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H. BOWER.

PROCESS OF AND APPARATUS FOR PACKING BRAN.

No. 282,046. Patented July 31, 1883.

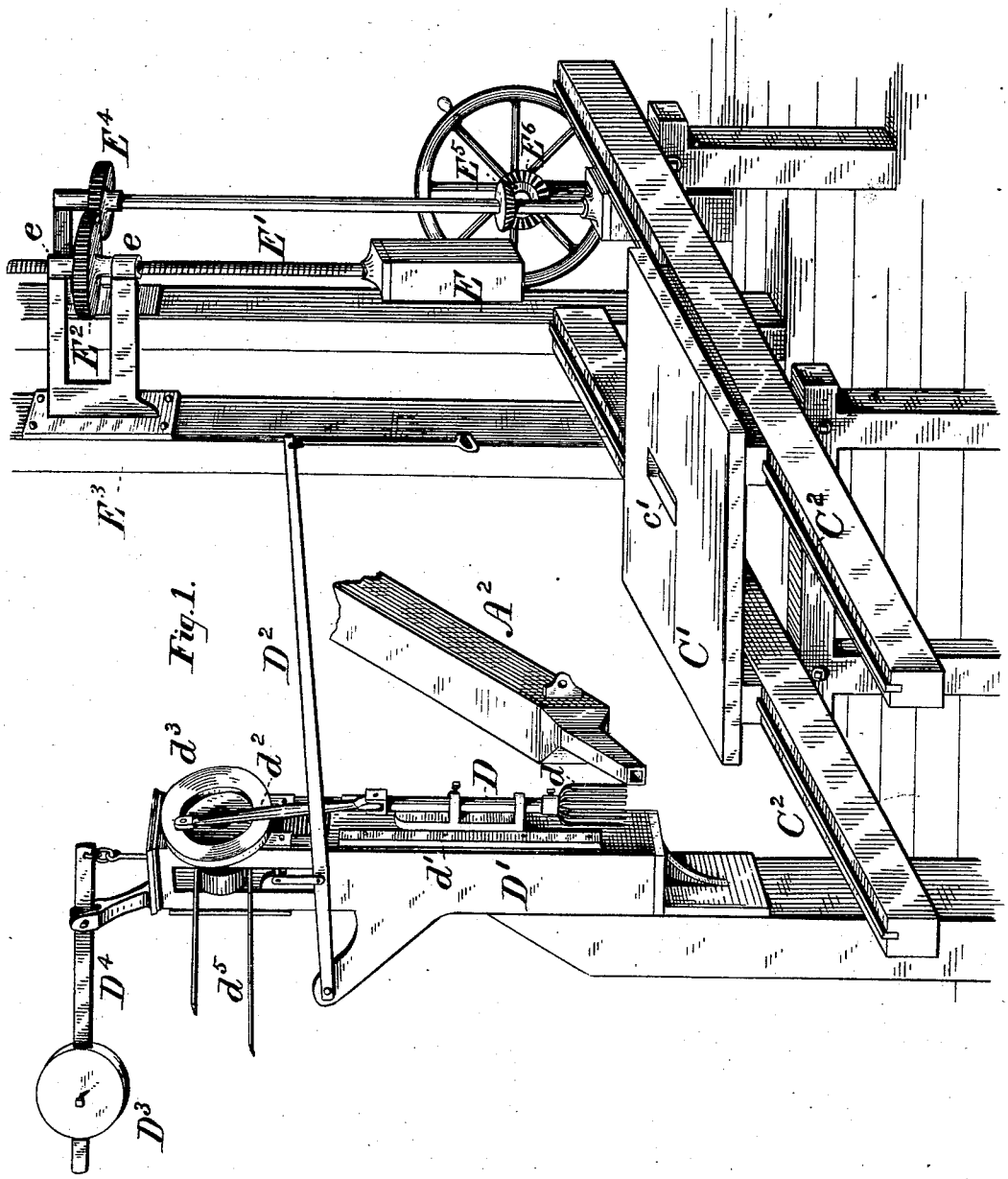


Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

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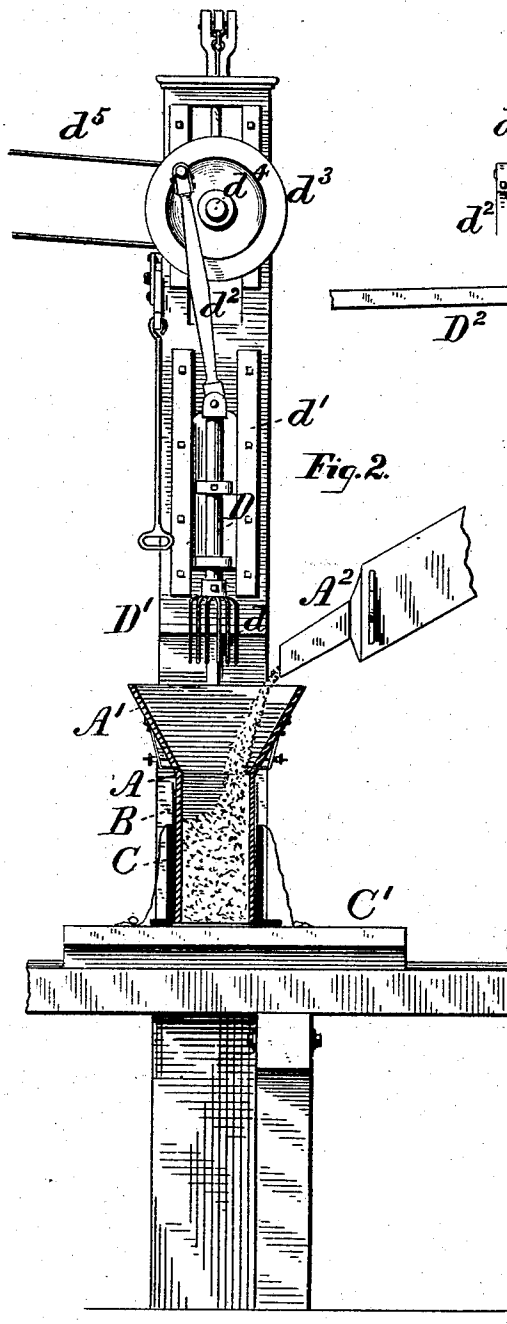


Fig. 2.

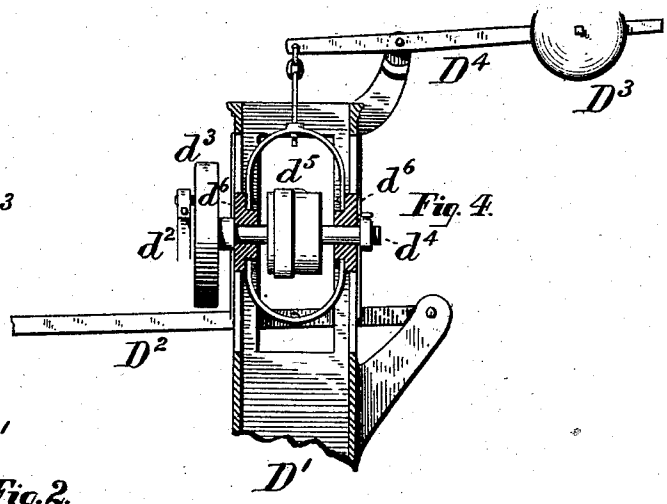


Fig. 4.

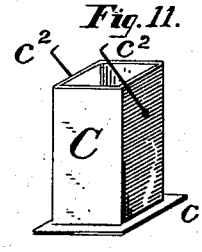


Fig. 11.

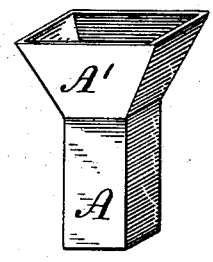


Fig. 12.

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PROCESS OF AND APPARATUS FOR PACKING BRAN.

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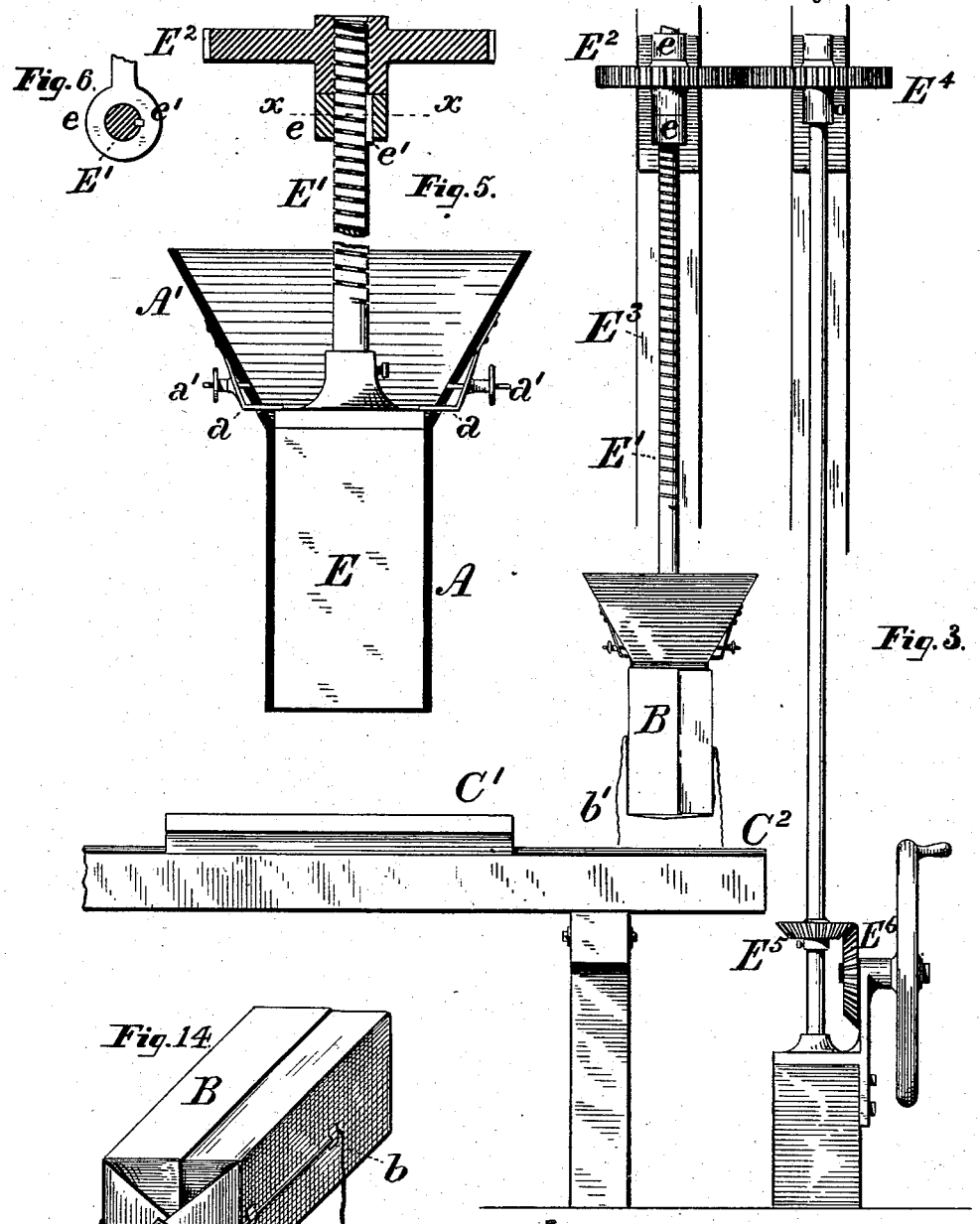


Fig. 6.

Fig. 5.

Fig. 3.

Fig. 14.

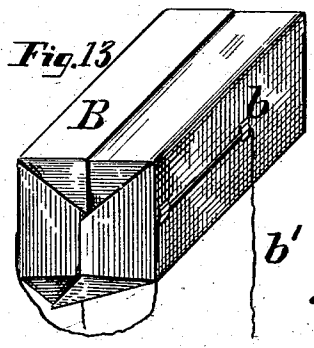


Fig. 13.

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PROCESS OF AND APPARATUS FOR PACKING BRAN.

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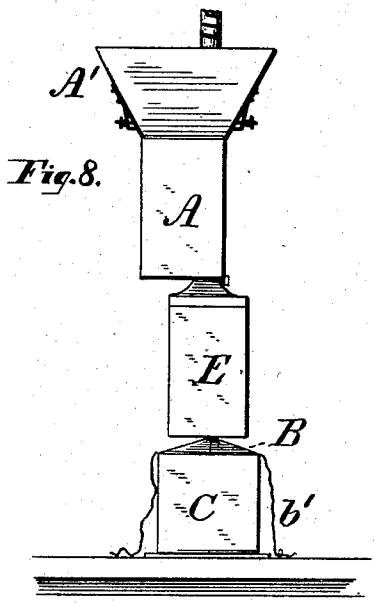


Fig. 8.

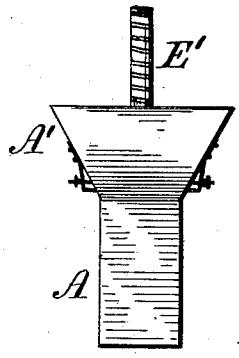
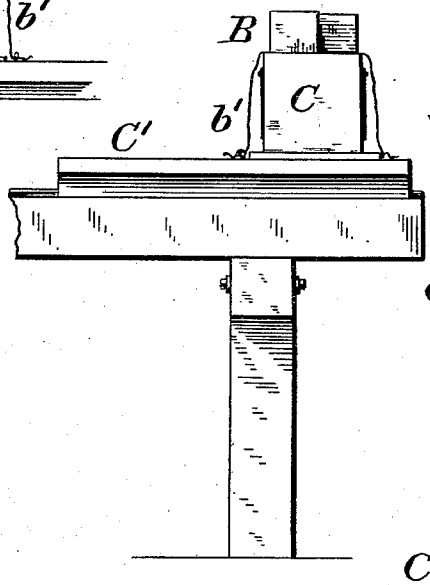


Fig. 7.



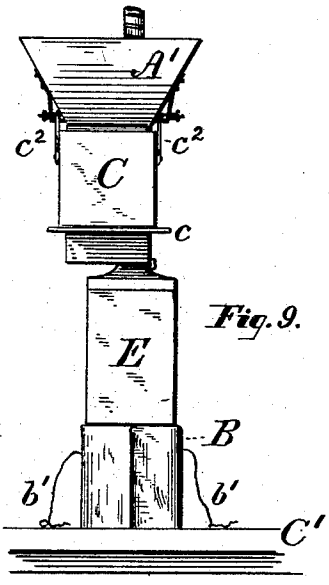


Fig. 9.

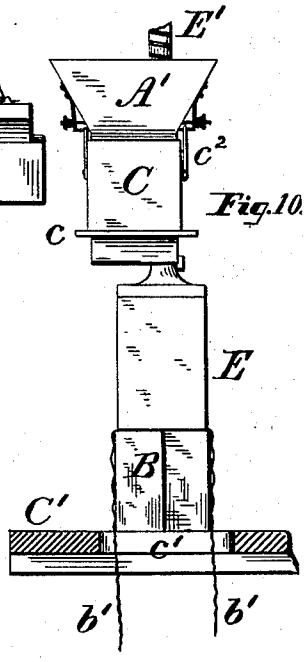
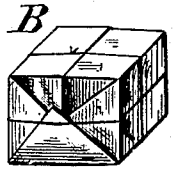


Fig. 10.

Fig. 15.



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UNITED STATES PATENT OFFICE.

HENRY BOWER, OF PHILADELPHIA, PENNSYLVANIA.

PROCESS OF AND APPARATUS FOR PACKING BRAN.

SPECIFICATION forming part of Letters Patent No. 282,046, dated July 31, 1883.

Application filed May 22, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY BOWER, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Process of and Apparatus for Packing Bran or other Flaky or Scaly Materials, of which improvements the following is a specification.

The object of this invention is to provide convenient and effective means for compressing into and retaining in the smallest practicable compass bran or other comminuted material of a flaky or scaly character, in order to effect, as far as may be, economy of space in storage and transportation.

To this end my invention consists in a certain novel method or process of packing said materials, and in certain novel devices and combinations of mechanism for the practice of said process, all as hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a view in perspective of an apparatus for packing bran in accordance with my invention; Fig. 2, a side view, partly in section, of that portion of the apparatus in which the filling and adjusting and settling operations are effected; Fig. 3, a side view in elevation of the portion in which the operation is completed; Fig. 4, a vertical transverse section through the upper portion of the column supporting the adjusting and settling bar; Fig. 5, a vertical section on an enlarged scale through the feed-hopper and filling-chamber; Fig. 6, a horizontal section through the packer-shaft at the line *x x* of Fig. 5; Fig. 7, a view in elevation illustrating the filled package after compression and before being folded together at top; Fig. 8, a similar view illustrating the package after being folded and before being tied; Figs. 9 and 10, views in elevation illustrating, respectively, different methods of tying the folded package; Fig. 11, a view in perspective of the compressing-chamber, Fig. 12, a similar view of the feeding-hopper; Fig. 13, a view in perspective of the filled package, showing the manner of folding its ends; Fig. 14, a similar view with the end folded preparatory to being tied; and Fig. 15, a similar view of the package after being tied and ready for storage or shipment.

The economical utilization of bran, which is produced in large quantities in the manufacture of flour, has been heretofore impracticable by reason of the difficulty encountered in reducing its bulk to a sufficient extent to enable it to be transported from the mill to the consumer at a reasonable cost. Such difficulty is due to the fact that it is separated from the grain in the condition of thin and light flakes or scales, which, being strong and elastic and lying loosely one upon the other, occupy, in mass, a large bulk relatively to their weight, and oppose a comparatively great resistance to compression, both by reason of their elasticity and of the absence of angular faces adapted to interlock.

My invention is designed to enable bran or materials of kindred character to be compressed into packages of such form and size relatively to the weight of their contents as shall render them susceptible of being cheaply transported, and from which the material may be removed, whenever desired, in proper condition for use.

In the practice of my invention, I first take a strip or sheet of paper or other material suitable for the formation of a wrapper or package and fold it around a former into an open-ended tube, which is preferably of rectangular cross-section. Stout Manila paper, or that which is used in the manufacture of sand or emery paper, I have found well adapted to the purpose, as possessing in a sufficient degree the necessary qualities of strength, toughness, and pliability. The tube so formed, having been closed at one end by folding over, is then inserted in a casing or cover of corresponding form, and the bran is fed into the tube up to its top, being subjected continuously during the feed to the action of a series of adjusting and settling rods or prongs, by which those particles of the bran which stand on edge relatively to the mass are caused to seek and find a horizontal position, and a preliminary condensation of the bulk of the mass is effected. The filled package of adjusted and settled material is next subjected to the action of any suitable compressor, by which the bulk of its contents is reduced to the required minimum; and in such reduction the upper level of the compressed bran is carried so

far below the top of the tube as to leave sufficient of the material thereof adjacent to its open end free to be folded over and closed upon itself to form a cover for the tube or package. The tube is then folded over and closed at its open end and securely tied—preferably while under compression—in which condition it is ready for storage or shipment. Preparatory to the folding of the paper into the tube, as first mentioned, the binding-cord should be passed through loops or eyes upon the sheet of paper, so as to be held in proper position, and in readiness to be tied at the conclusion of the operation.

The several steps of the process involved in the practice of my invention may be suitably performed by the employment of the apparatus illustrated in the drawings, which will now be described. Sundry details of the mechanism of said apparatus may, obviously, be varied, in the discretion of the constructer, without departing from the spirit of the invention.

Having provided a series of sheets of paper or other material proper for the formation of the wrapper in which the compressed bran is to be inclosed, I take one of said sheets and fold it into the form of an open-ended tube, around a metallic former, A, which in this instance serves as a filling and adjusting and settling chamber, and is provided at its top with a flaring mouth or supply-hopper, A′. The sheets from which the wrappers B are formed are previously cut to the proper dimensions, and loops *b* are pasted upon them, through which the tying-cords *b′*, by which the packages are secured, are passed, said loops serving to retain the cords in proper position to be conveniently made fast at the termination of the operation. The former A and folded wrapper B are next inserted in a compressing-chamber, C, the transverse section of which corresponds with that of the folded wrapper, said chamber serving as a casing or cover, and being provided with a series of feet, or a lower flange, *c*, by which it is supported upon a horizontal table, C′, having a slot or opening, *c′*, and adapted to slide longitudinally upon rails C^2. Hooks c^2 are pivoted to the sides of the compressing-chamber, to enable the same to be coupled to the feed-hopper, for a purpose hereinafter set forth. The table C′ is then moved into such position as to bring the chamber and wrapper beneath and in line centrally with an adjusting and settling bar, D, having a series of prongs or rods, *d*, upon its lower end, and fitted to reciprocate on guides *d′*, secured to a standard, D′, adjacent to the supporting-rails of the table. The bar D is coupled by a connecting-rod, d^2, to a crank arm or wheel, d^3, secured upon a shaft, d^4, which carries fast and loose pulleys for the reception of a driving-belt, d^5, and is mounted in bearings d^6, which are fitted to slide vertically in slots in the standard D′. A lever, D^2, pivoted to the standard and to a transverse bar connecting the bearings d^6, serves to raise and lower the shaft and adjusting and settling bar, as required, the weight of said members being compensated by a counter-balance, D^3, secured upon a lever, D^4, pivoted to the standard and to an upper brace connecting the bearings.

The shaft d^4 and adjusting and settling bar D having been lowered to a position proper to enable the adjusting and settling prongs to act upon the material at the bottom of the filling-chamber, as nearly as may be, the shaft is rotated, so as to impart reciprocating movement to the adjusting and settling bar and prongs, and the bran or other material to be packed is supplied to the feed-hopper and filling-chamber through a spout or conduit, A^2. In proportion as the chamber A becomes filled with the material the shaft and bar D are gradually elevated by the lever D^2, without interrupting the reciprocation of the adjusting and settling prongs, until the chamber is filled and a proper preliminary condensation of its contents has been effected by the continuous adjusting and settling operation to which they have meanwhile been subjected. The table C′ is next moved along the rails C^2 until the filling and compressing chambers, with the interposed wrapper and the adjusted and settled charge of material, are brought beneath and centrally in line with a packer or compressor, E, and the latter is, by any mechanism proper to impart a sufficient degree of pressure, forced into the filling-chamber and upon the adjusted and settled charge therein until the latter is compressed to the required extent, at which time its upper level will be at a sufficient distance below the upper edge of the wrapper to admit of the same being turned in and folded over, so as to completely cover and inclose its contents. The filling-chamber and hopper are then coupled to the packer, and are withdrawn with it from the wrapper after the compressing operation, the wrapper remaining within the compressing-chamber, as seen in Fig. 7.

In the construction shown in the drawings the packer E is secured upon the lower end of a vertical screw, E′, engaging a gear, E^2, rotating between bearings *e* on a standard, E^3, adjacent to the rails C^2 of the table C′. Rotation of the screw is prevented by a key, *e′*, engaging a slot in one of the bearings *e*, and entering a longitudinal groove in the screw E, and longitudinal movement is therefore imparted to said screw by the rotation of the gear E^2—in this instance by gears E^4, E^5, and E^6, driven by a suitable prime mover. A pair of springs, *a*, secured to the sides of the hopper A′, serve to enable the same to be connected to and disconnected from the packer E, said springs, when pressed outwardly, permitting the packer to enter and pass freely in the chamber, and when allowed to resume their normal inward position they engage the top of the packer on its ascending movement, and thereby cause the hopper A′ and chamber

A to be elevated from the wrapper and compressing-chamber by the upward movement of the packer.

The packer having been raised from the compressed charge of material, the wrapper is then folded over at top, and the feed-hopper and adjusting and settling chamber being released from and swung to one side of the packer, as shown in Fig. 8, the packer is again pressed down upon the closed wrapper, which remains in the compressing-chamber, after which the compressing-chamber is raised from around the wrapper and connected to the feed-hopper by its hooks c^2, which engage studs a' on the hopper. The packer is then raised and the wrapper is securely tied and forms a completed bale or package, as shown in Fig. 15, the same being a new and useful article of manufacture, which may be conveniently handled and transported with the same degree of economy as ordinary freight, and from which the contents may be readily removed for use whenever required, without any alteration of or deterioration in their character and condition.

It is preferable that the tying operation should be effected while the bale is under compression, and this may be effected by causing it to be located, during the compressing operation, immediately above the slot c' of the table, with the ends of its tying-cord b' projecting downwardly through said slot. The cord is in such case tied from below, before the pressure of the packer is relaxed from the bale.

In lieu of securing the bale by cords, bands and clasps may be employed for the purpose; and further economy of time and labor will be promoted by the employment of suitable mechanism for performing the tying or banding operation, which mechanism, in practice, I contemplate using in connection with the apparatus. Such, however, does not, *per se*, constitute part of my present invention, and need not therefore be herein specifically described.

I claim as my invention and desire to secure by Letters Patent—

1. The improvement in the art of packing bran or materials of analogous character, which consists in simultaneously feeding and adjusting and settling a charge of the material in a folded flexible wrapper, subjecting the adjusted and settled charge of material to compressive action, closing the wrapper upon the charge, and securing the completed bale or package by cords or bands, substantially as set forth.

2. The improvement in the art of packing bran or materials of analogous character, which consists in folding a flexible wrapper into the form of a tube which is open at one end, inclosing the folded tube in a casing or cover, feeding the material to be packed to said tube, and subjecting it during the feed to the operation of adjusting and settling, subjecting the adjusted and settled charge of material to compressive action, folding over the open ends of the tube and removing its protecting cover or casing, and finally securing the completed bale or package by cords or bands, substantially as set forth.

3. The improvement in the art of packing bran or materials of analogous character, which consists in filling, adjusting, and settling and compressing a charge of material in a folded flexible wrapper, and securing said wrapper, while under compression, by cords or bands, substantially as set forth.

4. In an apparatus for packing bran or materials of analogous character, the combination, substantially as set forth, of a former, a casing or cover, mechanism for adjusting and settling a charge of material, and mechanism for compressing said charge.

5. In an apparatus for packing bran or materials of analogous character, the combination, substantially as set forth, of an adjusting and settling bar carrying a series of rods or prongs, a shaft adapted to impart reciprocating movement to said adjusting and settling bar, and mechanism for moving said shaft and its bearings in the line of the movement of said bar during and without affecting said movements.

6. In an apparatus for packing bran or materials of analogous character, the combination, substantially as set forth, of a slotted table or support and a packer or compressor adapted to reciprocate perpendicularly thereto, these members being combined for joint operation to admit of the tying or securing of a bale or package while subject to the compressive action of the packer.

7. In an apparatus for packing bran or materials of analogous character, the combination, substantially as set forth, of a supporting-table, a filling-chamber, a reciprocating adjusting and settling bar and prongs, a track or way on which the filling-chamber is adapted to traverse longitudinally, and a packer or compressor adapted to reciprocate adjacent to said track.

8. The combination, substantially as set forth, of a filling-chamber and a casing or cover adapted to surround and be connected to and disconnected from said chamber.

9. The combination, substantially as set forth, of a reciprocating packer or compressor and a filling-chamber adapted to be connected and disconnected from said packer.

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