No. 797,997. PATENTED AUG. 22, 1905.

S. J. WEBB.

METHOD OF CHANGING THE SHAPE OF AND COMPRESSING BALES.

APPLICATION FILED NOV. 17, 1900.

3 SHEETS—SHEET 1.

Fig. 1.

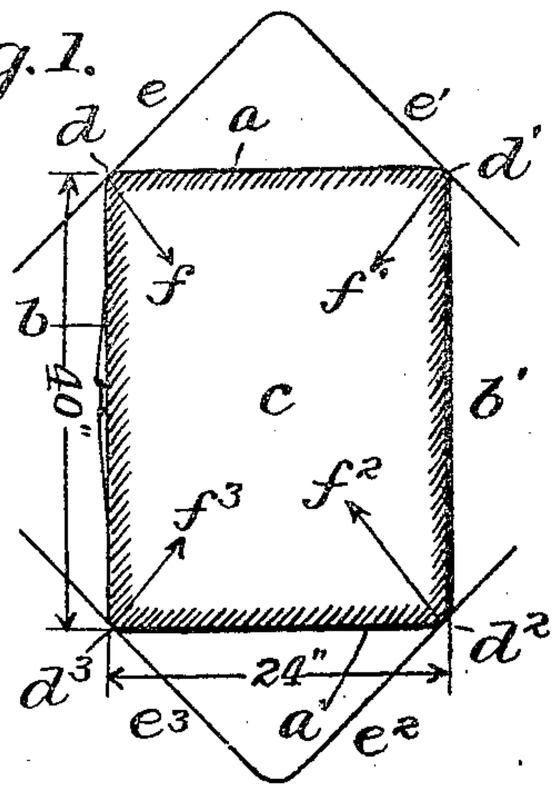


Fig. 1a.

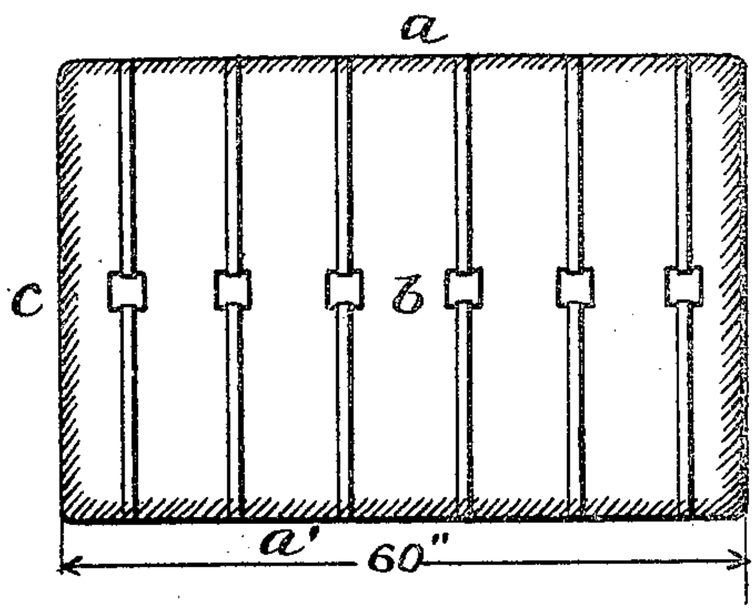


Fig. 2.

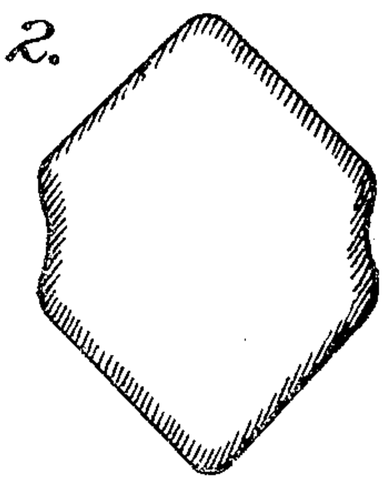


Fig. 2a.

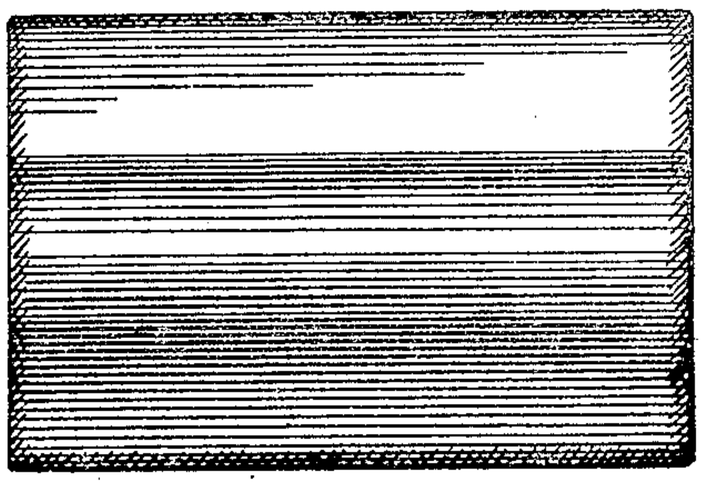


Fig. 3.

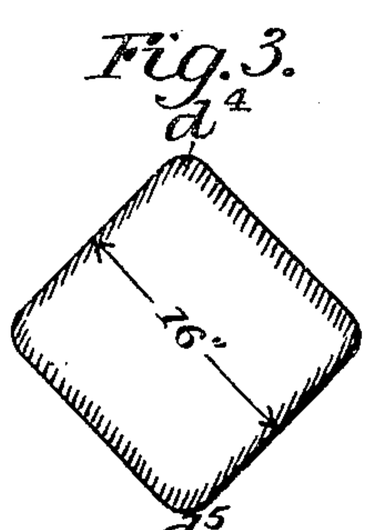


Fig. 3a.

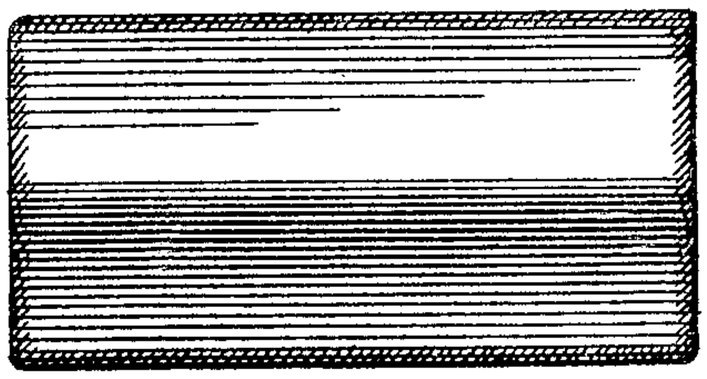


Fig. 4.

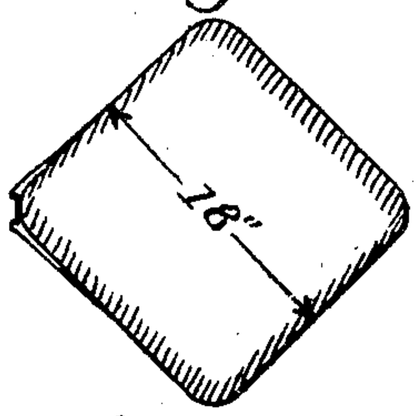
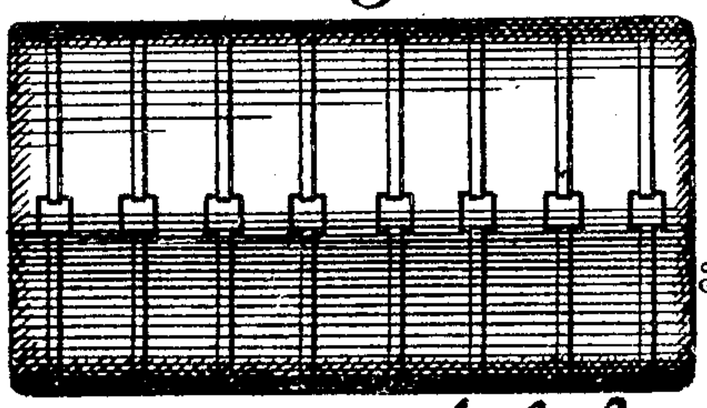


Fig. 4a.



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3 SHEETS—SHEET 2.

Fig. 5.

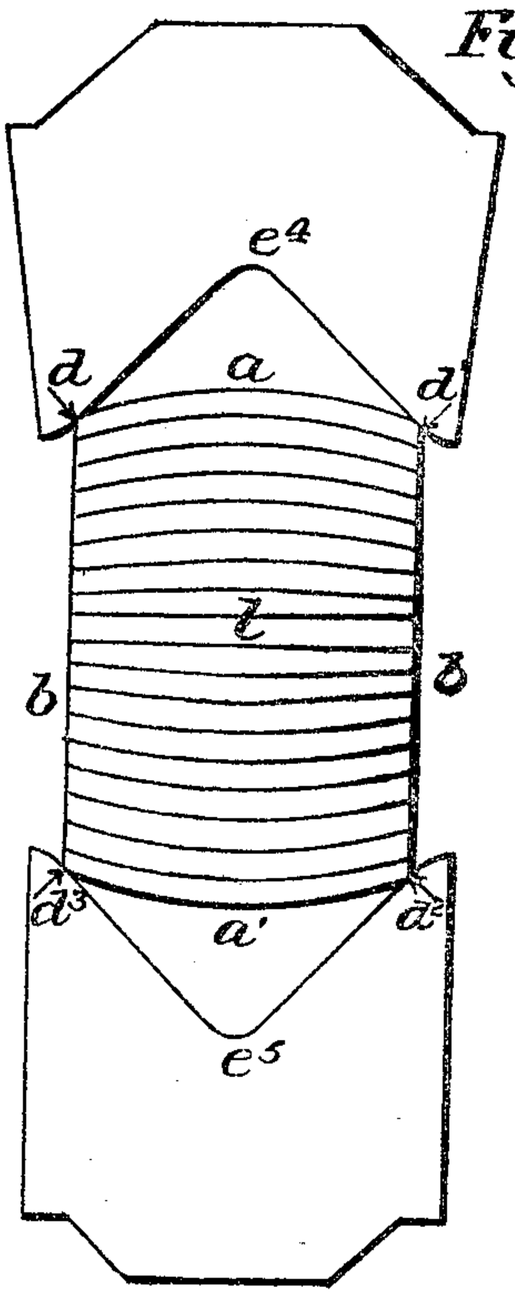


Fig. 6.

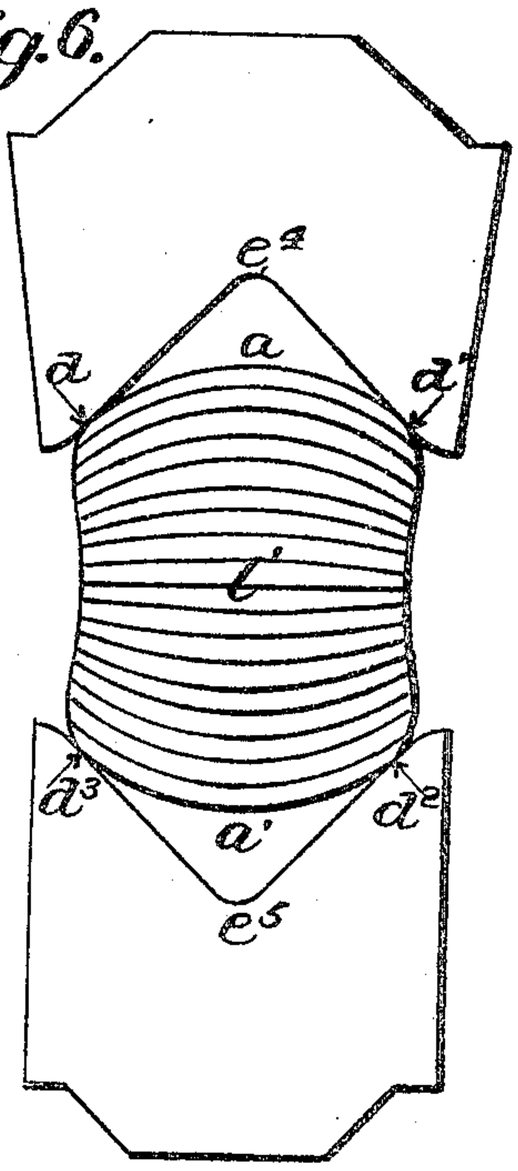


Fig. 7.

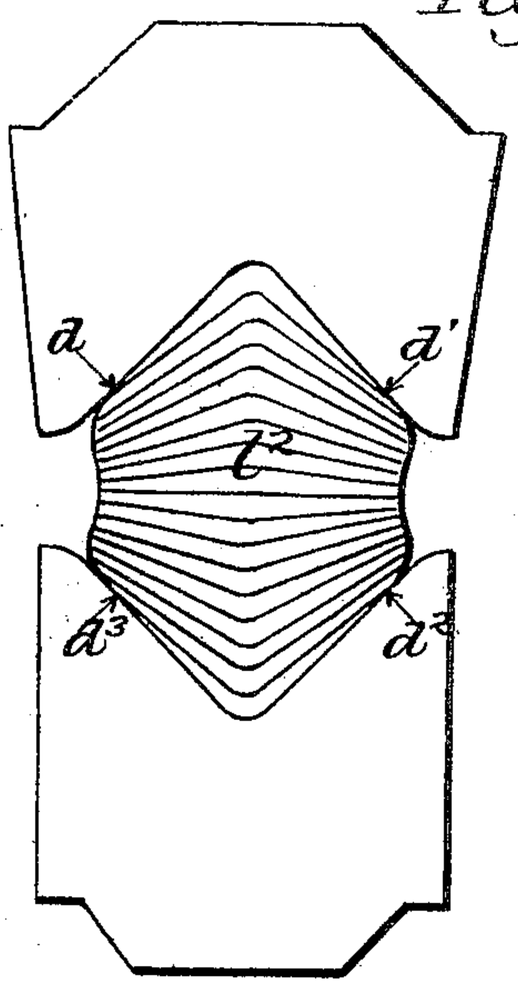
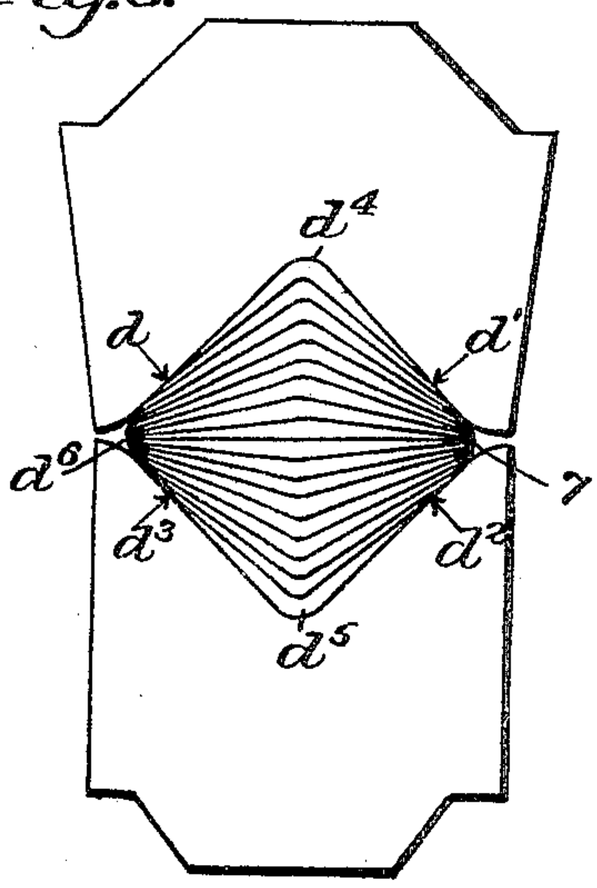


Fig. 8.



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3 SHEETS—SHEET 3.

Fig. 10.

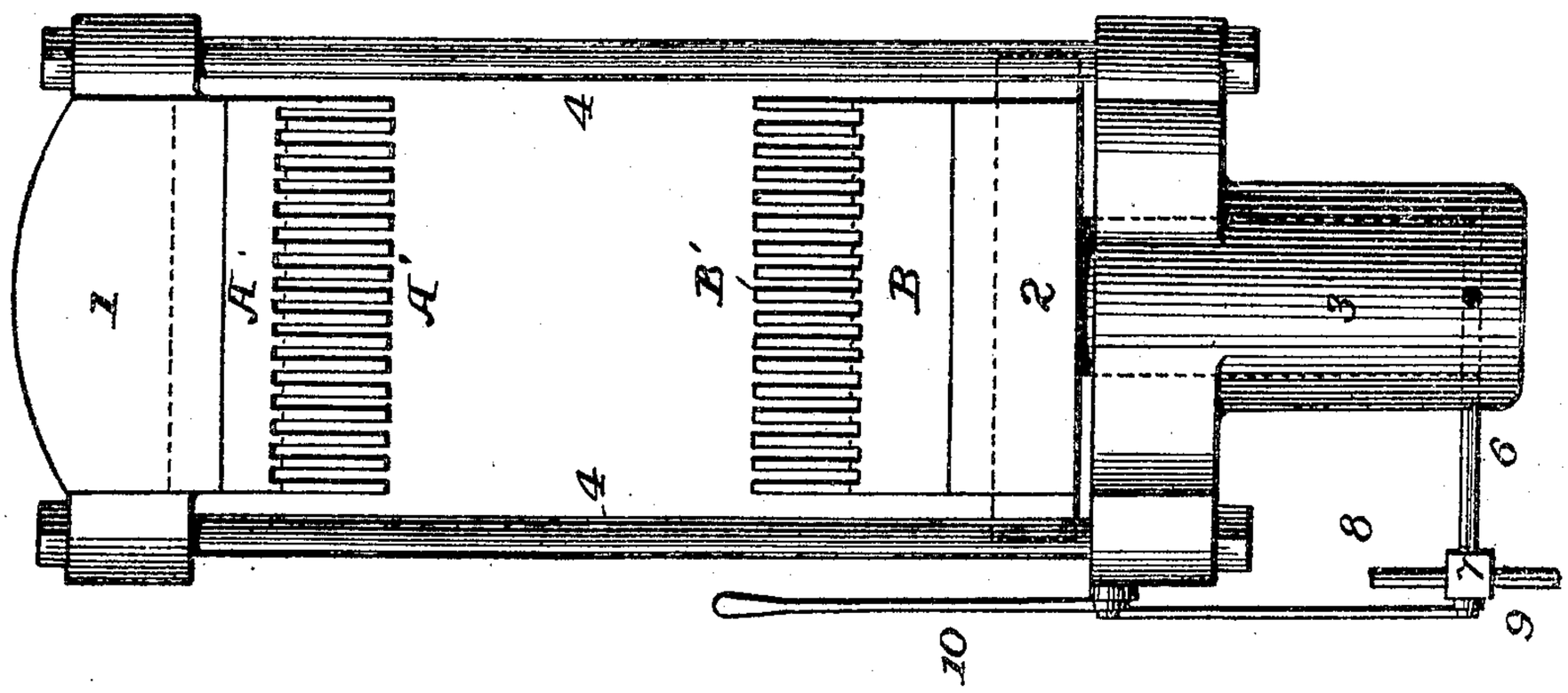
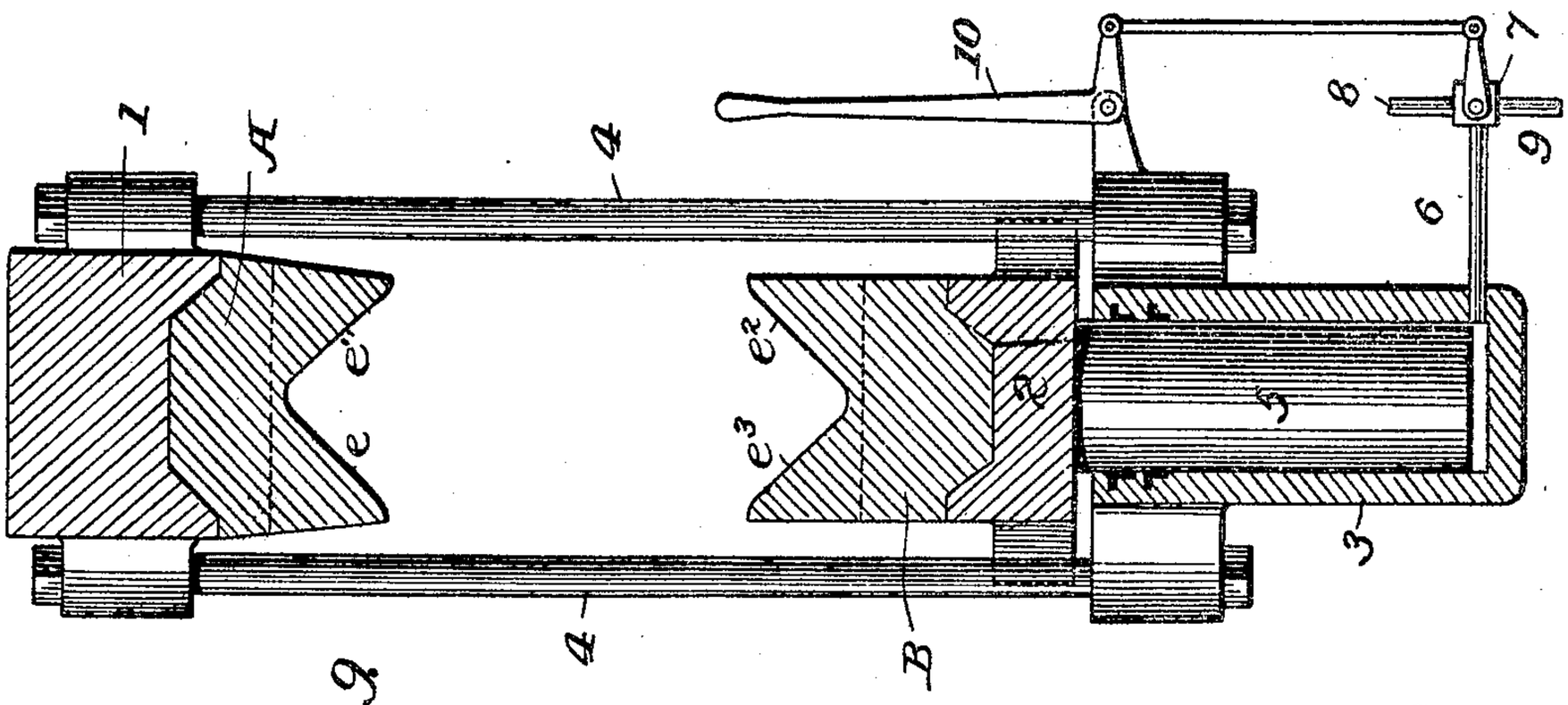


Fig. 9.



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UNITED STATES PATENT OFFICE.

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METHOD OF CHANGING THE SHAPE OF AND COMPRESSING BALES.

No. 797,997. Specification of Letters Patent. Patented Aug. 22, 1905.

Application filed November 17, 1900. Serial No. 36,886.

To all whom it may concern:

Be it known that I, SAMUEL J. WEBB, a citizen of the United States, residing at Minden, in the parish of Webster and State of Louisiana, have invented certain new and useful Improvements in Methods of Changing the Shape of and Compressing Bales, of which the following is a specification.

My invention relates to a method of changing the shape of and compressing bales of cotton and similar materials; and it has for its object to provide a new and improved method whereby the form of bales can be changed and the material thereof compressed so that their density is largely increased; and to these ends my invention consists in the method substantially as hereinafter more particularly pointed out.

In the accompanying drawings, Figures 1 and 1^a represent, respectively, an end and side of a plantation bale. Figs. 2 and 2^a represent, respectively, an end and side of a bale after it has been subjected to more or less pressure along its edges, forming practically new sides. Figs. 3 and 3^a are respectively end and side views of a bale compressed according to my invention. Figs. 4 and 4^a are respectively end and side views of such a compressed bale banded and ready for delivery. Figs. 5, 6, 7, and 8 are views representing in a general way the different conditions of a bale being subjected to my invention, and Figs. 9 and 10 are respectively vertical section and side view of a compress which may be utilized in carrying out my method.

While my invention may be applied to various materials, I shall describe it in connection with the compression of cotton without limiting it thereto, and while my invention may also be applied to compressing farm or plantation bales and even to compressed bales I shall illustrate my method in connection with the former bales, which will be sufficient to explain the general principles of the invention and to enable those skilled in the art to carry them out and to practice my invention in connection with other bales.

It is well known that in ordinary practice cotton is baled and subjected to more or less pressure, usually in one direction, in what is generally known as the "farm" or "plantation" bale, and it is generally banded and has a relatively large bulk and low density, and it is found desirable to decrease the bulk and increase the density by compressing the bales, so as to better fit them for transportation, storage, and other purposes. By my invention I provide a new method or mode of operation for accomplishing this result.

In referring to a bale of cotton it is convenient to consider it as having top and bottom surfaces, two side surfaces, and two end surfaces; but in this specification I shall speak of the top and bottom surfaces and the side surfaces as constituting the four "sides" of the bale, and the line of union of any two of these surfaces I shall call an "edge" for convenience, so that the bale will be considered as having four sides, four edges, and two ends.

In carrying out my improved method as applied to plantation bales I subject the bale to compression on its edges, as above defined, tending to compress the material of the bale toward its center, generally speaking. As the pressure continues the shape of the bale is changed and the parts which in the beginning formed the edges of the bale become the sides and the edges of the finished bale are in substantially the relative positions of the centers of the sides in the beginning. This compression may be and preferably is continued until the bale assumes a shape in which it is practically square in its cross-section and the parts which in the beginning formed the edges of the bale as above defined are parts of the sides of the bale. The bale is then banded, preferably while under pressure, or otherwise suitably secured or manipulated.

In order to explain more in detail the features of my improved method, reference is made to the accompanying drawings, and in Figs. 1 and 1^a I have indicated an ordinary plantation bale, in which $a\ a'$ represent what are ordinarily termed the "top" and "bottom" of the bale, $b\ b'$ the sides of the bale, and $c\ c'$ the ends of the bale; but in my description I shall speak of $a\ a'$ and $b\ b'$ as the "sides" of the bale. The lines of union of any two sides form the edges, and these are represented by the letters $d\ d'\ d^2\ d^3$. I apply pressure to or compress the bale on the lines of its edges, and $e\ e'\ e^2\ e^3$ in Fig. 1 represent planes of the compressing surfaces applied to the edges of the bale, and in ordinary practice the planes $e\ e'$ and $e^2\ e^3$ are moved toward each other, one or both of them moving in the direction of a right line passing through the centers of the sides $a\ a'$. In thus applying the pressure on the edges of the bale the material at or about the edges will be forced in the general direction indicated by the arrows $f\ f'\ f^2\ f^3$—that is, in a general

direction toward the center of the bale—the greatest pressure being at substantially right angles to the planes of the compressing surfaces. As the compressing surfaces *e e'* and *e² e³* approach the center of the bale the material at or near the centers of the sides *a a'* being unresisted or unconfined will tend to move outward and the material at or about the centers of the sides *b b'* will tend more or less to approach the center of the bale and the bale will assume substantially the form indicated in Figs. 2, 2ª. The pressure being then continued, the planes of the compressing surfaces bear over a large proportion of the area of what may now be called the "sides" of the bale and the bale is compressed and condensed until it assumes practically the form indicated in Figs. 3 and 3ª, and in this condition the form or shape of the bale has been changed and the edges *d⁴ d⁵* occupy a relative position practically midway between the position of the edges *d d'* of the original bale. If now the bale is banded when under compression, it will expand to assume substantially the form indicated in Figs. 4 and 4ª.

In Figs. 5, 6, 7, and 8 I have indicated somewhat roughly the progress of my improved method as applied to a plantation bale, in which A represents a platen or die embodying in its construction the planes *e e'* of the compressing surfaces, and B is a platen or die embodying in its construction the planes *e² e³* of the compressing surfaces, and these are supposed to be arranged in connection with suitable mechanism, so that either one or the other, or both, of the platens or dies A B will move in a direct line toward each other. In Fig. 5, for instance, a plantation bale is shown in position for about the commencement of the changing of the shape of the bale, and the lines *l* are to represent the layers of cotton composing the bale.

In Fig. 6 one of the platens or dies—as B, for instance—has moved upward toward the other platen or die A, and the pressure on the edges *d d'* and *d² d³* of the bale has caused the material of the bale to expand upward and downward in the direction of substantially the middle portion of the sides *a a'*, the edges *d*, *d'*, *d²*, and *d³* of the bale being drawn in along the planes *e e' e² e³*, respectively, toward the meeting lines of the planes at *e⁴ e⁵*. As the distances between the edges *d d³* and *d' d²* have decreased, the compression on the cotton along the sides *b b'* has increased more rapidly than it has nearer the center, and as the pressure on the sides *a a'* has not been resisted and the material has expanded in that direction the material of the sides *b b'* (especially near the centers) tends to approach the center of the bale, and the bale has become slightly narrower through the middle of these sides than at the edges *d d'* or *d² d³*, so that in general appearance the material of the bale has tended to move inward or become slightly concave on these sides *b b'*.

In Fig. 7 one of the platens or dies, as B, is shown as having approached nearer to the platen or die A, and the material of the bale has expanded more in the direction of its sides *a a'*, and its edges *d d' d² d³* have been drawn in still more, and the lines *l²* indicate in a rough way the position of the various layers of cotton.

In Fig. 8 the platens or dies A B are brought so that their adjacent edges are practically together and the bale has assumed a form which is substantially square in cross-section, the portions of the bale which were originally the edges *d d' d² d³* have been still more drawn in toward the meeting lines of the planes of the compressing surfaces *e e'* and *e² e³*, as indicated, and have been merged into the new sides of the bale, and new edges *d⁴ d⁵ d⁶ d⁷* have been formed on the bale, and the lines *l³* indicate in a rough way the general arrangement of the layers of cotton composing the bale, and the dimensions or bulk of the bale is largely decreased, while its density is correspondingly increased.

While of course my invention is not limited to any particular dimensions, in the present instance the plantation bale (indicated in Fig. 1) is assumed to be twenty-eight inches wide, forty inches high, and sixty inches long, and when compressed after its form has been changed its length remains practically the same, while it is practically sixteen inches in width and height, and after being banded under pressure it may expand to be practically eighteen inches in width and height, as indicated in Fig. 4. The ultimate dimensions will of course depend not only upon the size of the bale being treated as it was originally and the amount of pressure exerted upon it, but upon its original density, and in all cases within proper limits its form is changed and it is delivered in substantially the shape indicated in Fig. 4. This change of form and compression has resulted from applying pressure to the bale on the lines of its edges and exerting this pressure in a direction so that it is generally toward the center of the bale and then continuing the pressure on what may be termed the "new" sides or portions of the sides of the bale and then banding it. Stated in another way, the bale is compressed by pressure exerted upon its four edges to form new faces or sides on the bale, which faces or sides are substantially at right angles to lines drawn through the edges toward the central portion of the bale, and the pressure is continued on the new faces or sides until the bale assumes a new form, which is substantially square in cross-section. Thus it will be seen that by my method I cause pressure to be exerted upon the edges of a rectangular bale to change its shape by flatten-

ing the edges so that they form the sides of a reduced bale, which sides are at an angle to the sides of the original bale being acted upon. Of course in carrying out my new method any suitable mechanism may be used, and of course the shape of the compressing surfaces may be varied from those shown so long as the essential features of my method are utilized, and substantially the same results are accomplished.

In Figs. 9 and 10 I have indicated sufficient of a compress to enable one to carry out my improved method, and in such compress, 1 indicates a stationary bed or platen having a properly-shaped die or face A embodying the planes e e' of the compressing surface, and 2 is a movable platen carrying a die or platen B embodying the planes e^2 e^3 of the compressing surface. Connected to the stationary platen 1 is a hydraulic cylinder 3, there being suitable connections, as the rods or bolts 4, to hold it in position with relation to the stationary bed. Connected to the platen 2 is a plunger 5, working in said hydraulic cylinder, and there is an inlet and outlet pipe 6, controlled by a suitable valve 7, which also controls the pipe 8, leading to the source of supply and the exhaust-pipe 9. This valve is operated by a suitable handle 10.

In order that the bale after it has been finally compressed may be properly banded, the dies or platens A B are provided with slots A′ B′, which of course must be of sufficient depth to allow the bands to pass entirely around the bale while confined between the platens or dies.

What I claim is—

1. The method substantially as hereinbefore described, of changing the shape of and compressing a bale, which consists in subjecting the bale to compression on the lines of its edges and toward the center of the bale and continuing said pressure on the new sides of the thus-formed bale until the bale again assumes a substantially rectangular form.

2. The method substantially as hereinbefore described, of changing the shape of and compressing a bale, which consists in subjecting the bale to compression on the lines of its edges and toward the center of the bale and then continuing the pressure on the new sides of the bale thus formed until the bale assumes a substantially square form in cross-section.

3. The method substantially as hereinbefore described of changing the shape of and compressing a bale, which consists in subjecting the bale to compression on the lines of its edges and toward the center of the bale, then continuing the pressure upon the new sides of the bale thus formed until it assumes a substantially square form in cross-section, and banding the bale while under such pressure.

4. The method substantially as hereinbefore described of changing the shape of and compressing a bale, which consists in reducing the bale by pressure upon its four edges to form sides substantially at right angles to each other and to lines drawn through the said edges toward the center of the bale.

5. The method substantially as hereinbefore described of changing the shape of and compressing a bale, which consists in reducing the bale by pressure upon its four edges to form sides substantially at right angles to lines drawn through said edges toward the center of the bale, and continuing the pressure upon said sides until they are substantially at right angles one to another.

6. The method substantially as hereinbefore described of changing the shape of and compressing a bale, which consists in pressing upon the corners of a rectangular bale to change its form, and flattening the corners so that they form the sides of a reduced bale which sides are substantially equal to each other and are at an angle to the sides of the original bale.

7. The method substantially as hereinbefore described of changing the shape of and compressing a bale, which consists in simultaneously squaring and compressing the bale by applying pressure at its edges toward its center.

8. The method substantially as hereinbefore described of changing the shape of and compressing a bale, which consists in simultaneously squaring and compressing the bale by applying pressure at its edges toward its center, and banding it while under pressure on its sides.

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

SAMUEL J. WEBB.

Witnesses:
F. L. FREEMAN,
W. CLARENCE DUVALL.