March 9, 1943. S. Y. TAYLOR 2,313,102

HIGH DENSITY PRESS

Filed April 24, 1939 3 Sheets-Sheet 1

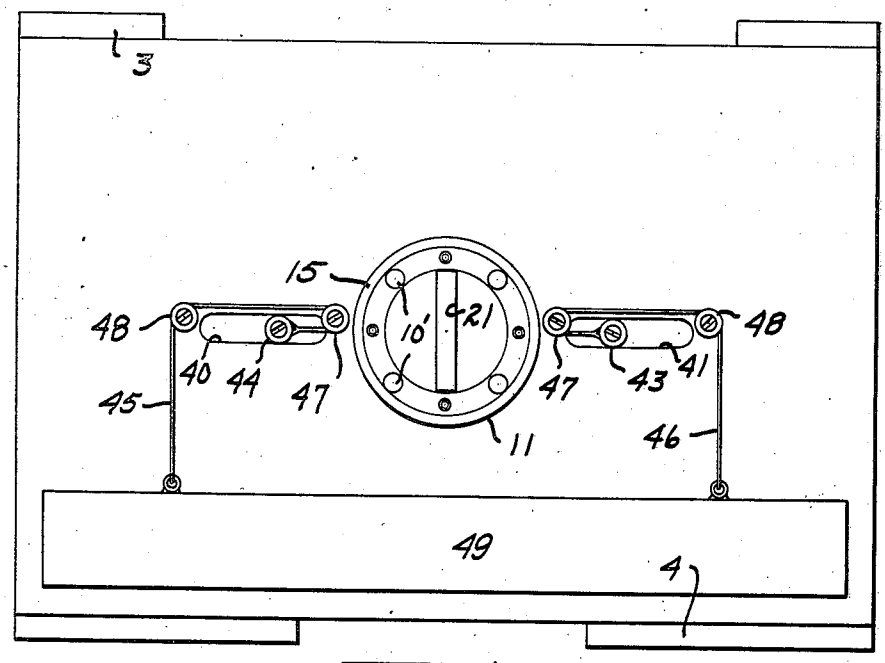


Fig. 1.

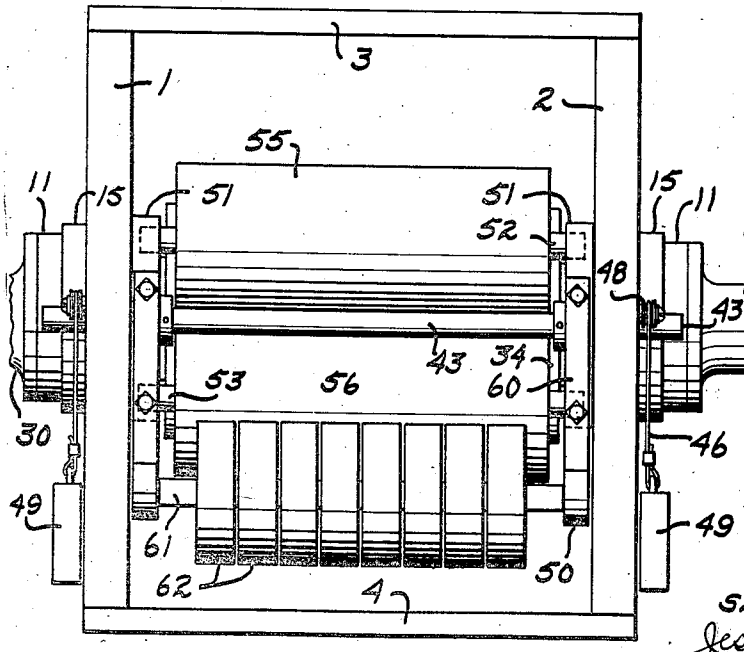


Fig. 2.

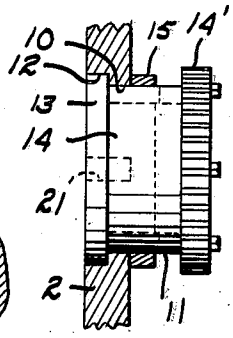


Fig. 3.

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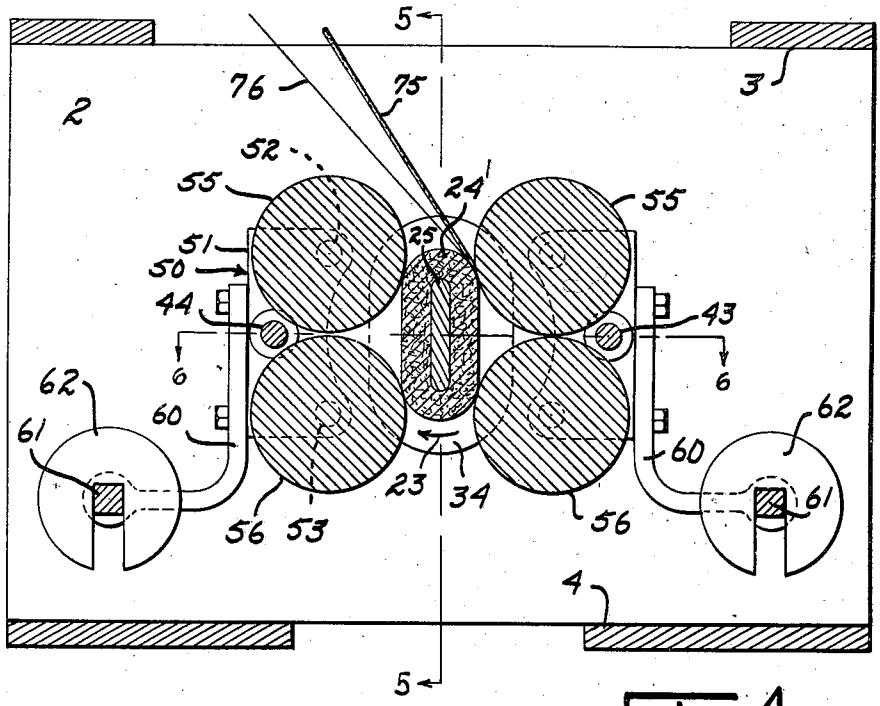


Fig. 4.

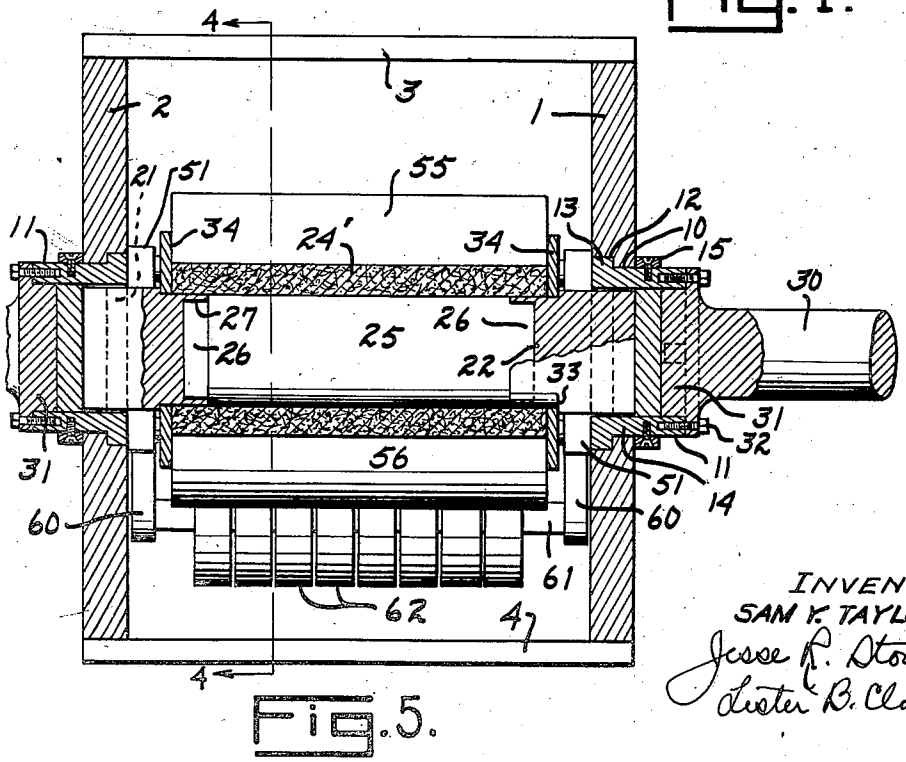


Fig. 5.

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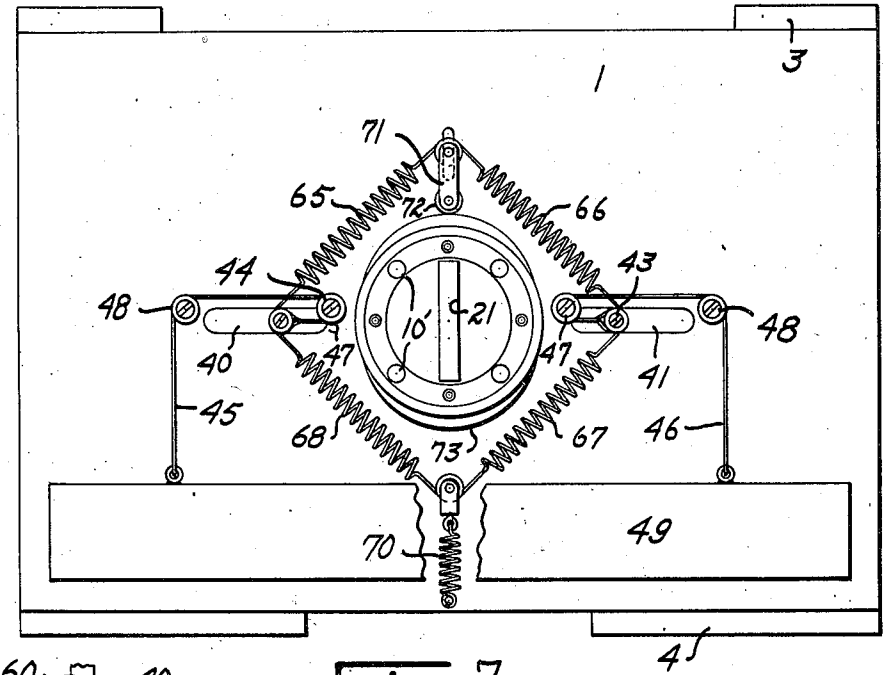


Fig. 7.

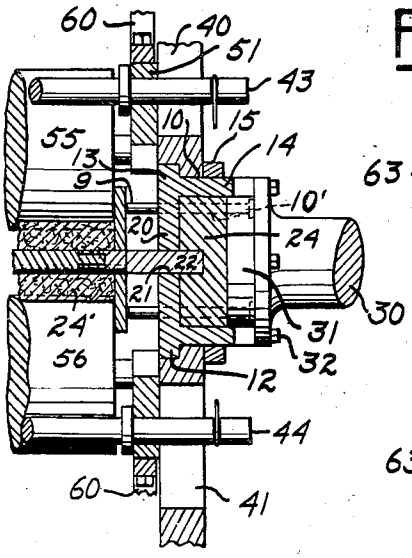


Fig. 6.

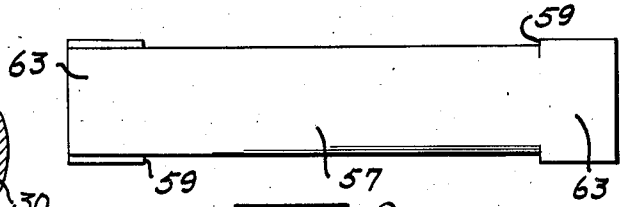


Fig. 8.

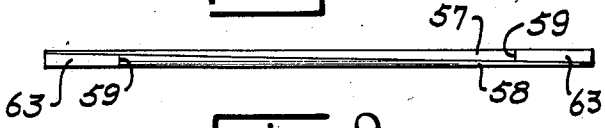


Fig. 9.

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Patented Mar. 9, 1943

2,313,102

UNITED STATES PATENT OFFICE

2,313,102

HIGH DENSITY PRESS

Samuel Y. Taylor, Houston, Tex., assignor of fifty per cent to F. J. Herbelin, Galveston, Tex.

Application April 24, 1939, Serial No. 269,554

3 Claims. (Cl. 100—1)

This invention relates to the baling of cotton or other fibrous material into high density bales.

While the present invention is not confined to the handling of cotton, reference is made thereto by way of illustration. The customary procedure in the handling of cotton is to form, at the gin, large low density bales which are partially covered with bagging. These bales are subsequently formed, at a different place, into high density bales in order to facilitate shipment thereof. Such bales are usually of a rectangular cross section and are held in compressed form by means of steel bands or ties which are applied while the material is held in compression. This procedure is expensive and the resulting bale is unsatisfactory, both in appearance and the condition of the material at the time such material is to be utilized by the spinner.

In order to avoid some of the difficulties already indicated it has been proposed to form a round bale at the gin. Such procedure is unsatisfactory as the machines and methods have not been developed to the point where bales of satisfactory density can be produced in a manner which is economically feasible. The present invention overcomes these various difficulties in a manner to be more fully described.

It is the general object of the invention to provide a device of improved construction for conveniently condensing and baling cotton, wool or other fibrous materials.

Another object is to form a highly compressed bale of fibrous material by spirally wrapping a bat or web of the material, pressure being constantly applied by rolling contact at spaced points on the periphery thereof.

Another object is to form a bale having a substantially elongated transverse cross section.

Still another object is to form bales of compressed fibrous material of elongated or substantially elliptical cross section, the novel mechanism for producing such bales being so constructed that substantially uniform rolling pressure is constantly applied to the periphery of the bale, whereby the material is compressed from the center outwardly during the formation of the bale.

Another object is to form a bale of oblong cross section in such manner that the baled material may be withdrawn therefrom by continuously unwinding the bat which was spirally wound to form the bale.

It is also an object to provide a bale press in which a bat of material to be baled is spirally wound upon a driven core of oblong cross section, pressure retaining heads being used at the ends of the core during the formation of the bale and adapted from the expansive effort of the baled material to effect release of the core member from the driving means when the bale is completed.

It is also an object to provide a bale press which, when used for the baling of raw cotton, may be utilized as a gin press, thereby eliminating successively forming low and high density bales.

Still another object is to provide a bale press of the class described in which pressure is applied to the compressible material by means of paired rollers which are mounted in cradles so that the pressure is uniformly applied regardless of the position of the rollers upon the changing contour of the material being baled.

Another object is to provide a bale press in which paired pressure rollers surround a driven bale core of oblong cross section, such rollers being so mounted as to constantly apply uniform rolling pressure upon the material which is fed between the rollers and the core for compression.

Still another object is to provide a bale press for spirally wrapping compressible material into a bale of oblong cross section, rolling pressure being applied at all times to the periphery of the bale so that the fibers of the material are not unduly stressed in the completed bale.

These and other objects will be apparent from the following description taken in connection with the drawings of a mechanism which illustrates both the method and apparatus and in which:

Fig. 1 is a side elevation of a construction embodying the invention, the driving mechanism being removed therefrom.

Fig. 2 is an end elevation of the construction shown in Fig. 1.

Fig. 3 illustrates an alternate construction for supplying power to the driving head assemblies.

Fig. 4 is a secional view taken on line 4—4 of Fig. 5 and illustrating a partially completed bale.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4.

Fig. 6 is a sectional view through one of the driving head assemblies, taken at right angles to the view shown in Fig. 5.

Fig. 7 is a view similar to that shown in Fig. 1 but illustrating the use of supplemental structure for applying the desired pressure to the material to be compressed.

Figs. 8 and 9 are plan and elevation views re-

spectively of a removable core member comprising an element of the invention.

The device of the invention is illustrated in the drawings as comprising a frame having spaced side members 1 and 2 which are secured in place by means of transverse upper and lower tie members 3 and 4. The side members 1 and 2 have central openings 10 to receive driving head assemblies generally indicated as 11. Opening 10 is counterbored at its inner end at 12 to receive the flange 13 on the drive collar 14. When the drive collar 14 is in position within the opening 10, the assembly is secured in place by means of a collar 15 secured thereto on the outside of the frame member.

It is to be noted that the collar 14 (see Fig. 6) is provided with a bottom 20 having a slot 21 to receive a tongue 22 which extends inwardly from the circular block 24 which is adapted to enter the collar 14.

A core 25 of wood or other suitable material is reduced at its ends at 26 to enter a complementary recess 27 in the inner ends of the tongues 22. It is believed apparent that when the blocks 24 and their associated tongues are inserted within the collars 14, the core 25 will be engaged thereby so that the driving head assemblies and the core may rotate as a unit.

A mechanism for driving the heads 11 and the core 25 is shown in Figs. 2, 5 and 6 as a shaft 30. This shaft has a portion 31 which enters the collar 14 and engages the block 24. The shaft is secured to the collar 14 by means of cap screws 32 and in this manner the blocks 24 are restrained against outward movement.

The tongues 22 are of reduced cross section at their inner ends to provide a shoulder 33 against which restraining plates 34 abut. Since these plates are subjected to material transverse pressure that would tend to cause buckling, supporting means such as pins 9 pass through openings 10' in the driving heads 11. These support pins are held in place and resist transverse pressure upon the restraining plates until such time as it is desired to release the baled material from within the device as will more fully appear.

Mounted transversely of the frame within slots 40 and 41 in the members 1 and 2 are shafts 43 and 44. Cables 45 and 46 are attached to these shafts at their outer ends, these cables passing over rollers 47 and 48 and having their outer ends secured to weight member 49.

As the construction just described is symmetrical the weight 49 will produce effort which uniformly tends to move the shafts 43 and 44 inwardly toward the center of rotation of the driving heads and core already described.

A cradle assembly generally indicated as 50 is mounted upon each of the shafts 43 and 44 between the frame members 1 and 2. Each of these assemblies comprises a roller support member 51 which is provided with openings 52 and 53 above and below the shafts 43 and 44 in which upper and lower rollers 55 and 56 are journaled. An arm 60 is attached to each of the support members 51 and the outer ends of these arms are interconected through a bar 61 whereby the entire cradle assembly, including the rollers 55 and 56 may rock about its shaft 43 or 44. A plurality of weights 62 are mounted upon the bar 61 so that the cradle assembly is balanced upon the supporting shaft.

By means of this construction the force exerted by each of the shafts 43 and 44 toward the axis of rotation of the driving mechanism is distributed between the two rollers 55 and 56 of the associated cradle assembly. The operation of the construction is such as to constantly apply desired inward pressure upon the forming bale to maintain the desired condition of compression of the material already in position upon the core 25, and to progressively add thereto a batt 75 of the material to form the completed bale.

While desired pressure may be applied through the instrumentality of the construction as described in connection with the weight 49, such pressure may be supplemented by means of the construction shown in Fig. 7 wherein a plurality of springs 65, 66, 67 and 68 surrounding the driving head 11 have their outer ends attached to the shafts 43 and 44. The lower ends of the springs 67 and 68 are attached to the frame through a spring 70, while the upper ends of the springs 65 and 66 are attached to a movable support 71 having a roller 72 which rides upon cam surface 73 upon the driving head 11. It is understood that the cam surface 73 will be of such configuration that the supplemental force exerted by this arrangement is such as to provide the desired pressure exerted by the rollers 55 and 56 upon the material being formed into a bale on the core 25.

The disclosed construction operates in a manner that will now be described.

In Fig. 4 there is shown a sectional view through the device in which a partially formed bale 24' is in position upon the core 25, the assembly being rotated in the direction indicated by the arrow 23. It is obvious that as the core 25 and the bale 24' rotate, the bat 75 is wound spirally thereon. During such winding operation the pairs of rollers 55 and 56 are urged inwardly toward the center of rotation and the cradle assemblies rock upon their respective shafts 43 and 44 as the rollers follow the changing and irregular contour of the bale 24'. This rolling pressure forces the fibers of the bale into close contiguity whereby a high density bale of generally elliptical cross section is formed.

To facilitate use of the material of the bale 24' by the spinner a plurality of cords 76, preferably of the same material, may be incorporated in the bale. Such cords enable unwinding the bale in bat form and the bat together with the cord material enter directly into the first operation in conversion of the fibrous material into a finished product.

When the bale 24' has attained a desired size, bagging or other suitable material is introduced between the rollers and the bale and is thus made to surround the bale. This covering material is secured about the bale in any suitable manner as by stitching, or if desired, bands or other suitable ties may be placed around the bale.

The blocks 24 in the driving heads are then released by loosening the cap screws 32 so that the shaft 30 may move axially for a limited distance whereupon the expansive pressure of the bale 24 upon the retaining plates 34 will force the blocks 24 outwardly whereby the bale will be released to fall under gravity to a position below the winding mechanism. Thereafter the covering material of the bale may be desirably secured about the ends thereof so that the compressed material will be completely covered.

An alternative manner of transmitting power to the driving heads 11 is shown in Fig. 3 wherein a cog wheel 14' is secured to the end of the

collar 14. In this embodiment the block 24 is held wtihin the collar 14 by any suitable releasable means whereby the removal of a bale from the device is facilitated.

In Figs. 8 and 9 there is shown an alternative core construction to be used when it is desired to remove the core from the formed bale. This core comprises elongated flat members 57 and 58 which are tapered in opposite directions and when assembled provide a core of substantially rectangular cross section. Each of the members 57 and 58 is provided with shoulders 59 against which the retaining plates 34 abut when the core is in use.

When utilizing a core as disclosed in Figs. 8 and 9 the tongue 22 is made removable from the block 24 and the ends 63 of the core are inserted through the opening 21 in the collar 13 into a slot in the inner ends of the blocks 24.

The construction just described is operated in a manner above described in connection with the use of the core 25 illustrated in Figs. 4, 5 and 6. When the block 24 is released, however the expansive pressure of the bale 24' against the retaining plates 34 causes the core members 57 and 58 to move outwardly respectively. Such outward movement causes the transverse thickness of the core to decrease because of the tapered section of these members. Accordingly the core members are released from excessive pressure and may be withdrawn from within the bale.

While in the disclosure of the invention reference has been made to specific constructions and technique, it is to be understood that the invention is not confined thereto but broadly comprehends the production of high density bales of compressible material by spirally winding and compressing a bat of such material into a bale having an elongated transverse cross section.

What is claimed is:

1. A bale press for compressing a bat of fibrous material delivered thereto, said press comprising a frame, opposed driving heads in said frame, means for driving said heads, a core, drive members releasably secured in each of the heads and engaging an end of the core, a retaining end plate on and rotatable with each of said members, idling pressure rollers extending longitudinally of the core member and entering between the end plates to engage and compress the bat spirally wound on the core, said rollers being arranged in pairs, a mounting for each of said pairs, each of said mountings being rockably mounted about a shiftable axis parallel to and spaced from the core so that the rollers of each pair follow the contour of the forming roll and apply equal pressures over spaced areas which extend axially and peripherally of the roll, and means urging each of said pairs of rolls into engagement with the material on the core.

2. A press for forming a compressed bale from a bat of fibrous material delivered thereto, said press comprising, a frame, an elongated core of transverse oblong cross section extending transversely of said frame, means for supporting and driving said core, a plurality of cradles, means whereby said cradles are indepenedntly rockably mounted in the frame, a pair of rollers in each of said cradles and extending throughout the length of the core, and means for moving the cradles with said rolls in engagement with the bat of material so that the rollers of each pair apply substantially equal pressures upon the forming bale to compress the spiral turns of the bat upon the core during the formation of a bale of the bat material.

3. A press comprising a frame, opposed driving heads rotatably mounted in the frame, means for driving said heads, a core member having its opposite ends attached to said heads to be driven thereby, a pressure disc at each end of said core and rotatable therewith, pressure rollers independently rockably mounted in pairs and extending lonigtudinally of the core and coextensive therewith, said rollers being adapted to enter between said discs to engage the material upon the core, and means for urging said pressure rollers into engagement with the material with a constant force which is independent of the size of the formed portion of the bale.

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