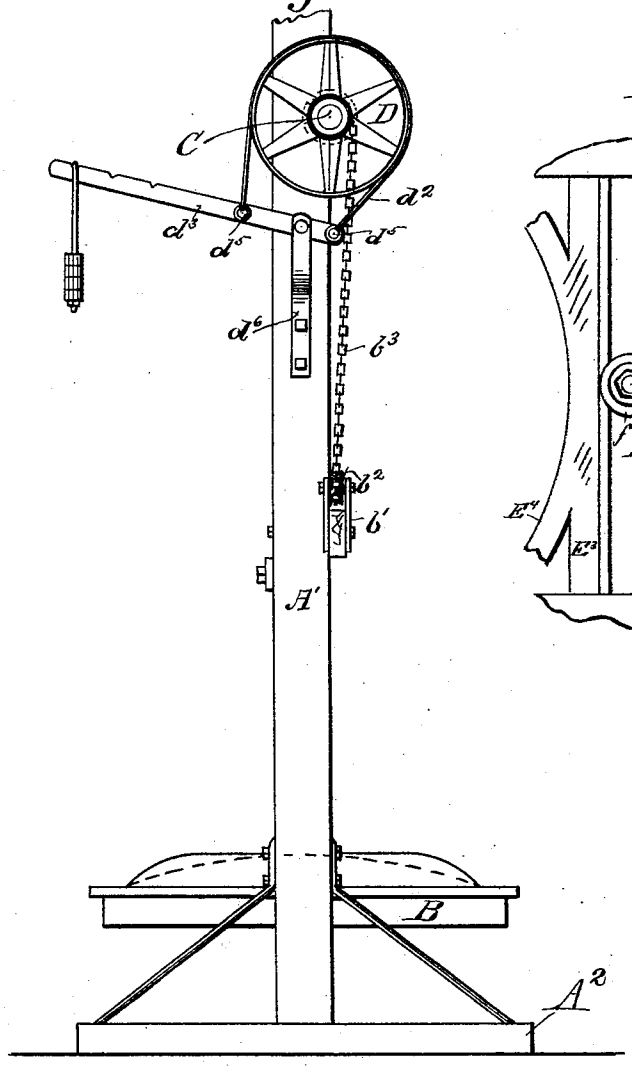
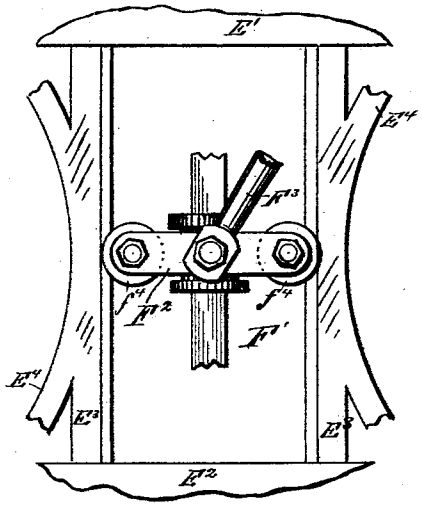


Fig. 4.



Witnesses.

Burge Brett.

L. A. Minturn.

Inventor

Evert M. Thompson

by Joseph A. Minturn

Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

E. M. THOMPSON.

BRAN PACKER.

No. 435,467. Patented Sept. 2, 1890.

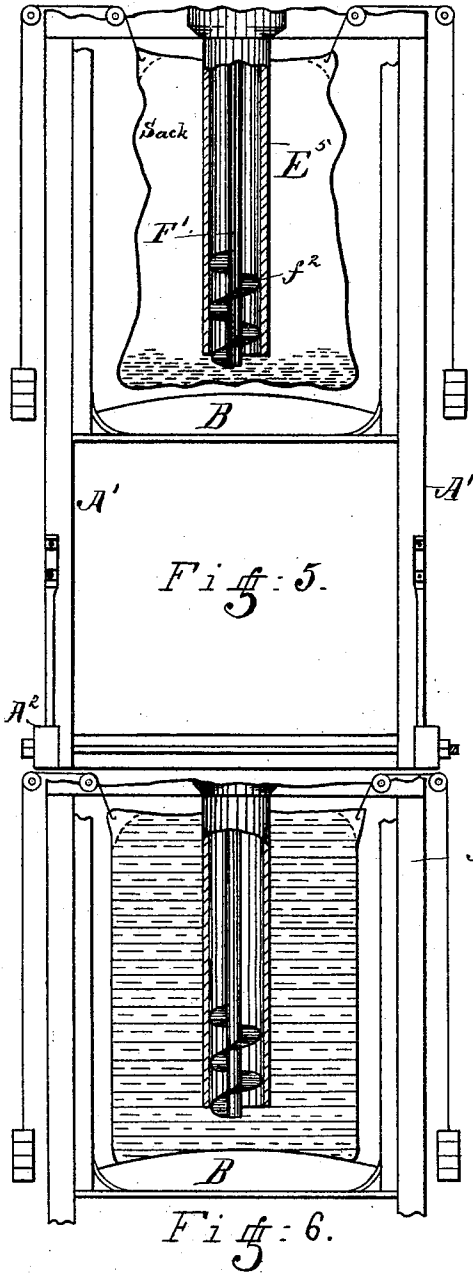


Fig. 5.

Fig. 6.

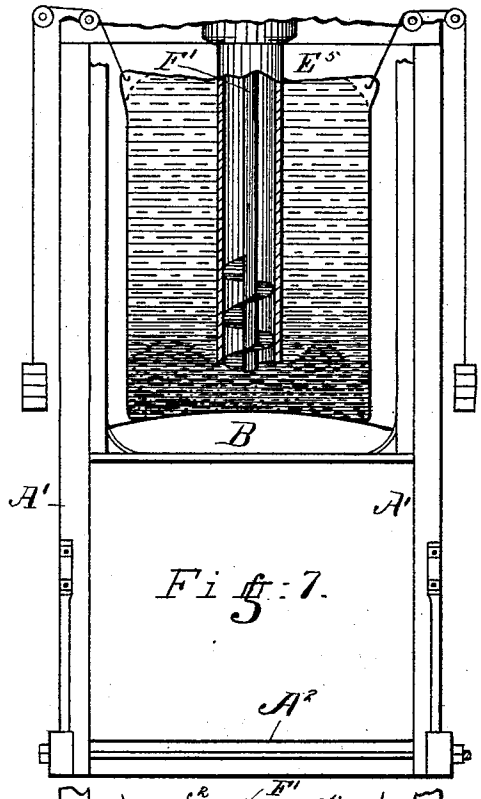


Fig. 7.

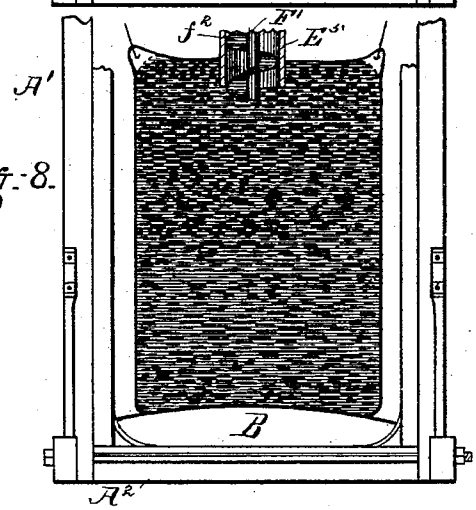


Fig. 8.

Witnesses:

N. E. C. Whitney,

Frank W. Warner.

Inventor:

Evert M. Thompson,

by Joseph A. Minturn

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EVERT M. THOMPSON, OF INDIANAPOLIS, INDIANA.

BRAN-PACKER.

SPECIFICATION forming part of Letters Patent No. 435,467, dated September 2, 1890.

Application filed December 13, 1889. Serial No. 333,645. (No model.)

To all whom it may concern:

Be it known that I, EVERT M. THOMPSON, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Bran-Packers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in bran-packers, the objects of the invention being to produce a machine which will automatically impact bran to a degree of density heretofore unknown without an admixture of foreign substances, and which shall be cheap, simple, and durable in construction and easily operated.

In the process of packing bran as heretofore practiced it has been common to employ a vertically-fixed but rotating screw to force-feed the bran into the sack; but with such machines many disadvantages are experienced and many difficulties are encountered, as, for instance, with a fixed screw, owing to the elasticity of the bran, it will kick up from in front of the screw and choke up the delivering-spout in which the screw revolves and render the screw inoperative. Again, with such a screw it is necessary to employ a jacket to incase the sack to hold it in position, and also to prevent its bursting, as a great strain is exerted upon the sides of the bag before it is filled, a continuous side pressure being exerted during the action of the screw, due in a great measure to the kicking up of the bran around the screw, and, again, after completely filling the bag or sack by this process, it will be found on examination that while the bran may be tightly packed at the bottom of the sack the bran is loose and disturbed at the top.

It is the chief object of this invention to obviate these difficulties and provide a bran-packing machine which will successfully impact the maximum amount of bran into the minimum amount of space for the purpose of shipment, and I do not desire to claim a vertically-fixed rotating screw to accomplish this end.

With the foregoing objects in view my invention consists, essentially, in the combination, with a suitable frame, of a reciprocating and continuously-rotating screw, a delivering-spout surrounding said screw and adapted to extend into said sack, a movable platform or elevator to support the sack, and suitable mechanism to rotate and reciprocate the screw, substantially as hereinafter described and claimed.

It also consists in a bran-packer, comprising a suitable frame, a delivering-spout of less diameter than the internal diameter of the sack formed upon or secured to the frame and adapted to extend into the sack nearly its entire length, a rotating screw terminated in said spout and loosely journaled in bearings on the frame, gearing to rotate the screw, and a pitman or equivalent to reciprocate it, substantially as hereinafter described and claimed.

It also consists in the combination, with the frame of a bran-packer, of an elongated spout of less diameter than and adapted to extend into a sack, a continuously rotating and reciprocating screw working in said spout, a movable elevator to support the sack and contents, straps or chains connecting said elevator with a windlass or shaft, and a weighted brake-shoe to regulate and govern the descent of the elevator according to the increasing weight thereon and permit it to yield to the pounding movement of the screw as the sack is being filled, substantially as hereinafter described and claimed.

It also consists in certain details of construction and in the combination and arrangement of the several parts of the bran-packer, substantially as hereinafter described, and set forth in the claims.

Figure 1, Sheet 1, represents in side elevation, partly in central vertical section, a bran-packer constructed substantially in accordance with my invention; Fig. 2, a vertical section on dotted line 2 2, Fig. 1; Fig. 3, Sheet 2, a detail in side elevation showing the brake and mechanism that controls the movement of the elevator; Fig. 4, a detail of the cross-head connected with the screw-spindle, said figure showing the friction-rollers, their guides, and a portion of the pitman which actuates it. Fig. 5,

Sheet 3, represents in sectional detail a portion of the bran-packer, showing the sack supported in position ready to be filled with bran with its small mouth encircling the tube near the upper end, said figure illustrating the first step in the process of packing bran by my improved packer; Fig. 6, a like view showing the sack as filled with bran in a fluffy condition and just prior to compression, the sack in this condition being about one-sixth full; Fig. 7, a like view showing the bran in the sack as partially compressed and with the elevator descending. The sack at this stage of the process is about one-third filled. Fig. 8 is a like view showing the elevator as down and the sack filled with compressed bran and ready to be removed.

The relative density of the bran in the different stages of the process of filling the sack is illustrated in the four last figures of the drawings by the different densities of hatch-lines.

In brief, the process of packing bran by my improved machine is, in so far as I am aware, new in itself, it consisting in feeding bran through a spout having a screw therein into a sack, ramming or pounding said bran into the sack by reciprocations of the screw, rotating the screw in an out-screwing direction, so as to leave the bran in an undisturbed condition during the ascent of the screw, the relative movements of the screw being so timed that it will revolve to a degree equal to the full length of the threads or wings of the screw while it makes one upward stroke, thus screwing itself out of the bran during ascent, and inasmuch as this art of packing bran may be new and other mechanism than that herein shown and described might possibly be made to carry out this art, it is desired to draw a claim herein of sufficient breadth to cover varying constructions of machines embodying this principle, as well as the particular machine hereinafter fully described.

In the drawings, A represents the framework of the machine, and B the elevator or movable carriage which supports the sack, both of which may be of any suitable material and construction, the frame consisting, preferably, of two uprights A′, arranged similarly to the uprights of an ordinary freight-elevator, with a suitable base A^2 to support the uprights, and with braces connecting them.

Secured to the cross-beam of the elevator at or near its ends are plates b', which will preferably be pivoted thereto, and pivoted between these plates at their upper ends are idle wheels or pulleys b^2, around which the elevator-chain b^3 extends, said chain or other suitable equivalent being extended upward around a winding drum or shaft C, loosely journaled in bearings near the upper end of the frame A. At each end of this shaft or drum is a pulley D D′, the one D having a sheet metal or other brake-shoe d^2 partially extended around it, a weighted lever d^3 being so secured to said brake-shoe as to exert a bearing-strain upon one side thereof to tighten said shoe upon the pulley to prevent the shaft from turning until a sufficient strain is brought to bear upon it to overcome the frictional strain exerted by the weighted lever, which strain will be regulated by increasing or decreasing the weight upon the lever in accordance with the requirements determined by the quantity and quality of bran being packed and the work of the machine in packing. The pulley D′, at the opposite end of the shaft C, will have a strap or chain wound around it, to which is suspended a weight d^4 to counterbalance the weight of the elevator, which assists in elevating it, the shaft being preferably turned by hand to raise the elevator. If desired, the shaft C might be connected to the driving mechanism by belt and pulleys, or by clutch-gearing, to revolve it when it is desired to raise the elevator, which constructions and arrangements are simply matters of taste and are not essential elements of this invention.

Counterbalanced winding-drums for elevators are old, and therefore I do not desire to broadly claim one in this application.

As shown in the drawings, the braking mechanism for controlling the movement of the elevator consists of the sheet-metal shoe d^2, which is preferably slotted at its lower depending ends and has eyes d^5 formed therein, a lever d^3, pivoted to the ends of said shoe (which shoe is preferably the shape of an inverted U,) and a bracket d^6, secured to the frame of the machine and pivoted to the lever d^3 between its points of connection with the brake-shoe, which pivot forms the fulcrum of said lever and will be in close proximity to the end of the lever, where it is pivoted to the brake-shoe and considerably remote from its other pivotal point. There are many ways of constructing this brake mechanism—as, for instance, one end of the brake-shoe might be secured directly to the frame, and a lever pivoted at its end to the frame, or to a bracket thereon and to the other end of the brake-shoe, might be used. Therefore it is not desired to limit the claim in this application to this particular construction of brake mechanism. The contacting inner face of the brake-shoe will preferably be covered with leather, rubber, or other yielding and adhesive material to increase friction.

Secured to the uprights A′ at a point considerably above the elevator is a supplemental frame E, constructed of cast metal, said frame E consisting of the horizontal transverse pieces E′ E^2, which are bolted to the uprights, the vertical guide-supporting pieces E^3, and the filling and bracing-pieces E^4. It is obvious that this supplemental frame might be constructed of wrought metal and in pieces bolted together; but it is preferable to cast it in a single piece.

Secured to or formed a part with the lower

transverse piece E^3 of the supplemental frame E, central with relation to its ends, is a vertically-depending spout E^5, which is provided with a communicating chute E^6 at its upper end, set at the proper degree to receive and direct the bran into the delivering-spout E^5, and formed upon or secured to the upper transverse piece E′ is a journal-box (or half-box) E^7, the center of which is directly in a vertical line with relation to the diametrical center of the delivering-spout.

Journaled in the box E^7 is a sleeve f', having preferably a square journal-bearing therethrough, and keyed to the upper end of this sleeve is a horizontally-rotating bevel gear-wheel F. Loosely journaled in the sleeve f' is the square shank of a conveyer-screw F′, which screw extends into the delivering-spout E^5, as clearly shown in Fig. 1, the threads or helix-shaped wing f^2 of the screw being in practice wide and about one-third the length of the delivering-spout in which it revolves. Secured to the square shank of the screw, considerably above the upper end of the spout E^5, through the medium of a sleeve f^3, preferably divided vertically and flanged at its upper and lower ends and having a square central opening through which the shank extends, is a cross-head F^2, said cross-head being preferably constructed in two pieces bolted together and having a central vertical journal-bearing box to engage the sleeve f^3 in a manner to permit said sleeve and the shank extended through the sleeve to rotate freely therein. There are many ways of making this connection—as, for instance, the square shank might be turned round at this point to form a journal to be engaged by the journal-box of the cross-head, and collars may be secured to the shank above and below said cross-head to prevent vertical displacement. Therefore I do not desire to limit myself to the exact construction and arrangement shown. Pivoted to the ends of the cross-head F^2 are guide-wheels f^4, having preferably V-shaped grooved peripheries, which ride upon the V-edge of guide-plates f^5, secured to the vertical pieces E^3 of the supplemental frame E. Pivoted to one side of the cross-head F^2 centrally is a pitman F^3, which is pivoted at its upper end to the face of a vertically-rotating bevel-wheel F^4, which meshes with the bevel-wheel F, said bevel-wheel F^4 being keyed to the main horizontal shaft F^5 of the machine, said shaft having the fast and loose pulleys F^6 F^7 at its other end. Both this shaft and the winding-drum will preferably be provided with balance-wheels.

Instead of a pitman other suitable mechanism may be used to reciprocate the screw F′. Therefore I do not desire to limit myself to the use of a pitman.

The operation of my improved machine is as follows: First, I take a sack having its upper end sewed up with the exception of an opening substantially equal in area to the diameter of the delivering-spout, fasten it upon hooks suspended from a string or rope extended over pulleys, with its mouth encircling the tube or spout close to its upper end and its bottom in near proximity to the lower end of the spout, as clearly shown in dotted lines, Fig. 1. The ropes which suspend the empty sack are provided with weights, as shown, to counterbalance the weight of the sack and allow it to descend with the elevator. In this position the bag hangs loose and wrinkled. Second, the elevator is then raised by means of the winding drum or shaft until the platform is within a few inches of the bottom of the sack. Third, the machine is then started, the bran being fed into the delivering-spout and is force-fed by the screw therein into the sack. The first action of the bran within the sack is to spread the bag lengthwise and diametrically inflating it with loose fluffy bran and rubbing out by distention all the wrinkles, when it will settle down upon the elevator-platform, as the bran in the primary step of filling the sack, meeting with no resistance, will, owing to its fluffy and elastic qualities, rise up around the tube or spout and completely fill the bag or sack, without straining it, from top to bottom, and in consequence of the loose and fluffy bran rising up to the top of the sack and completely surrounding the tube (which tube is directly central with relation to the sack and occupies but a small portion of its area) a solid wall of fluffy bran is formed between the tube and sack, which, together with the tube, which is stationary, stays and supports the bag in a vertical position and axially aligned with the tube or spout while the packing and pounding process continues, thus positively insuring a central action of the screw with relation to the sack and obviating any tendency to side or uneven filling. The screw has a constant rotation both in its descent and ascent, and such constant rotation has an essential function—*i. e.*, in its ascent it screws out of the bran being fed into the spout, leaving the bran centrally in the sack to be operated upon and displaced in its descent, and in its revolving descent, in consequence of the pitch to the bottom flange or thread, it not only compresses the bran by its quick-pounding movement, but acts as a conical wedge after such compression, and by its revolving movement forces, as a wedge, the compressed bran toward the inner wall of the sack, the tufty bran arching in its resistance to the stroke of the screw, thereby equalizing the strain by distributing the effect of the stroke over a large area of the inner surface of the sack, which prevents bursting of the sack at a weak point. Owing to the great power required to depress the elevator, which is governed by the weighted brake-shoe and will be regulated according to the kind of bran being packed and the required density of packing, the elevator will not begin to descend until the bran has attained the required density and a density which will resist the pounding of the screw

in its reciprocations, and a reactionary force results great enough to overcome the weighted resistance of the elevator, which may be nicely governed by this machine. As the bran continues to flow and is pounded home, the elevator gradually descends on account of the increasing bulk in the sack and the resistance of the packed bran to the pounding of the screw, which will be continuous until the sack is filled. These steps in the operation of filling sacks and packing the bran therein, as referred to hereinbefore, are fully illustrated by Figs. 5, 6, 7, and 8, Sheet 3.

The screw as arranged and operated in my machine has three distinct functions, every one of which is absolutely essential to the perfect working of the machine—*i. e.*, feeding, pounding, and displacing. In practice after the machine is at work—that is, after the sack has been distended and the bran first begins to solidify—the first of these operations or functions occur last. Assuming the bag or sack to be sufficiently filled to resist somewhat the pounding action of the screw, as shown in Fig. 6, Sheet 3, the screw will in its downward movement impact or pound the bran in advance of it and will force the greater portion of the bran at the same time aside. It then screws out, and as it screws out leaves the loose bran force-fed into the sack from the spout during the operation of pounding in position to be acted upon by the screw in its next descent. The pounding, displacing, screwing out, and feeding or depositing continues until the sack is filled with impacted bran. The screw rotates in a direction opposite to the inclination of the threads or spiral wings or reversed as a screw-propeller. If the screw was to revolve without reciprocation, the action and result would be the same as in the old bran-packers and as fully described in the preamble of this specification, and if it should reciprocate without revolving the bran would practically cease to flow owing to the bran in the sack filling the displacement at each ascent of the screw and choking the mouth or outlet of the bran-delivering spout. By my construction and arrangement—that is, by providing a delivery or directing spout of very small diameter and greatly less than the internal diameter of the sack, and by sewing up the bag at the mouth with the exception of the space occupied by the spout, which extends into it—I am enabled to completely fill a sack, keep the sack in a vertical position, obviate breaking or tearing the same at weak points by uniform distribution of straining forces, and dispense with incasing-jackets therefor, now commonly used, and, again, after the sack has been completely filled I am enabled to close the mouth thereof without overflow and waste.

I am aware that a machine has been constructed to pack salt, flour, and other like materials having a tamper which reciprocates and revolves, but only revolves in its ascent to screw out of the material, such machine only being used to pack salt and inelastic materials in solid cases—such as barrels—it having flat horizontal wings at the end of the screw to act upon the salt. This machine has no tube or spout to extend into the barrel, and even if it had it is entirely inadequate for the purpose my machine is intended, as will be clearly apparent to any one skilled in the art of packing bran or materials of an elastic and fluffy nature, and therefore it is not the object of this invention to cover any such construction, arrangement, or operation, and for that reason is disclaimed.

My machine is intended solely for the purpose of packing bran and fluffy materials in cheap sacks, to obviate the expense of barrels, and to lessen the expense of shipment and exporting; also, to dispense with sack-incasing jackets and save time in packing, and to do this it is absolutely necessary that the machine be provided with a fixed long tube of considerably less diameter than the internal diameter of the sack, provided with a diametrically-small screw with inclined wings to continuously rotate and reciprocate in said tube, the continuous rotation of the screw in its descent acting to displace by centrifugal force the centrally-impacted bran (like the operation of a conical wedge) to the sides of the sack, as before stated, arching the bran and distributing evenly the strain over the whole internal area of the sack, which is the greatest desideratum in perfect bran packing in sacks.

In so far as I am aware it is entirely new with me to combine with a small bran-delivering tube or spout a reciprocating and continuously-rotating screw for packing in the manner described.

I claim—

1. A machine for packing bran and other materials of an elastic and fluffy nature in sacks having a vertically-reciprocating and continuously-rotating screw with inclined wings, a tube to extend into the sack and surrounding the screw, said tube being of a diameter greatly less than the internal diameter of the sack, and gearing mechanism to reciprocate and rotate said screw continuously, substantially as described, and for the purpose set forth.

2. In a bran-packer, a suitable frame, an elevator movably secured thereto, a small delivering spout or tube adapted to extend full length into the sack, a screw working in said spout and loosely journaled in vertical bearings, and gearing to continuously rotate and reciprocate said screw simultaneously, substantially as and for the purpose described.

3. That improvement in the art of packing bran or materials of a fluffy and elastic nature in sacks, which consists in, first, extending a tube of small diameter centrally into a sack and closing the mouth of the sack around the tube; secondly, force-feeding bran through said tube, so that owing to its fluffy and elastic nature it will rise and surround the tube

and in a measure distend the entire sack; thirdly, pounding the bran at the end of the tube and at the same time, or substantially so, displacing the greater portion thereof radially, which further distends the entire sack and arches the bran, as shown, thereby equalizing the strain on the sack by equally distributing the bran; and, fourthly, by continuously feeding bran and repeatedly pounding and displacing the same, as set forth, completing the compression and the operation of packing, the tube being gradually withdrawn as compression proceeds, substantially as described.

4. In a bran-packer, the fixed spout E^5 of sufficient length to extend approximately the full length of the sack, a movable elevator to support the bag or sack, the screw F′, the shank of which is journaled so that it may be continuously rotated and reciprocated, and which works in said spout, the horizontally-rotating bevel-wheel F, connected with the shank of the screw, the vertically-rotating bevel-wheel F^4, meshing continuously with the wheel F, the cross-head F^2, secured to the screw-shank, and the pitman connected therewith and with the gear-wheel F^4, all of which are so arranged that a continuous rotating and reciprocating movement is given to the screw, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

EVERT M. THOMPSON.

Witnesses:
N. E. C. WHITNEY,
JOSEPH A. MINTURN.