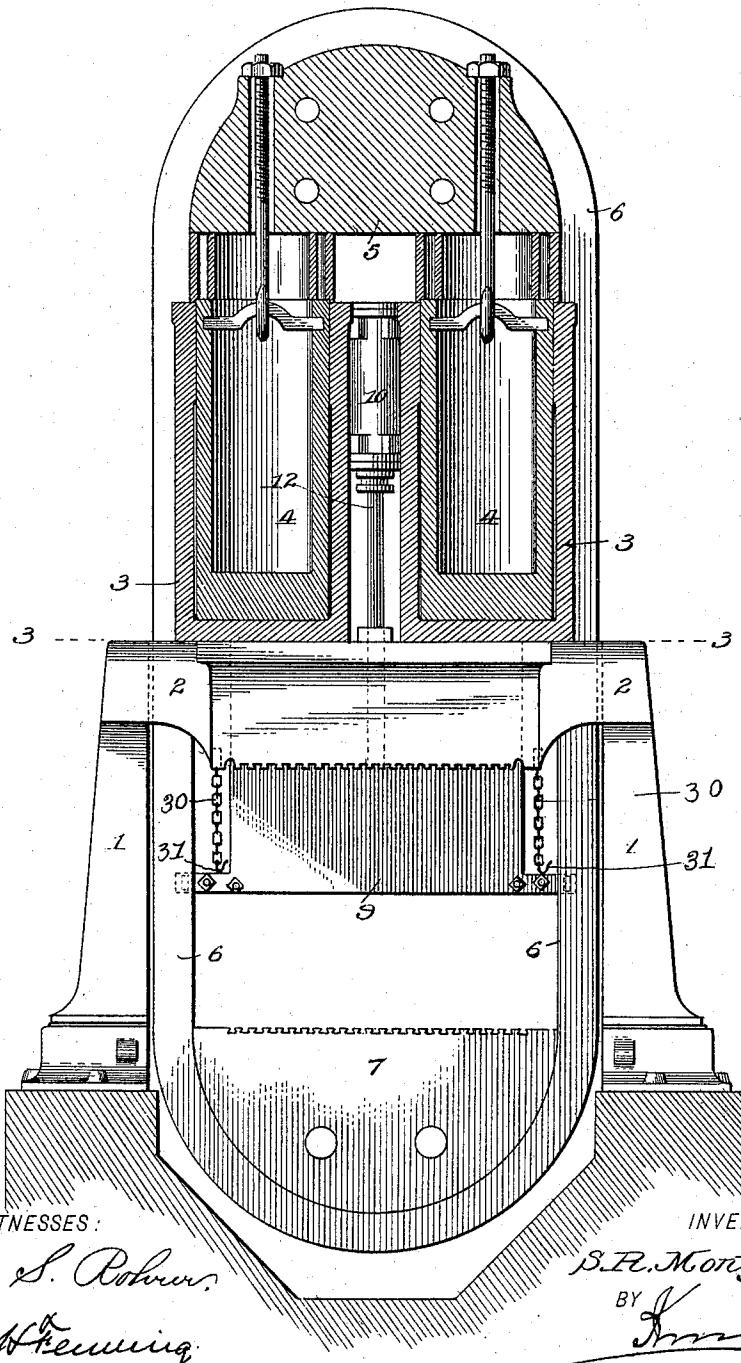
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S. R. MONTGOMERY.

METHOD OF AND APPARATUS FOR COMPRESSING BALES.

No. 590,158. Patented Sept. 14, 1897.

Fig. 1.



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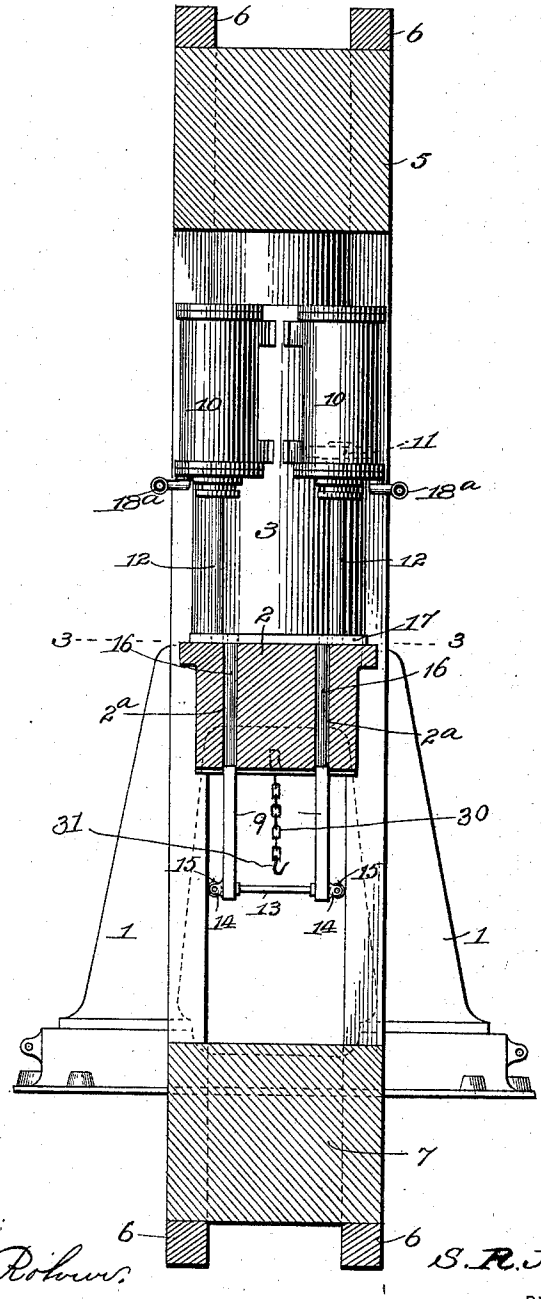
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Fig. 2



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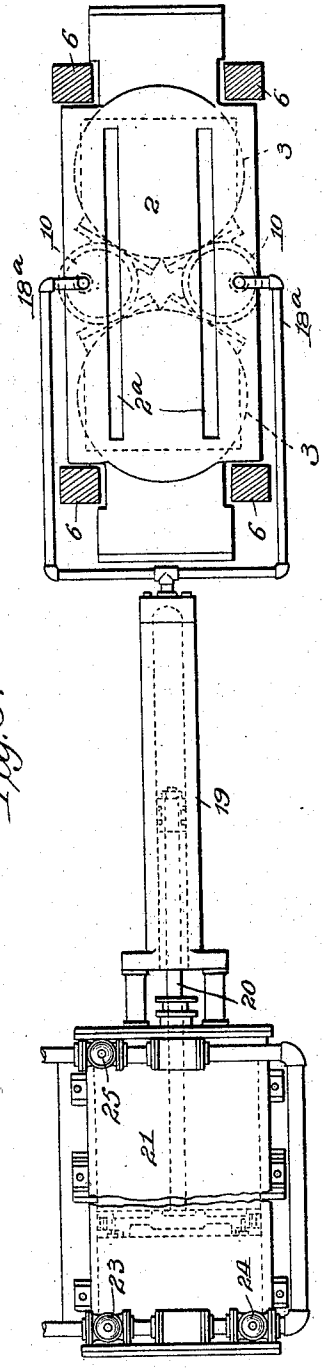


Fig. 3.

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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR COMPRESSING BALES.

SPECIFICATION forming part of Letters Patent No. 590,158, dated September 14, 1897.

Application filed June 16, 1897. Serial No. 641,037. (No model.)

To all whom it may concern:

Be it known that I, STONEWALL R. MONTGOMERY, a citizen of the United States, and a resident of Memphis, in the county of Shelby, in the State of Tennessee, have invented a certain new and useful Method of and Apparatus for Compressing Bales, of which the following is a specification.

It is customary to prepare cotton and other fibrous materials, hay, and such like produce for shipment from the plantation by baling it, and it is common practice with dealers to whom such bales are shipped to subject them to a further compression in the same direction till they are reduced to a bulk of one-half or less of the original bale, though substantially maintaining the original lateral dimensions of the bale.

I have discovered that while a bale of cotton or other like fibrous material may be compressed in one direction to the limit attainable with means ordinarily at hand—even the strongest presses—and the material thereby brought into an apparently solid mass in that direction said material is far from solid in a lateral direction. I have also discovered that if such a compressed bale be turned on edge and pressure applied to it, even with the same press, in a new direction—namely, edgewise—while the dimension of the bale is sustained transversely to the new line of compression—that is to say, so as to maintain the reduced dimension in the former direction of compression—the dimension in this new direction of compression may be reduced in almost if not quite the same proportion as resulted from the first compression and a bale finally obtained which, with a given weight, will be reduced to nearly one-half the size which has heretofore been obtained. While it has heretofore been common to subject the bale to two compressions, they have together accomplished but the first step of my invention.

The explanation of my discovery probably is that upon compressing cotton or other fibrous material there is little or no "flow" or movement transverse to direction of compression, as is the case with solid substances or non-compressible liquids. The condensation of such fibrous materials is probably no more than taking up spaces which exist between the component fibers in the particular direction of compression, while the spaces naturally existing between fibers in another direction are not taken up by said first compression, but may be similarly taken up by a separate compression in the proper direction. These separate compressions may be accomplished in various ways, so that the fundamental principle of my invention is not dependent upon any particular machine. It may also be found desirable to compress a bale on its three dimensions successively. These essential steps of complete compression may be successively performed in a single machine without removing the bale or manipulating it further than to shift it by hand or by automatic means into a position on edge or end as a step intermediate of the respective compressions.

A further object of my invention is to provide an apparatus for carrying out the said primary object of my invention. For this purpose I prefer to employ an apparatus similar in the main to that hereinafter described, and which comprises a press of suitable size and capacity to perform the first compression between the customary platens with open sides, and having within the edges of said platens plates spaced apart by about the dimension to be attained by the first full compression, and which may be conveniently brought into position on opposite sides of the bale of the first compression as soon as it has been tied and stood upon edge, so as to maintain said first compression while the second compression is taking place.

My improved construction and mode of procedure will be readily understood upon reference to the accompanying drawings, in which—

Figures 1 and 2 are central vertical sections, in planes at right angles to each other, showing a press constructed in accordance with my invention. Fig. 3 is horizontal section on the line 3 3, Figs. 1 and 2, together with a plan of the controlling mechanism.

My improvements are for purposes of illustration shown applied to a press comprising supports 1 and a head 2 fixed to said supports and having mounted upon it main compression-cylinders whose pistons 4 support the

block 5 of the links 6, while the lower ends of said links carry a platen 7. This press is intended to be of size and capacity sufficient to perform the usual compression of the "country" or plantation bale. In the fixed head 2 are formed guides or ways 2^a, in which are fitted side plates 9, spaced apart by about the dimension of complete compression first obtained and adapted to drop down about and confine the bale laterally, as shown in Fig. 2, during second compression. These plates are movable upward to permit use of entire area of platens for first compression and for insertion and removal of the bale. The plates 9 slide in the fixed head, and therefore offer no opposition to the working of the platen, and continue to perform their function throughout the second compressing operation.

To raise the plates out of position when it is desired to have the press free for first compression or open for handling the bale and to drop them in place after first compression when the press is being closed, cylinders 10, of which there are preferably two, one for each plate, are mounted on the sides of the main cylinders 3 or upon any other convenient fixed portion of the machine, and these lifting-cylinders are provided with pistons 11, whose rods 12 connect with the plates 9. Then by opening a cock and admitting steam or other convenient pressure medium into cylinders 10, or by allowing the escape of pressure from said cylinders, the plates may be raised or lowered at will.

In order to support the lower ends of the plates laterally, they are strapped together by bolts 13 outside the platens.

I may employ any suitable connections for supplying pressure to the main cylinder and the cylinders for elevating the plates; but I find by experiment that an arrangement substantially like that now to be described is preferable.

Each plate has a lateral extension 14 on either side, which projects within the edge of the link and carries a friction-roller 15, which bears against said link as the plate moves up and down. The rods 13 are shouldered, as shown in Fig. 2, and they brace the plates outward, as well as tying them together, and a rigid structure is thereby obtained which works evenly up and down. The plates 9 work through slots in the fixed upper head as far as the lower ends of the main press-cylinders, and in order to raise said plates when desired they are connected by rods 12 with the pistons 11, which work in the lifting-cylinder 10. There is one cylinder for each plate, and they are supplied simultaneously with water-pressure through pipes 18^a from an accumulator 19, the piston of which is controlled by the piston 20 of steam-cylinder 21. The relative sizes of these parts are such that live steam introduced in rear of the piston 20 will insure a quick action of the accumulator 19 and the raising of the plates 9 without loss of time. 23 represents the steam-inlet valve, and 24 25 exhaust-valves for opposite ends of the steam-cylinder.

The mode of operation is as follows: The plantation bale is introduced into the compress and is compressed in one direction in the usual manner and by the ordinary means of compression—for instance, the steam-cylinders which raise the lower platen through the medium of the links. When this compression is accomplished, the valve 23 is opened to admit steam behind the piston 21 and exhaust-valve 25 is opened in front of said piston, so that water will be forced out of the cylinder 19 through pipes 18 to the lifting-cylinders 10, and the side plates 9 are raised, so as to expose the tie-grooves 29 in the platens and permit the tying of the bale. Chains 30 at the ends of the upper platen are then attached to each end of the bale near one side, such attachment being facilitated by the use of hooks 31, carried by said chains, and the lower platen is allowed to drop. As said platen drops the bale is automatically lifted up on edge by the chains which are attached to the stationary platen. Valves 23 and 25 are then closed and valve 24 is opened and the side plates are permitted to drop on opposite sides of the bale, and the bale is thereby confined laterally and made ready for its second compression, which is accomplished similarly to the first.

With the apparatus constructed as above described I am enabled to take a "plantation" bale of cotton or other material, compress it by the full width of the platen into flat form, then place it edgewise in the press, then drop the plates on opposite sides of it to confine it laterally, and finally compress the lateral dimension until the bale assumes a substantially square section and occupies a correspondingly-reduced bulk.

Having now described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The herein-described method of condensing a bale of cotton or other like fibrous material, the same consisting in compressing it in one direction, securing it in such compressed form, then turning it on edge, then confining it in the direction of its first compression, and finally compressing it in a direction transverse to the direction of first compression, and securing it in said final compressed form, as explained.

2. In combination with a compress, vertically-sliding plates for reducing the lateral dimensions of the platens and affording lateral support to a bale compressed between said platens, substantially as herein explained.

3. In combination with a compress, a vertically-sliding plate for confining a bale on one side, means coöperating with said plate for confining it on the opposite side, and the lifting-cylinder for controlling the position of said plate, substantially as herein explained.

4. In combination with the compress, the attaching connections for engaging the bale

at one side while permitting the other side to drop to effect automatic turning of the bale on edge, substantially as herein explained.

5. In combination with a compress, the side plates working through slots in one of the platens, substantially as explained.

6. In combination with the platen of a compress, the side plates working in slots in said platen and tie-rods connecting said plates together, substantially as and for the purposes set forth.

7. In a compress, the combination of the press-platens, the confining-plates, and independent means for controlling the movements of the platens and the plates separately substantially as herein explained.

8. In a bale-press, the combination of the movable and fixed press-platens, the links for moving the one relatively to the other, the confining-plates mounted in the fixed platen and having means for moving them at will, extensions on said plates overlapping and bearing against the links, substantially as set forth.

9. In a bale-press, the combination of the press-platens having suitable pressure appliances, the confining-plates perpendicular to the platens, lifting-cylinders controlling the position of said confining-plates, a hydraulic press supplying controlling pressure to the lifting-cylinder, and a steam-cylinder, containing a piston having connection with the piston of the press, to control movement of the latter, substantially as and for the purposes set forth.

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