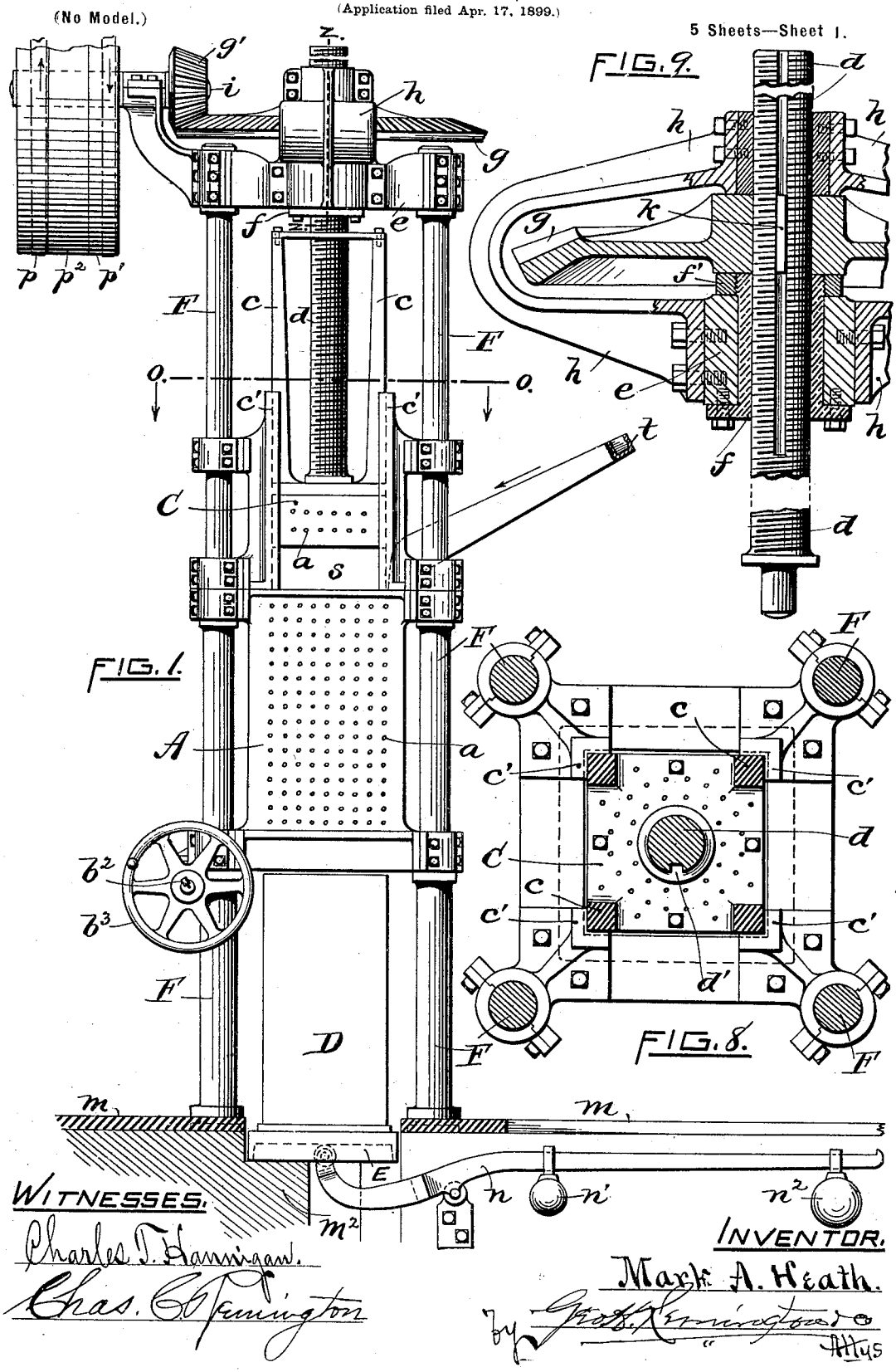
No. 647,490. Patented Apr. 17, 1900.

M. A. HEATH.

BALING PRESS.

(Application filed Apr. 17, 1899.)

(No Model.) 5 Sheets—Sheet 1.



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(No Model.) (Application filed Apr. 17, 1899.)

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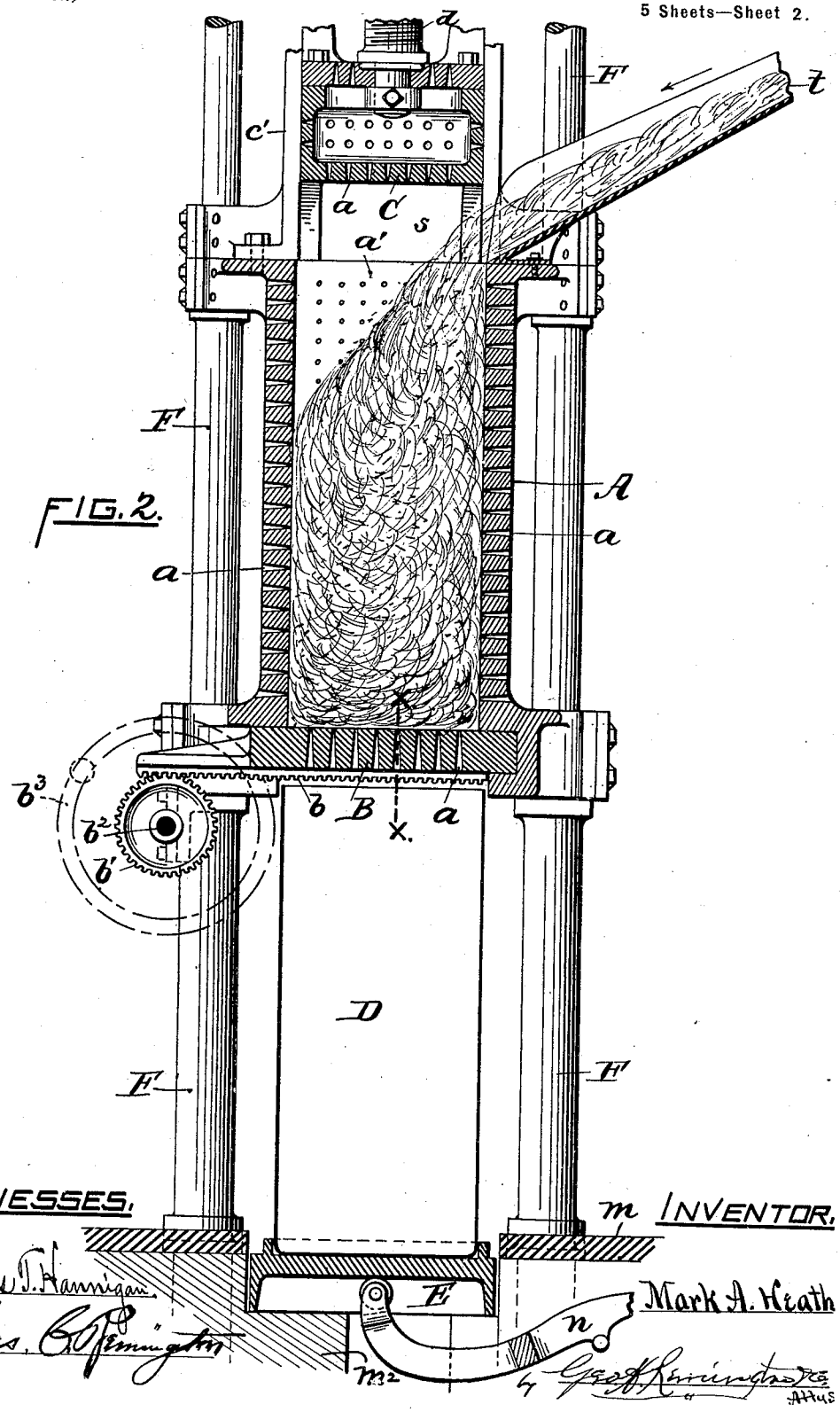

FIG. 2.

WITNESSES.

Charles T. Hannigan.

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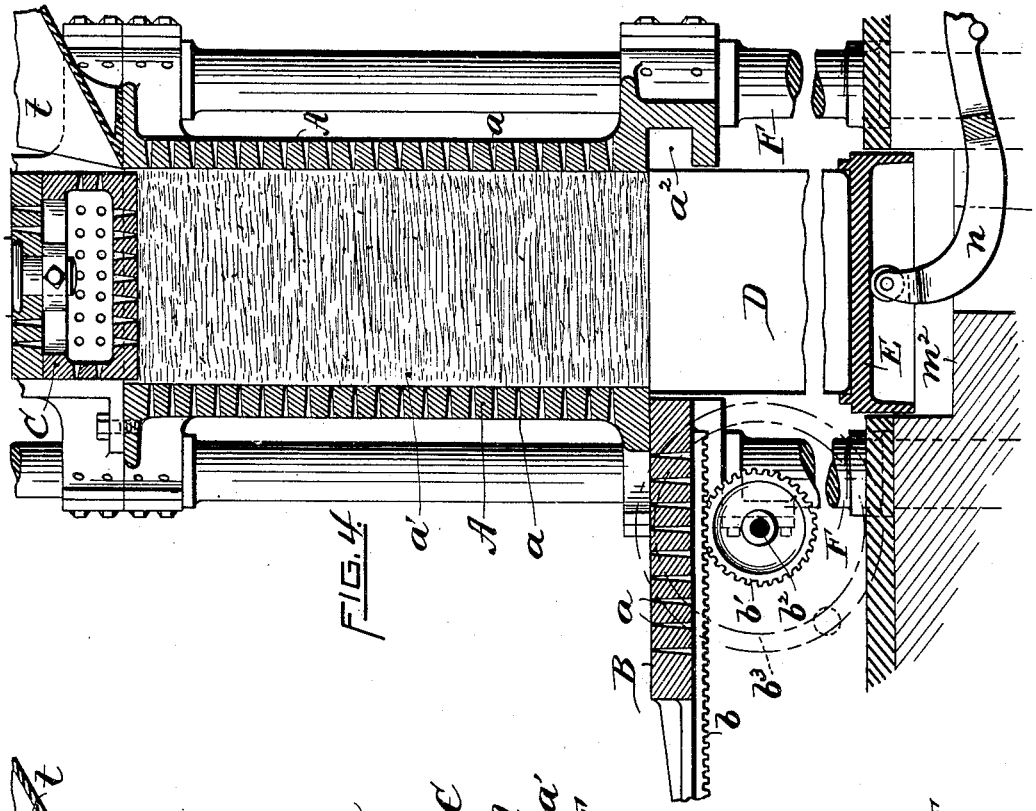
(No Model.) 5 Sheets—Sheet 3.



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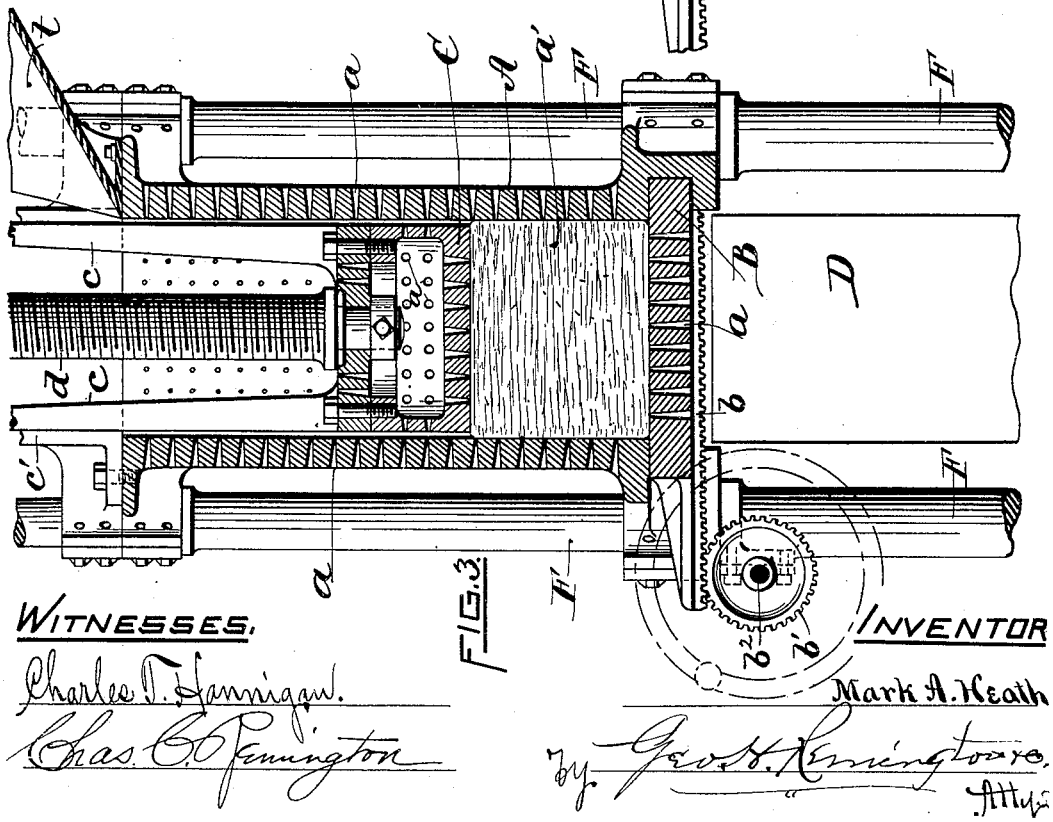

FIG. 3.

WITNESSES.

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No. 647,490. Patented Apr. 17, 1900.

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(Application filed Apr. 17, 1899.)

(No Model.) 5 Sheets—Sheet 4.

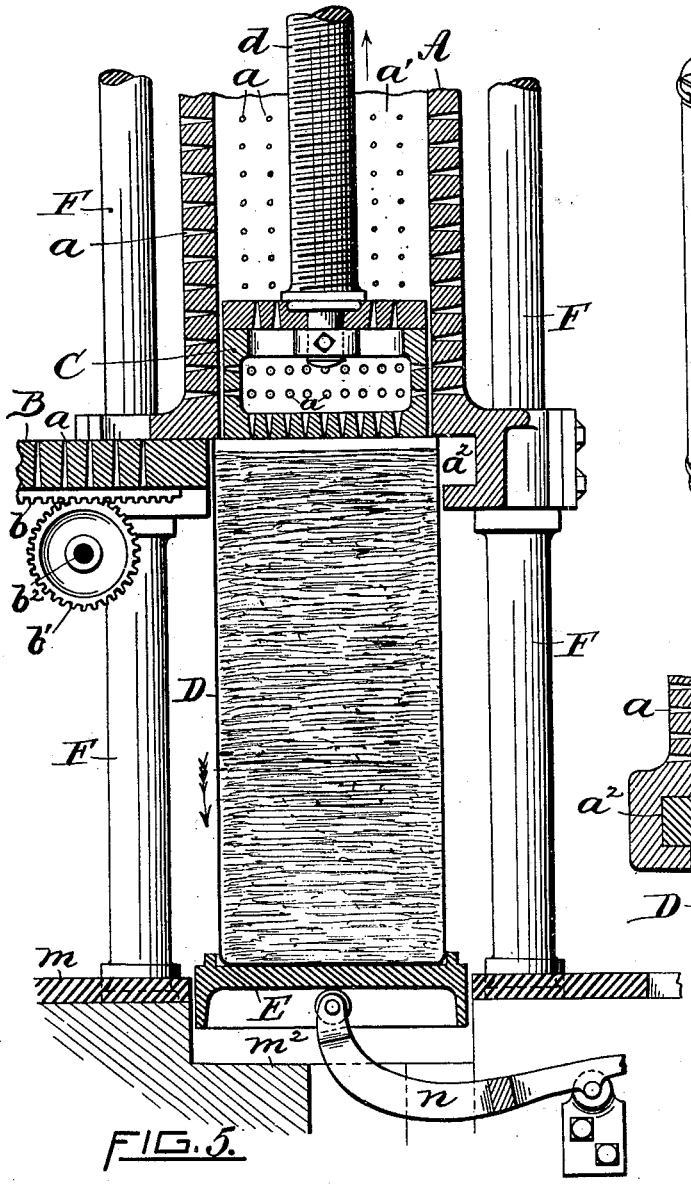

FIG. 5.

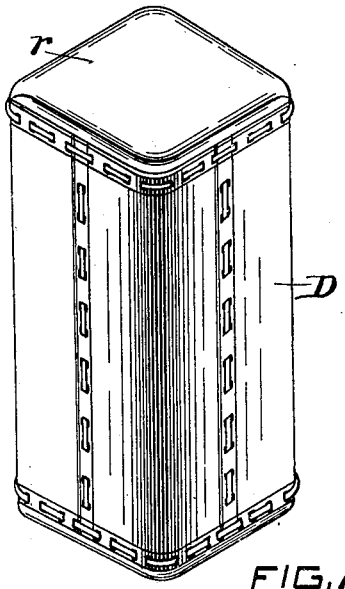

FIG. 12.

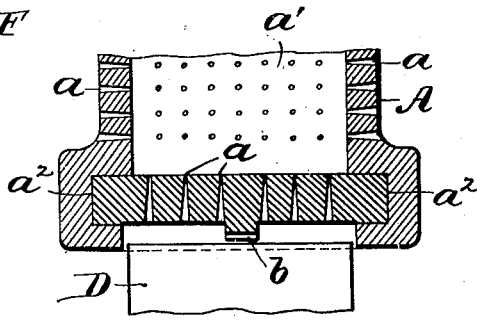

FIG. 6.

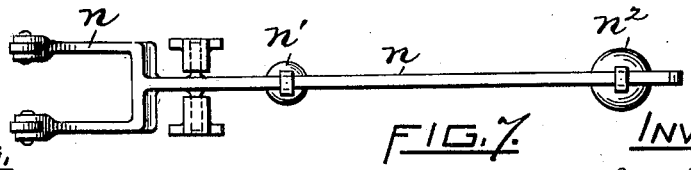

FIG. 7.

WITNESSES.

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No. 647,490. Patented Apr. 17, 1900.

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BALING PRESS.

(Application filed Apr. 17, 1899.)

(No Model.) 5 Sheets—Sheet 5.

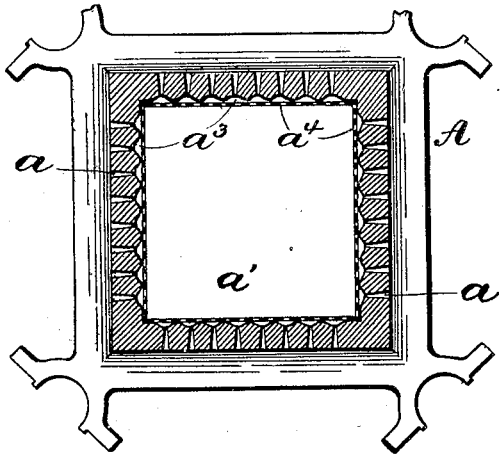

FIG. 11.

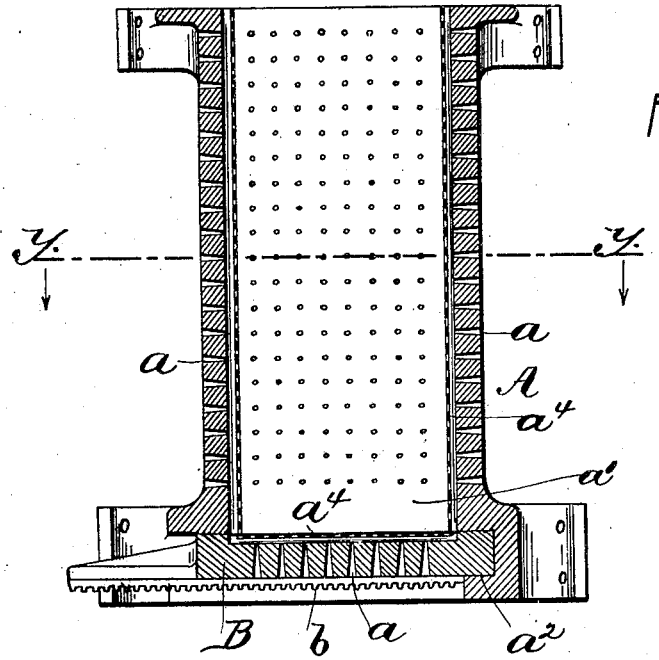

FIG. 10.

WITNESSES.

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Chas. B. Pennington

INVENTOR.

Mark A. Heath.

by Geo. H. Remington & Co

Attys

UNITED STATES PATENT OFFICE.

MARK A. HEATH, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE AMERICAN COTTON-BALE COMPANY, OF SAME PLACE.

BALING-PRESS.

SPECIFICATION forming part of Letters Patent No. 647,490, dated April 17, 1900.

Application filed April 17, 1899. Serial No. 713,278. (No model.)

To all whom it may concern:

Be it known that I, MARK A. HEATH, a citizen of the United States of America, and a resident of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Baling-Presses, of which the following is a specification.

My invention relates to certain improvements in baling-presses and in the method of compressing cotton, &c., into bales; and it consists in the novel construction and arrangement of parts hereinafter fully set forth and claimed, the class of pressing or baling machines to which the invention more particularly relates being that employed for pressing cotton or other analogous fibrous material into bales.

Baling presses or compresses as usually devised are as a rule very large, heavy, and expensive machines. In pressing cotton or similar fibrous matter it is very desirable that practically all the air be forced or squeezed out, thereby rendering the bale more compact and giving it greater specific gravity or weight. I believe it is due to the presence of confined air in the bale that renders the usual pressing process so comparatively slow and expensive—that is to say, while the cotton may be compressed within certain limits with a comparatively small initial power or pressure and with corresponding rapidity it will be found that to compress the material, say, some ten per cent. further or to the usual maximum degree a very much greater pressure will be required to complete the operation, such increased pressure being largely, if not wholly, expended in expelling the confined air from the bale or package, and more especially so when the cotton is being compressed into a casing or covering having closed or imperforate sides.

The primary object I have in view is to produce a baling-press having a capacity equal to or exceeding that of analogous presses as heretofore produced, my improved press being at the same time both smaller and lighter and correspondingly less expensive.

Another object of the invention is to provide the press with a press-box having perforated sides and ends, thus permitting the air to escape freely under a comparatively small pressure.

Another object of the invention is to provide a mechanically-movable base for the press-box, the same being located directly above and registering with the bale covering or casing mounted below it, the upper end of the casing being open, so as to receive the compressed cotton when the base of the press-box is retracted.

Still another object of the invention is to provide the press with an adjustable automatic weighing device, whereby the weight of the bales may be made uniform before removal from the press.

In the accompanying five sheets of drawings, Figure 1 is a side elevation of the press complete, the parts being in the normal position preparatory to feeding the cotton into the press-box and forming the bale. Fig. 2 is a corresponding vertical central sectional view, in enlarged scale, some of the parts being omitted, the cotton being fed into the press-box. Fig. 3 is a similar view showing the press-box partly filled with a charge of cotton and being compressed by the plunger. Fig. 4 is a similar view, the press-box being full of compressed cotton and showing the base retracted preparatory to discharging the compressed cotton into the open casing beneath. Fig. 5 is the same, showing the cotton forced into the casing. Fig. 6 is a transverse section taken through bottom of press-box, &c., on line *x x* of Fig. 2. Fig. 7 is a plan view of the weighing device. Fig. 8 is a horizontal section, in enlarged scale, taken on line *o o* of Fig. 1. Fig. 9 is a vertical section, enlarged, taken on line *z z* of Fig. 1. Fig. 10 is a vertical central section of the press-box, showing a modified construction. Fig. 11 is a horizontal section taken on line *y y* of Fig. 10, and Fig. 12 is a perspective view of the complete bale removed from the press and ready for shipment.

In my improved baling-press are embodied the following parts or instrumentalities: a perforated press-box A, an endwise-movable apertured base B for said box, means for effecting such movement of the base, means for feeding the cotton into the press-box, a vertically-movable apertured plunger C and

mechanism for operating the same for compressing the cotton in the press-box and forcing it therefrom into the casing beneath, a separable metallic casing D, forming a practically-impervious covering for the cotton, and a weighing device supporting a movable platform E, on which the casing and bale rest.

In the drawings the construction and arrangement of the several parts constitute an upright or vertical baling-press. As thus arranged the machine requires less area or floor-space, the frame can be made somewhat lighter, and the moving parts are readily accessible and in full view of the operator.

The frame proper as drawn consists of a series of four strong iron columns F, adapted to be firmly secured to the foundation. The press-box A is supported by the columns and maintained in position thereon by means of suitable fastening devices. The distance from the floor m to the lower end of the press-box exceeds the length of the bale, thus permitting the casing D to be readily placed in position and removed from the press at will. The upper portion of the frame carries the plunger-operating mechanism, all as clearly indicated in Fig. 1.

The press-box A is provided with thick-walled sides, having numerous holes or perforations a therethrough communicating with the pressing-chamber a', the latter practically forming the mold or counterpart of the compressed bale. The holes a may be conical—that is, the greatest diameter being at the outer surface of the walls. This is done so that the air expelled from the cotton during the pressing operation will escape more readily, while at the same time the holes are less liable to become filled or clogged with lint, &c. The lower end of the press-box is provided with side grooves a^2, in which the base B is slidably mounted. The member B is also perforated and is further provided with a toothed rack b. The latter is formed on the lower side and extends beyond the frame, so as to mesh into the small gear-wheel b', secured to a shaft b^2, mounted to revolve in suitable bearings. For convenience of operation the shaft may be provided at each end with a hand-wheel b^3. The base B closes the end of the press-box while the cotton is being compressed, (see Figs. 2 and 3,) but is retracted in order to permit the compressed cotton to pass from the box into the metallic bale-covering. (See Figs. 4 and 5.)

The plunger or piston C is adapted to move vertically in the pressing-chamber a' and is attached to and actuated by the strong screw d, the screw being arranged to turn in the end of the piston in any well-known manner. The piston is hollow, the several sides or walls thereof being perforated substantially the same as the sides of the press-box. The piston is provided with vertical corner connections c, which coacting with the vertical stationary grooved casting c', secured to the columns F, form guides for the piston, whereby the latter is maintained in alinement throughout its travel up and down in the pressing-chamber.

The screw-operating mechanism may be described as follows: To the upper end of the columns F is rigidly secured a heavy head-casting e, which is bored out centrally to receive the long stationary nut f. The latter extends upwardly through the casting e and in connection with a fixed collar f' forms a support for the large bevel-gear g. This gear is bored to freely receive the screw d and is provided with a spline or keyway in which is fitted a key k, the latter also fitting a corresponding spline d', formed in the screw. In order to keep the gear in position vertically, a split yoke h may be employed, the same being bolted to the said casting e, all as clearly shown in Figs. 1 and 9. In Fig. 1 I have represented means for rotating the said gear g. As drawn, the same consists of a suitably-supported driving-shaft i, carrying a small bevel-gear g', meshing into the gear g. Upon the shaft i are mounted the three pulleys p p' p^2, p and p' being loose upon the shaft and p^2 fast to it. Now, assuming that the pulley p' be driven from any suitable source by a crossed belt and the pulley p by an open belt, it is apparent that upon shifting the crossed belt onto pulley p^2 the screw will be revolved in one direction and will be turned in the opposite direction when the open belt is shifted onto the pulley, as common to lathes and other machines adapted to be rotated in both directions.

At the base of the press is located a central movable platform E, adapted to receive and support the metallic bale-casing while it is being filled with cotton or other compressed substance or material delivered from the press-box. Mounted below and in contact with the under side of the platform is a suitably-fulcrumed weighing-arm or scale-beam n, the longer arm of the beam carrying two sliding weights n' n^2, the former, n', being set so as to form a counterpoise for the platform and the empty casing, while the other, n^2, is employed to balance the net weight of the cotton filling the casing. By means of this arrangement the attendant can readily determine whether the amount of cotton in the casing exceeds the predetermined or fixed weight or not. If it is found deficient in weight, he simply adds enough cotton to the bale until the latter forms an equipoise with the weight n^2. Conversely, if it is found to exceed the desired weight, he removes the surplus cotton from the bale, the same being quickly effected while the bale is still standing in the press. Obviously the position of the weight members on the beam may be changed or different ones substituted as desired.

Referring to Fig. 1, it will be seen that a clear space s is formed between the under side of the elevated piston C and the top end of the press-box. It is at this point that the

cotton is fed or introduced into the pressing-chamber. The cotton passes down an inclined trough t, or, if desired, a trough may be similarly arranged and used at each of the four sides of the box. The loose cotton constituting charges is fed from any suitable source of supply to the trough in any well-known manner, either by hand or by mechanical means, the piston meanwhile remaining stationary.

The manner of baling cotton, &c., through the medium of my improved baling-press may be described as follows: The several parts of the press are first assumed to be in the normal position, substantially as shown in Fig. 1, the weight n^2 meanwhile being lifted from the beam n, if desired. Now the first charge of cotton sufficient to loosely fill the press-box is fed into the chamber a', (see Fig. 2,) followed by cutting off the supply of cotton, after which the belt, say, on pulley p' is shipped onto the driving-pulley p^2, thereby revolving the press-screw d and forcing the piston downwardly and compressing the charge of cotton in the chamber. Fig. 3 shows the corresponding position of the piston, &c. The piston is then elevated to its normal position by reversing the direction of rotation of the screw, the same being effected by shipping the belt onto the loose pulley p', at the same time shipping the other belt from pulley p onto the driving-pulley p^2, the belt being reshipped onto the loose pulley p when the piston arrives at its highest position. This operation is repeated with other charges until the pressing-chamber is practically filled with compressed cotton. While the piston is still resting upon the cotton, the guided base or bottom member B of the press-box is retracted to its limit through the medium of the hand-wheel, gear, and rack, thereby uncovering the end of the box. Meanwhile the counter-weighted beam n automatically lifts the platform E and the casing D, resting thereon, until arrested by a suitable stop or by the contact of the end of the casing against the under side of the press-box. Fig. 4 shows the corresponding position of the parts. I may state here that I prefer to make the cross-sectional area of the pressing-chamber a little smaller than that of the casing, so that the cotton will slide into the casing with less frictional resistance. The weight n^2 should now be in position upon the beam. The continued downward action of the piston next forces the compressed cotton from the chamber into the casing below. Fig. 5 shows the relation of the parts at the completion of the operation. In fact the piston is returning to its normal position, (see arrow,) and the nearly-filled casing is moving downwardly. (See arrow.) A bottom seat or stop for the platform is indicated at m^2. The final operation consists in closing the upper end of the casing by inserting the sheet-metal end or cap r therein (see Fig. 12) and securing it in place, at the same time closing the lower end of the press-box by returning the base B to its normal position. The thus-completed bale may now be removed from the press and an empty casing substituted, the piston meanwhile compressing cotton in the box to form the succeeding bale.

During the compressing operation the air present in the cotton is freely expelled from all sides of the pressing-chamber through the numerous small holes a, thereby rendering the condensation of the cotton more rapid and with a less degree of pressure.

If desired, the open-ended bale may be removed from the press and the sheet-metal cap or end r subsequently secured thereto.

Fig. 12 represents a metal-covered bale well adapted to be employed in my improved baling-press. Bale-coverings of this type have been patented to me by the United States Patent Office, bearing dates of March 10, 1896, and July 26, 1898, and numbered 556,056 and 608,042, respectively.

In Figs. 10 and 11 I have represented a modified construction of the interior of the press-box. In this case the inner surfaces of the walls are both corrugated and perforated and faced or lined with thin flat perforated sheets of sheet metal, as steel, secured thereto in any well-known manner. The corresponding surface of the sliding base B is similarly treated. By this arrangement the wearing-surfaces of the mold or chamber may be more quickly and cheaply renewed, while also providing a greater percentage of ducts through which the air expelled from the cotton may escape. In the drawings, a^3 designates the grooves or corrugations, and a^4 the perforated sheet-metal lining-plates.

I claim as my invention—

1. In a baling-press, the press-box, a sliding bottom therefor, and a mechanism for operating the bottom after the bale has been compressed, combined with a platform located a suitable distance below the bottom of the baling-chamber, and adapted to receive a casing or envelop into which the bale is forced, and a weighing-rod connected at its short end to the platform, and which weighing-rod shows the weight of the bale, substantially as described.

2. In a baling-press, a suitable framework, an operating-screw, a piston connected to the lower end thereof, a mechanism for operating the screw, a perforated press-box, and a perforated plate forming the bottom of said box, the frame being provided with grooves in which said perforated plate moves, and a mechanism for moving the plate outward after the bale has been compressed, combined with a vertically-moving platform located a suitable distance below the perforated plate and upon which the casing or envelop is placed, and the pivoted counterweighted beam which has the platform loosely connected to its inner end, substantially as shown and described.

3. The combination in the improved baling-press, hereinbefore described, of the follow-

ing instrumentalities, viz., a stationary ventilated press-box capable of containing the full amount of cotton or other material to be formed into a bale, a mechanically-actuated ventilated plunger or piston for compressing the cotton in the press-box, a slidable ventilated base-plate or member closing the lower end of said box during the compressing operation, and a movable platform arranged to support the sheet-metal casing, or envelop, into which the cotton is forced while the compressed cotton is being discharged directly from the pressing-chamber into the casing.

Signed by me at Providence, Rhode Island, this 14th day of April, A. D. 1899.

MARK A. HEATH.

Witnesses:
GEO. H. REMINGTON,
M. MANN.