No. 776,956. PATENTED DEC. 6, 1904.

W. L. SPOON.

METHOD OF BALING FIBROUS MATERIAL.

APPLICATION FILED SEPT. 19, 1904.

NO MODEL. 4 SHEETS—SHEET 1.

CANCELLED

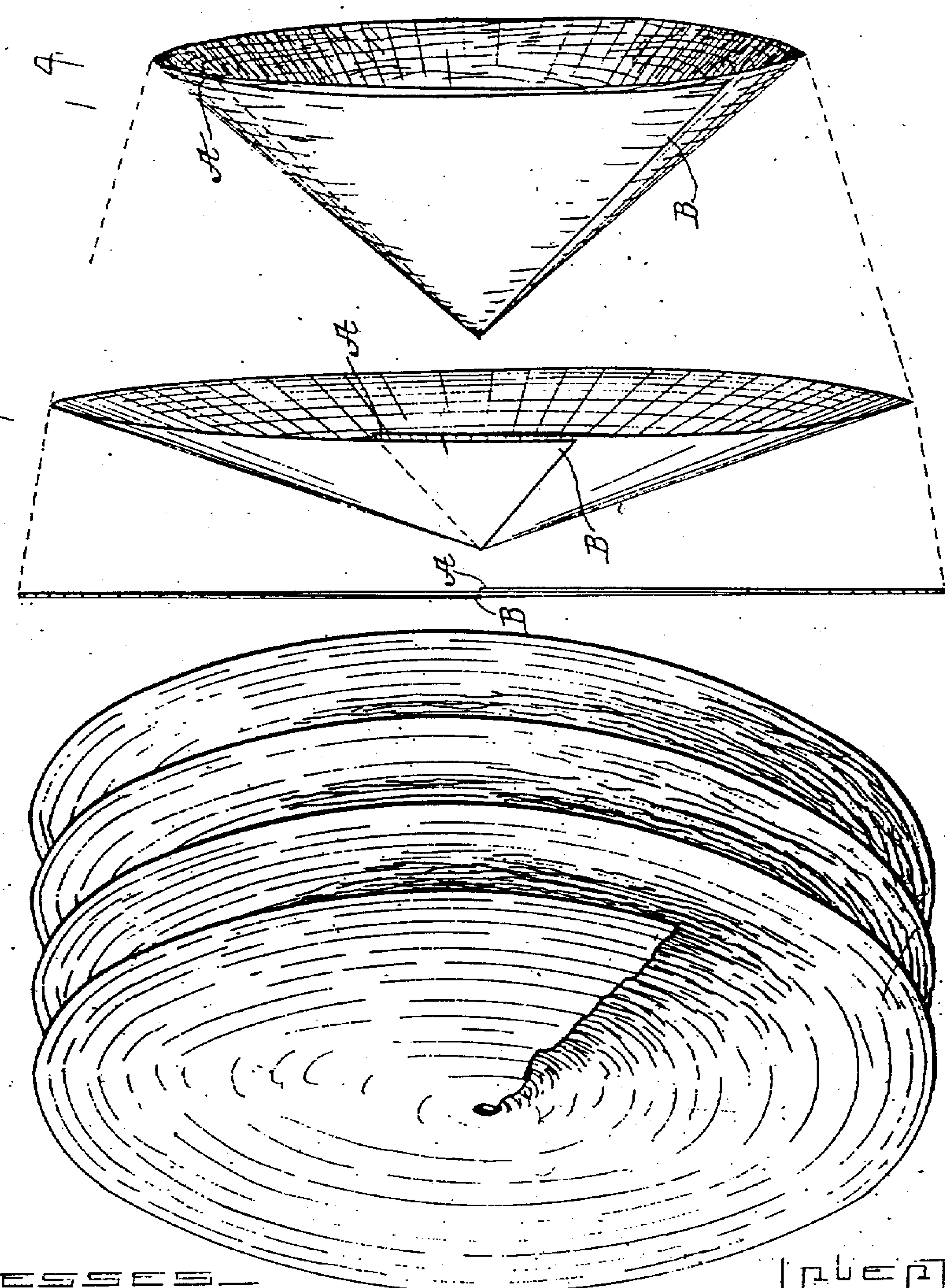

Fig. 3

Fig. 2

Fig. 1

CANCELLED

CANCELLED

Witnesses—

Chas. E. Ferris

Carrie R. Ivy

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William L. Spoon

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NO MODEL. 4 SHEETS—SHEET 2.

CANCELLED

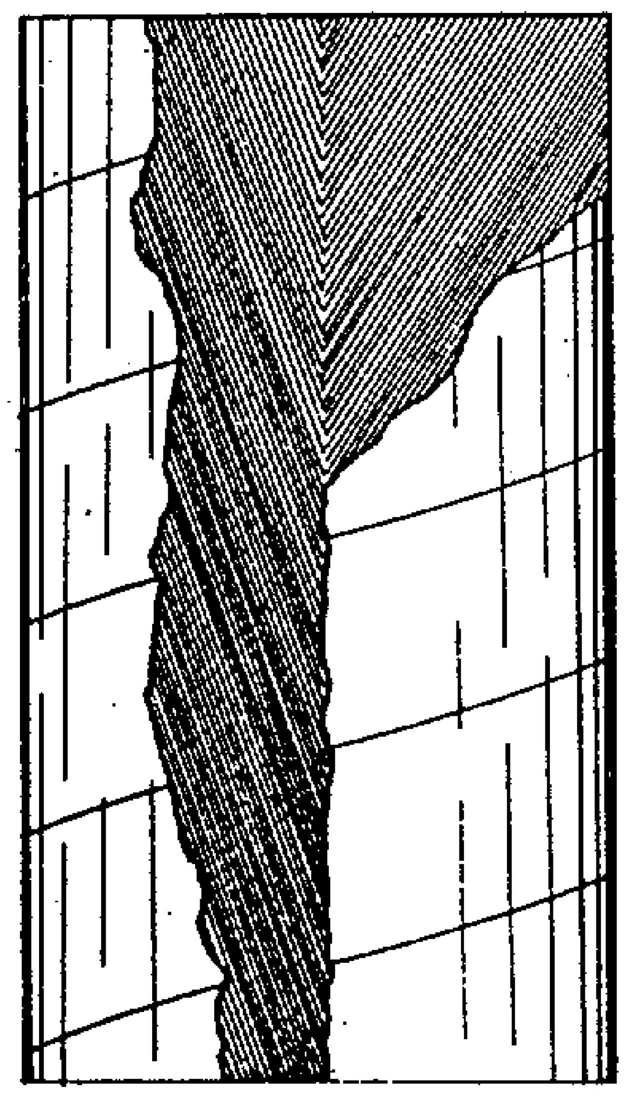

Fig. 7.

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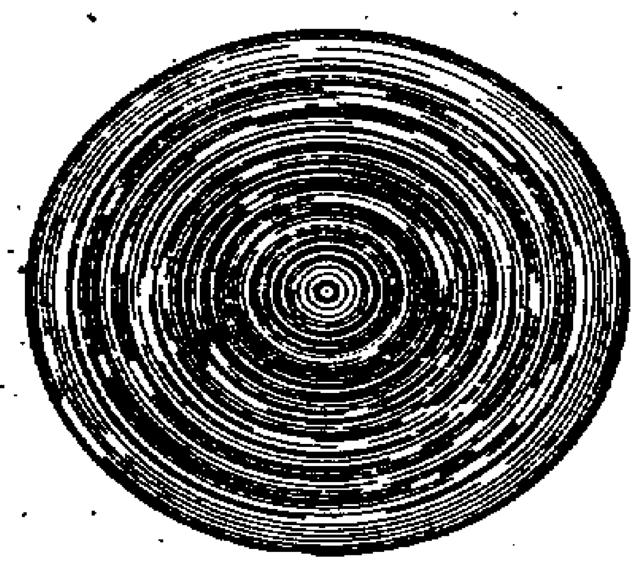

Fig. 8.

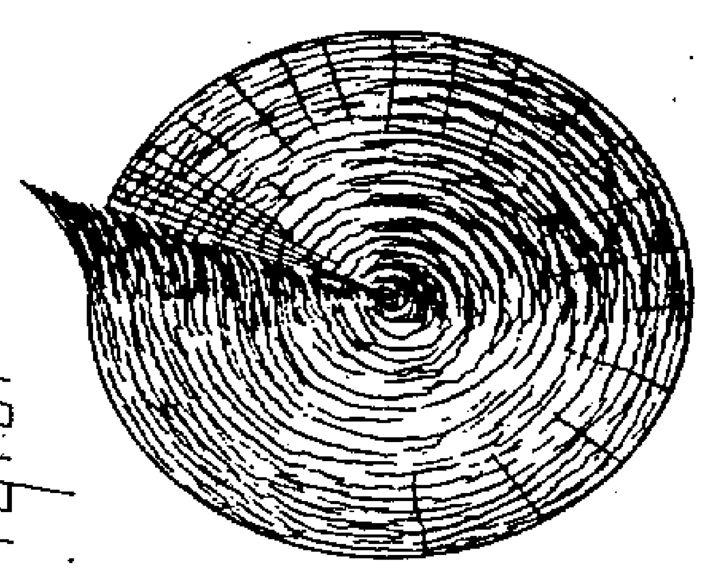

Fig. 6.

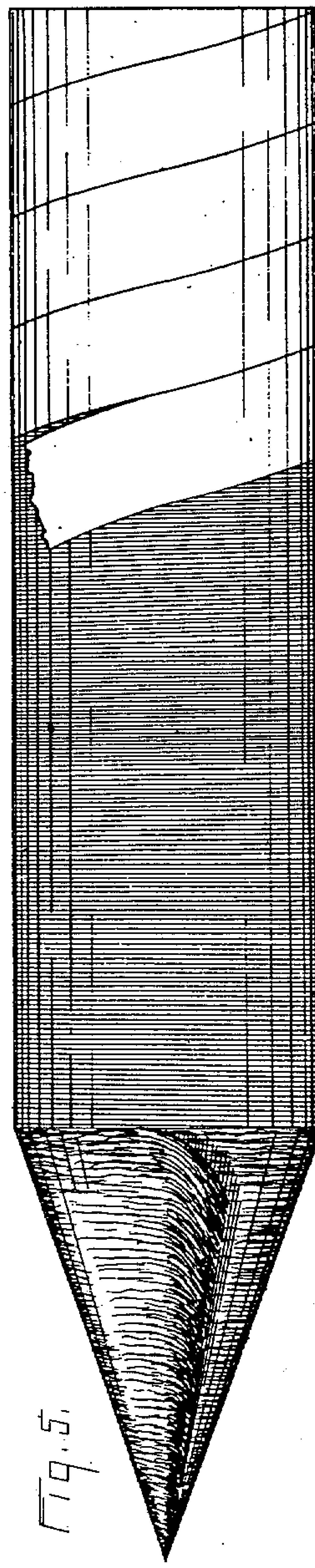

Fig. 5.

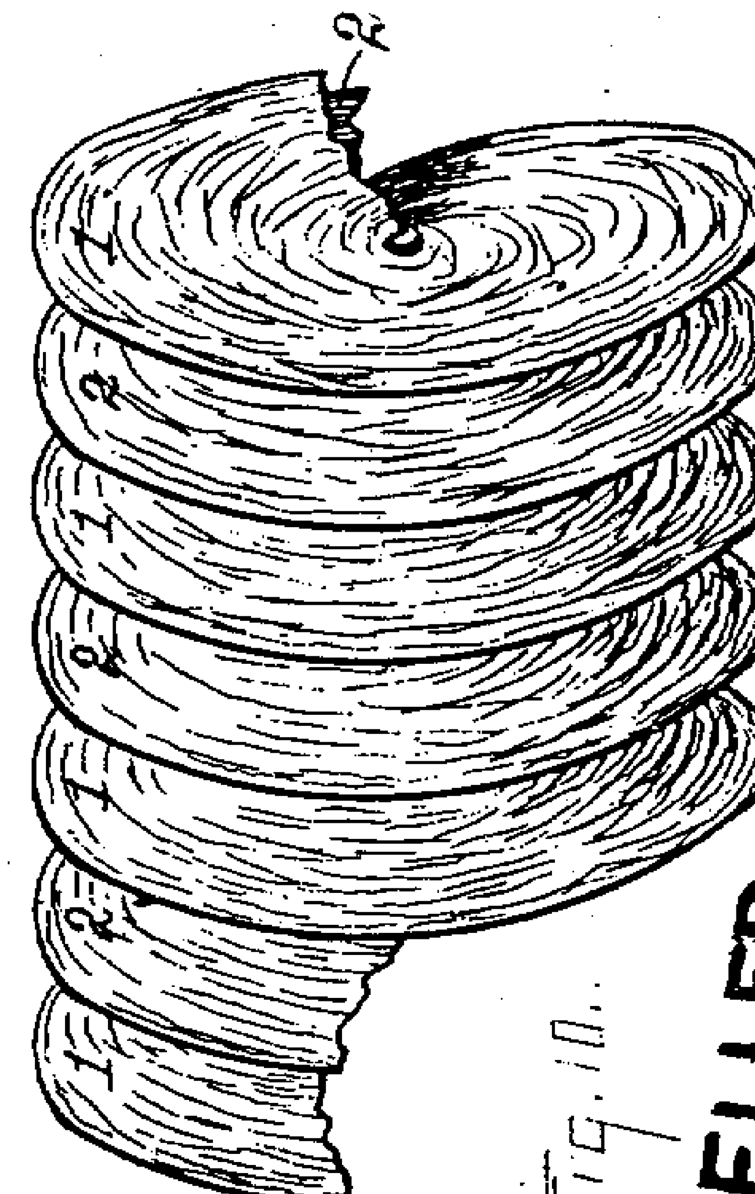

Fig. 10.

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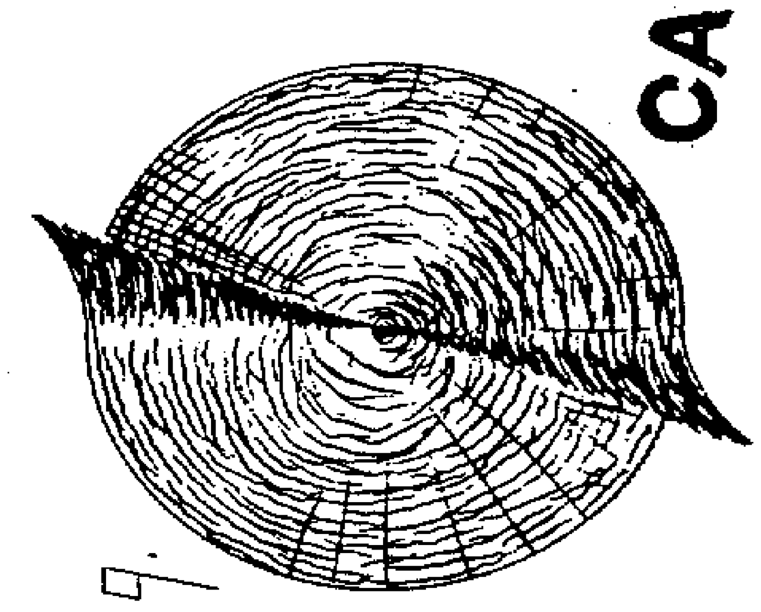

Fig. 9.

Witnesses—

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NO MODEL. 4 SHEETS—SHEET 3.

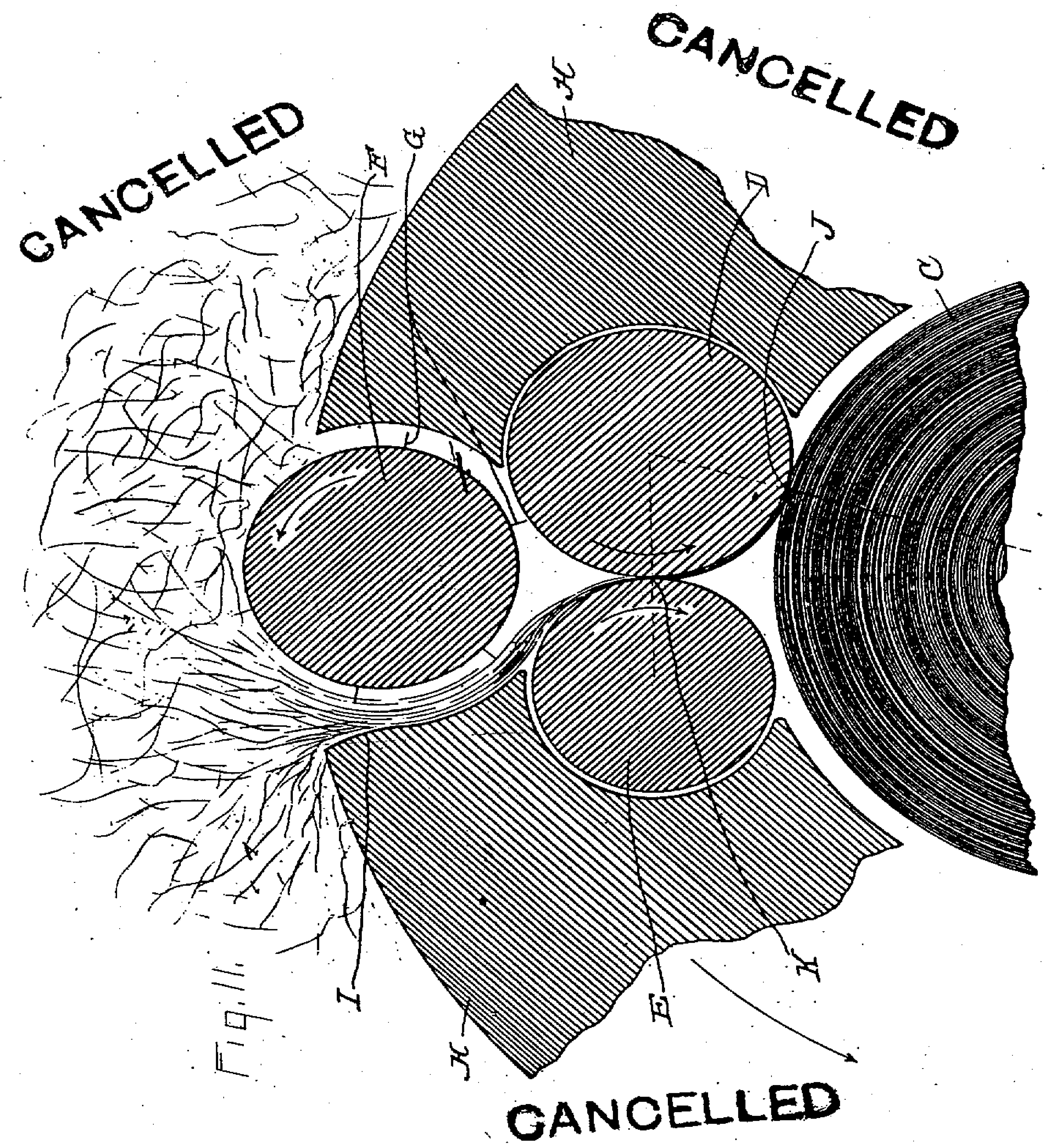

Fig. 11

Witnesses—

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Carrie R. Ivy

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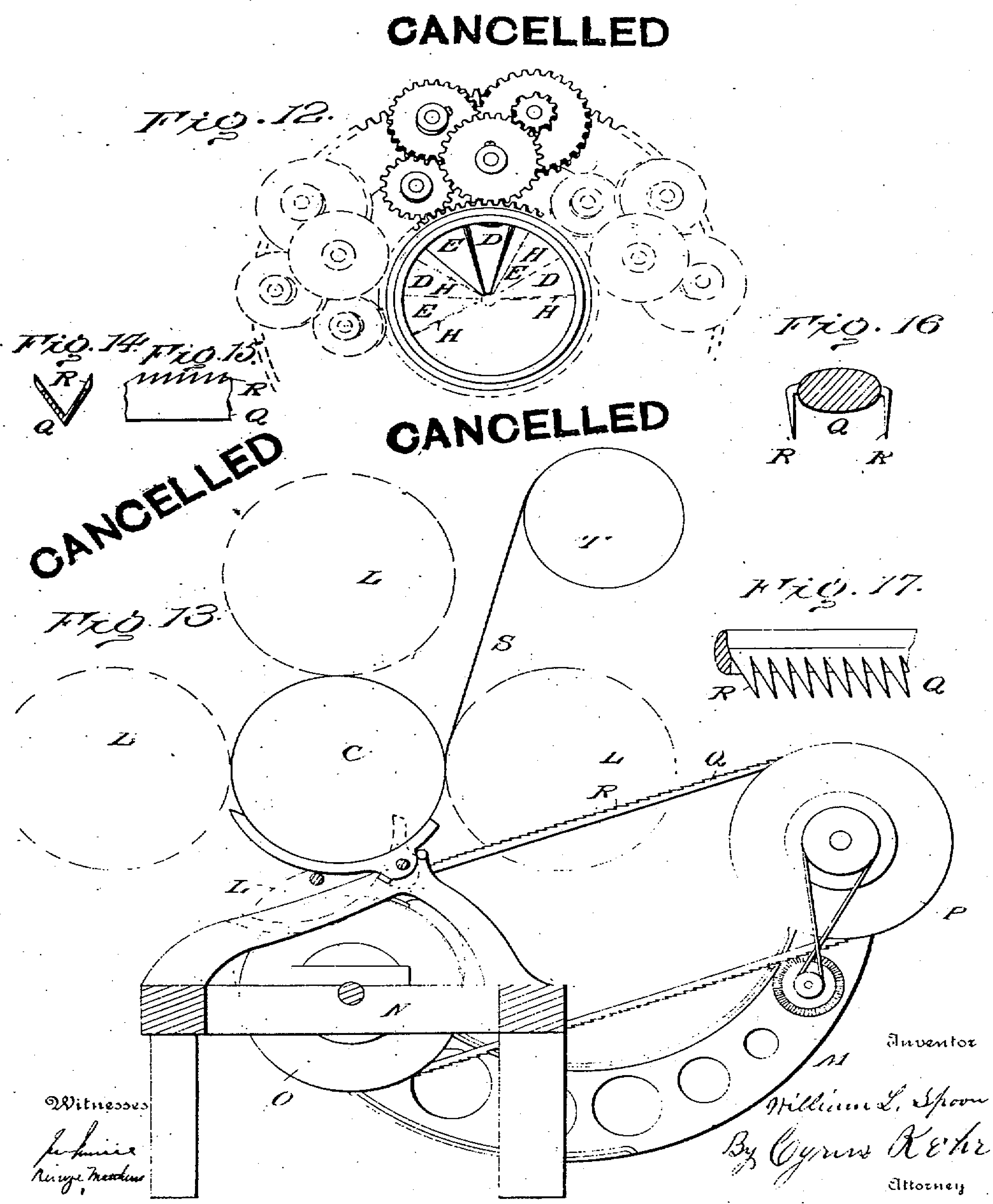
NO MODEL. 4 SHEETS—SHEET 4.



No. 776,956. Patented December 6, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM L. SPOON, OF COBLE TOWNSHIP, ALAMANCE COUNTY, NORTH CAROLINA.

METHOD OF BALING FIBROUS MATERIAL.

SPECIFICATION forming part of Letters Patent No. 776,956, dated December 6, 1904.

Original applications filed October 24, 1896, Serial No. 609,902, and September 10, 1901, Serial No. 74,985. Divided and this application filed September 19, 1904. Serial No. 224,950. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. SPOON, a citizen of the United States, residing in Coble township, in the county of Alamance and State of North Carolina, have invented a new and useful Improvement in Methods of Baling Fibrous Material, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates particularly to the baling of cotton and similar fibrous materials which have relatively high commercial values and require to be well preserved from the time and place of harvesting to the time and place of use in mill or factory. The most important of these fibrous materials is cotton.

The practice of my invention results in the forming of "round" or cylindrical bales having characteristics to be hereinafter described. The prime consideration in the baling of such fibrous material, particularly cotton, is density. It is desirable that the largest practicable amount of cotton be put into a bale of a given volume. This is desirable for the sake of saving space in storage of the bales in warehouses and in stowing the bales into cars and ships for transportation. Such density is also desirable for the sake of cleanliness. The more dense a bale is the smaller is the percentage of fiber so exposed as to become soiled during storage or handling of the bale, and density is also desirable for the sake of avoiding or reducing waste. A bale which is very dense will shed the least fiber in handling and will permit the least removal of fiber by persons who pilfer by taking cotton from bales. High density is also desirable, because it tends to render bales fireproof. The greater the density the more difficult it is to ignite a bale and the more slowly it will burn after being ignited. This statement is especially applicable when the operation is such as to expel and exclude the air from between the fibers, so that the interior of the bale is substantially free from oxygen to support combustion. While loose cotton or cotton which is packed to only moderate density may be readily ignited and then burns with great rapidity, cotton which is baled to high density and in such manner as to exclude the air will burn but little, if any, more rapidly than will a block of wood of corresponding dimensions and shape, and the cotton which is packed to great density in the bale is more secure against injury from dampness than is cotton which is loosely packed. The greater the density the less the permeation of atmospheric moisture and the less the absorption of water if the bale becomes immersed in water or becomes showered or flooded by effort to prevent or subdue fire; but while density is for the various reasons enumerated desirable it must be attained without injury to the fibrous material. In baling cotton, although it is highly desirable to attain great density, the cotton fiber must not be scorched, nor bruised, nor crushed, nor broken. It is well recognized in the textile industry that the value of cotton may be reduced or completely destroyed by such injury to the cotton fiber, and the attaining of high density merely at the time of forming the bale is not sufficient. The structure of the bale must be such as to adapt it to maintain the high density for an indefinite time. The bale must in this respect have "stability." This term as here used means that the bale must have no tendency to change form, or if it have such tendency the structure of the bale must be such as that said tendency can be readily and effectually overcome by mechanical means. In order that the bale may have such stability, it must not be constructed of masses which are not adapted to retain the position into which they are placed in the forming of the bale. For example, round or rope-like masses laid parallel to each other and put under pressure will tend to press each other sidewise. To illustrate, if a cylindric bale twenty inches in diameter and forty inches long were formed of two-inch rope coiled around the bale-axis and pressure were applied to the bale parallel to the axis each coil of rope would crowd the adjoining coils sidewise, so that the bale would bulge outward at the middle. (There is a railway-car draw-head in which coiled springs are intentionally arranged to thus crowd each other sidewise, so that the spring bulges when the draw-head is pushed or pulled with great force.) If it were attemped to make a dense cotton-bale by similarly building up rope-like spiral coils, such a bale could never have stability and high density. The endwise pressure for producing density would cause the coils to crowd each other sidewise, and the greater the pressure applied the more the bale would bulge between its ends, and finally disrupt or collapse. To attain stability and high density, the cotton must be laid in sheets or bats, and such sheets or bats must be to the greatest practicable extent continuous and uniformly thick. To illustrate, let it be supposed that a bale twenty inches in diameter and forty inches long is to be formed by superposing on a common axial line circular sheets of cotton cloth having a diameter of twenty inches. It will be readily understood that on applying endwise pressure to such a bale there would be substantially no tendency of the bale to bulge outward between its ends, for there would be no oblique faces bearing upon each other with a wedge-like action. By the use of sheets tendency toward movement in lines perpendicular to the direction of pressure may be substantially eliminated, and the more the sheet is organized—the fibers made to engage each other—the more fully will this result be attained. It has heretofore been proposed to form round bales by a spiral arrangement of rope-like or irregular masses, and the lack of stability of such bales for the reasons above pointed out has been practically demonstrated. Furthermore, the arrangement or organization of the fibrous material into a sheet form of substantial continuity and uniformity of thickness is essential to the attainment of high density in all portions of the bale. If the cotton is added to the forming bale in masses other than sheets which are of even thickness and extend over the entire area to which material is being applied, greater quantities will be applied to some portions of said area than to other portions, and where such greater quantities are applied maximum density will be attained, and elsewhere a less density will be attained, and such structure must also lack stability. To illustrate, let us suppose that sheets ten inches square of any fabric be superposed to form a column twenty inches high and that all such sheets are a little thicker at the right-hand side than at the left-hand side or that some of the sheets are not continuous to the left-hand side and that a platen is made to bear directly downward upon such column. Obviously only the right-hand portion of the column will be under compression, and said portion will be relatively narrow and free to bulge outward and permit the entire column to collapse, or let it be supposed that the sheets at the top and bottom of the column are thicker along the right-hand edge and the thickening in the sheets gradually shifts toward the middle of the sheets as the middle of the column is approached. Then the column will have practically no stability, for it will, in effect, be curved laterally between its ends, and its middle portion would promptly move laterally in response to pressure upon its upper end, and stability may be increased by the exclusion of air. If the air is completely excluded or expelled, the fibers come into closer contact with each other and can consequently make closer engagement with each other than would be the case with air distributed through the bale. In this connection it must be remembered that air is a highly elastic and mobile material and not at all adapted to density, solidity, or stability. A fibrous bale which is to be dense, solid, and stable must not have quantities of this elastic medium intermingled with the fibers, and, as already herein suggested, the exclusion of air from the bale tends to prevent the burning of the bale. It will be readily understood that a bale permeated throughout its entire volume by air, affording oxygen in approximately proper proportions to support combustion of the adjacent fibers, will burn much more rapidly than will a bale from which substantially all the air has been expelled and excluded, and it is practically impossible to expel the air from a large mass of cotton; but substantially all the air can easily be expelled by progressively compressing a thin uniform sheet of cotton, and the thinner the sheets applied to any area of the bale the easier it is to lay each successive sheet or convolution of the sheet at maximum density. Relatively small pressure is required to press or roll a thin sheet closely upon the portion of the bale already formed, and to attain great density and to exclude the air (not only for the sake of density, but to retard combustion) the fibers of the cotton should be to the largest practicable degree "paralleled." It will be readily understood that a mass of cylindric sticks piled upon each other in promiscuous, unorganized, or amorphous manner would occupy much more space than if they were all arranged parallel to each other, and it will be understood that if such sticks were tubular, (as cotton fibers are,) and therefore more crushable, and were arranged crosswise of each other in a press and pressure then applied they would be bruised, crushed, and broken where they cross, while if they were arranged parallel to each other each would give support to the others throughout their length and the pressure would not be concentrated upon particular points. From this it will be understood that not only will the paralleled cotton fibers occupy less space, and therefore permit putting greater quantity into a bale of a given size with the same pressure, but the paralleled fibers are adapted to endure greater pressure without injury, and to make the bale dense and also "self-binding," as will be hereinafter described, the fibers should not only be paralleled, but they should also be "intertwined" in order that the sheets may be a fabric adapted to be placed under and remain under tension.

In the practice of my method the cotton is taken continuously in small quantities (a thin sheet-form stream) from a loose or unorganized mass of cotton and formed, organized, or fabricated into a bat or sheet of substantial continuity and uniformity of thickness, and in organizing the sheet and applying it the fibers are more or less paralleled and "drawn" or intertwined, and such sheet is made quite thin, and the operation of forming or organizing said sheet or bat varies gradually in rapidity from one edge of the sheet to the other, such variation being from substantially zero at one margin or edge to the maximum rapidity at the opposite edge. On account of such variation in rapidity the sheet assumes a spiral form with one edge directed toward the axis of the spiral. Such operation as a whole results in forming, organizing, or fabricating a thin spiral sheet of substantial continuity and even thickness from edge to edge and from end to end and having its fibers paralleled and drawn or intertwined. For convenience said sheet is hereinafter termed a "spiral" sheet, and the stream of fibers from which said sheet is formed is termed a "sheet-spiral" stream. If the rapidity of formation at one edge of the sheet approximates zero, said edge will extend approximately to the axis of the spiral. Said edge may be termed the "inner" or "axial" edge, and the opposite edge may be termed the "outer" or "peripheral" edge. Each convolution of said sheet will if laid flat constitute a circular disk, and in the generation or fabrication of said sheet each increment added to the sheet is a segment of a circle adapted to be laid upon either the flat or the conical end of a bale-trunk with the apex of said segment approximately touching the axis of the bale-trunk, while the peripheral portion of said segment lies along the perimeter of the bale-trunk, and as the sheet is being so formed and organized it is preferably subjected to an initial or preliminary pressure, whereby it is made dense and the air is expelled, and subsequent to such initial compression said sheet is preferably kept under tension for the maintenance of such compression and exclusion of air and for the further "drawing" of the fiber and for the placing of the sheet or bat upon the forming bale or bale-trunk under tension. For the forming of the bale (or bale-trunk, which may be severed into sections constituting bales) the convolutions of said spiral sheet are, as fast as the sheet is formed, laid closely or densely against each other by suitable pressure, the axial edge of the sheet extending approximately to the axis of the bale and the peripheral edge of the sheet extending to the perimeter of the bale, and the sheet is preferably laid against the preceding mass, increment by increment, in such manner and with such pressure as to at once attain the full density which it is sought to impart to the completed bale. For convenience in description such density may be termed "complete" density. Usually complete density should be approximately the highest density which the cotton can endure without injury. As already stated, the bat or sheet is preferably given an initial compression for the attainment of density and expression of air. When this is done, on being laid against the end of the bale-trunk the pressure required for the final compression to attain complete density may be much reduced on account of such initial compression. During the operation the unorganized cotton is preferably kept away from the forming bale-trunk, as will be hereinafter more fully disclosed. The operation of forming said sheet and bale will be more fully described by reference to the accompanying drawings.

As already indicated, the spiral sheet is progressively applied to or built upon the end of the forming bale or bale-trunk. Hence the bale may be termed an "end-formed" or "end-built" bale.

The method constituting this invention may be practiced or carried out by various mechanical means. As an example of such means I refer to the machine described in my applications for Letters Patent of the United States, Serial No. 609,902, filed October 24, 1896, and Serial No. 74,985, filed September 10, 1901, of which applications the present application is a division.

In the accompanying drawings, Figure 1 is a perspective view of a portion of the spiral sheet used in forming my bales. Fig. 2 is an edge elevation of a single convolution of said spiral sheet. Fig. 3 is the same convolution in obtuse conical form. Fig. 4 illustrates the same convolution in less obtuse conical form. Fig. 5 is a side elevation of a bale-trunk formed by my improved method. Fig. 6 is an elevation of the left-hand or "forming" end of the bale-trunk shown in Fig. 5. Fig. 7 is a sectional side elevation of a bale severed from the right-hand end of the bale-trunk shown by Fig. 5. Fig. 8 is an end elevation of the bale shown by Fig. 7. Fig. 9 is an elevation of the forming end of a bale-trunk which is being formed by the simultaneous application of two spiral sheets or bats. Fig. 10 is a perspective view of sections of such two spiral sheets. Fig. 11 is a fragmentary section of a form of mechanism adapted to be used in the practice of my improved method. Fig. 12 is a transverse sectional elevation of mechanism for forming and applying the spiral sheets; Fig. 13, a transverse sectional elevation showing mechanism for applying covering material to the bale-trunk and for transversely severing the bale-trunk into sections. Figs. 14 and 15 are respectively a cross-section and a detail elevation of the "saw." Figs. 16 and 17 are similar views of another form of said saw.

Passing for the present the portion of the operation involved in the forming of the spiral sheet, the embodiment of the latter in the bale-trunk will now be more fully discussed.

In Fig. 1 of the drawings such a spiral sheet or bat is illustrated in perspective, and Figs. 2, 3, 4, and 5 illustrate the placing of such sheet in the bale-trunk. The sheet is always placed at an angle to the axis of the bale-trunk, which is also the axis of the spiral sheet. It may be most readily placed at an angle of approximately ninety degrees to said axis, as shown in Fig. 2. To form Figs. 2, 3, and 4, a single convolution of the sheet is cut from the section of the sheet shown by Fig. 1. Such convolution is substantially a circular disk whose radius equals the width of the spiral sheet. Such a disk-form section if arranged at an angle of substantially ninety degrees to the axis of the bale-trunk would stand as shown in Fig. 2; but if said angle is to be less than ninety degrees the section would change from disk form to obtuse conical form, the edges A B of said section overlapping, as shown by Fig. 3, and it will be observed that the diameter of the base of such cone will be less than the diameter of the disk form of the section was. If said angle is to be still less, the section is formed into a cone which is still less obtuse, the edges A B overlapping to a greater extent, and it will be observed that this will still further reduce the diameter of the base of the cone. In the bale-trunk shown in Fig. 5 the angle of the sheet and the diameter of the cone are still further reduced, and it will now be apparent that for a bat or sheet of a given width the diameter of the bale-trunk varies with the angle which the sheet sustains to the bale-trunk axis. In these several gradations (illustrated by Figs. 1, 2, 3, 4, and 5) the sheet is the same in organization, nature, and dimensions. It is the identical sheet in different positions, and in laying the sheet the final compression is always perpendicular to the sheet, as indicated by the arrows, so that when the angle of the layer is changed the direction of the final pressure must be correspondingly changed. Any inclination of the sheet will answer if it is intended to maintain the form of the bale only by external mechanical means—bands or other stays. Indeed, for this purpose an angle of approximately ninety degrees is perhaps the best, for then the stays need be so applied as to act in only one direction—namely, lengthwise of the bale; but I have found it desirable to so construct the bale as to adapt it to resist expansion. In other words, I have found it preferable to place the sheet or bat at such an angle to the axis of the bale-trunk as to cause each convolution to bear upon or bind a number of preceding convolutions, whereby the bale is made self-binding. In such form the convolutions become conical—strictly speaking conoidal, nearly conical—and said conoidal convolutions or layers are nested closely within each other. The attainment of such result is facilitated by the laying of the forming bat upon the end of the bale-trunk under tension as well as pressure. Not only does such tension increase the self-binding characteristic, but it makes possible the attainment of complete density with less final pressure than would be needed if such density were to be attained by pressure alone.

Referring now to Figs. 11 and 12, I will describe the operation so far as it is performed by the particular form of mechanism illustrated by said figures. C is a section of a portion of the conical end of the bale-trunk. D is the conical primary roll positively rotated in the direction of the arrow. E is a conical secondary roll rotated at the same surface speed as the primary roll D and bearing against the said roll D at K. The primary roll bears upon the bale-trunk at J, while the secondary roll is of smaller diameter than the primary roll, so that it does not bear against the bale-trunk at all or with only immaterial pressure. Above the primary and secondary rolls is located a conical feed-roll F, which is positively rotated in the direction of the arrow. Said feed-roll is provided with suitable radial teeth G. Fixed walls H are located at each side of the group of rolls D, E, and F. The space between said walls constitutes a slot in which said rolls are located and through which the cotton passes to the end of the bale-trunk. The right-hand upper portion I of the left-hand wall H constitutes a breast which acts in conjunction with the feed-roll F, and the space between said roll and said breast constitutes a throat. Above and upon the walls H H and the feed-roll F rests an unorganized heterogeneous loose mass of cotton separated or isolated from the bale-trunk by the intervening abutment formed by said rolls and walls H. The rotation of the feed-roll causes the teeth G to draw or comb cotton fibers in a thin sheet-form stream from said heterogeneous loose mass and present the same to the primary and secondary rolls. The quantity of fiber in said stream depends upon the length, quality, and humidity or dryness of the cotton fiber; the length, form, and number of teeth G; the velocity of rotation of said feed-roll, and the form of the breast I and its distance from the feed-roll. Said breast constitutes a resistance to the advance of the fiber, and said resistance must be overcome by the combing or drawing action of the feed-roll. The greater said distance the greater the quantity of fiber entering into said sheet, and the less said distance the thinner said sheet will be. Said sheet is drawn by the rolls D and E and passed between the latter and along the face of the roll D to the line of contact between said roll and the end of the bale-trunk. There said sheet becomes a part of the bale-trunk. The deposit of the sheet upon the bale-trunk is effected by either the rotation of the bale-trunk or the revolution of the rolls D, E, and F and the walls H H around the bale-trunk axis. The arrow in the left-hand portion of said Fig. 11 indicates the last-mentioned movement. Inasmuch as the said feed-roll, primary roll, and secondary roll are conical or substantially conical, (see Fig. 12,) the edge of the fiber sheet generated at the apex ends of said rolls is generated at a rapidity approximating zero, while from said apex edge there is a gradual increase of rapidity of generation, approximately proportional to the rate of increase of the circumferences of said rolls from their apexes toward their bases.

The drawing or combing of the cotton from the heterogeneous or loose mass into the passage or throat between the feed-roll and the breast I of the left-hand wall H tends to "parallel" and "draw" the fibers in much the same way as the card-rolls of card-engines operate to intertwine and concatenate the fibers. As already stated, the breast I acts as a resistance or obstruction to the passage of the fiber engaged by the feed-roll. This facilitates the taking of uniform quantities of fiber by the teeth of the feed-roll. While the stream or forming sheet is in engagement between the feed-roll and the breast I it is also in engagement between the primary and secondary rolls and is by the action of the latter placed under tension, which results in the "drawing" of said sheet in a manner similar to the action of drawing-frames, whereby the fibers of the sheet are further paralleled and intertwined or concatenated. For the purpose of placing the sheet upon the end of the bale-trunk under tension and also further drawing the sheet the surface velocity of the primary roll is made less than the orbital velocity of said roll, so that said roll will pull upon the sheet or bat while the latter is being laid. In other words, the orbital movement of the primary and secondary rolls or the rotary receding movement of the bale-trunk is a little more rapid than the generation of the spiral sheet. Hence there is a dragging straining action upon the sheet as it is being laid upon the end of the bale-trunk. Such pulling or straining exerts a further drawing action upon the portion of the sheet or bat which is below the line of contact between the primary and secondary rolls.

I have already mentioned that an initial compression is preferably given to the sheet, whereby the air is expelled from the sheet and the sheet acquires a preliminary density. In the apparatus illustrated by Fig. 11 this initial compression is imparted by the rolls D and E at the line of contact between said rolls. It will be observed that such initial compression may be quite effective, for the sheet of fiber is thin and the compression is between narrow faces—practically lines—and both of said faces are hard faces. It has also been herein stated that the sheet or bat receives a final compression while it is being laid into its final position upon the end of the bale-trunk. This occurs when the sheet passes the contact-line between the primary roll and the end of the bale-trunk. As already herein stated, the pressure applied to the sheet while it is being laid need be only sufficient to attain complete density and that this final pressure may be much reduced because of the density attained and retained by the "initial" compression. In other words, the density resulting from the manner of organizing the sheet and from the initial compression needs to be supplemented only by such final compression as will lead to complete density, and, as already herein pointed out, the final compression necessary to lead to complete density may be relatively small in view of the tension under which the bat or sheet is applied.

Additional rolls D may be arranged to bear upon the forming end of the bale-trunk, and by providing a plurality of sets of rolls D, E, and F, as shown in Fig. 12, a plurality of sheets or bats may be formed at the same time and simultaneously applied to the end of the forming bale-trunk. In Fig. 9 I have shown the forming end of a bale-trunk with two spiral sheets being applied thereto, and Fig. 10 shows two such spiral sheets intertwined.

As more and more of the spiral sheet is added to the end of the bale-trunk the latter and the abutment between the bale-trunk and the mass of unorganized cotton are relatively separated in the direction parallel to the bale-trunk axis. Such separation should be proportional to the increments added to the end of the bale-trunk in order that the pressure of the abutment upon the end of the bale-trunk may be uniform. This can be best accomplished by holding the bale-trunk with a yielding resistance, such resistance being adapted to be overcome when the desired degree of pressure by the abutment upon the portion of the sheet being laid is attained. For this purpose the bale-trunk may be made to extend through a tubular passage the walls of which bear upon the bale-trunk.

In Fig. 12 the four rolls L bear upon the bale and constitute such a resistance. Said rolls are oblique to the bale-axis, so that the bale as it is pressed forward rotates said rolls and is itself rotated by said rolls.

From the completed end of the bale-trunk—the end opposite the end to which the forming-bat is applied—sections of proper length to constitute bales are severed periodically.

Such severing may be accomplished by any suitable method or means. I prefer, however, to effect such separation by the removal of whole fibers of cotton throughout the plane of severance in order that the ends of the bales may not contain mutilated fibers. The fibers thus removed may be added to the original unorganized mass and allowed to again enter the forming spiral sheet and the bale-trunk, or if said fibers have become bruised or otherwise injured to a material extent they may be put aside to be used as an inferior grade of cotton. Such severing mechanism is shown by Figs. 13, 14, 15, 16, and 17. M is an arm mounted radially on the shaft N. O and P are pulleys mounted on said arm. A belt form device Q, resembling a saw, (and on account of such resemblance termed a "saw,") is supported by said pulleys as a band-saw is supported. Said saw is provided with two parallel rows of teeth R, and said teeth are preferably like card-teeth instead of having cutting edges in order that said teeth may pull the fibers without cutting them. The pulleys are rotated, and the arm M is turned toward the bale to bring the saw into engagement with the bale, and said arm is moved parallel to the bale-trunk axis synchronously with the longitudinal movement of the bale until the bale-section has been severed.

It is to be observed that, if so desired, all of the bale-trunk may be detached or removed as often as it attains the length desired for a bale.

The completed bale-trunk or sections thereof may be surrounded by any suitable extraneous binding or wrapping material or means for the sake of preserving the structure of the bale and for the sake of keeping the cotton from being bruised and soiled during handling or storage. I prefer to apply to such bale-trunk or bales a covering of cloth under progressive radial pressure accompanied by strain or tension on the cloth, one end or edge of said cloth being pressed against the bale-trunk on a line parallel to the bale-axis and said line of pressure advanced around the bale while the portion of the cloth not yet applied to the bale is kept under tension. By this method the perimeter-surface of the bale, so far as it may be yielding, will be smoothed and pressed and the air expelled therefrom and the cloth closely laid or bound around the bale under tension. According to a preferred variation of said method of applying said cloth a straight strip or sheet of cloth is laid obliquely or spirally to the bale-axis, the side edges of the sheet of cloth overlapping. In Figs. 5, 7, and 13, S is such a sheet of cloth. In Fig. 13 it is drawn from the reel T between one of the rolls L and the bale-trunk C by the rotation of the bale.

I claim as my invention—

1. The method of baling fibrous material, which method consists in generating from a mass of loose fibrous material a sheet-spiral stream of fibers leading out therefrom, and expressing the air from the stream by highly compressing the stream between opposed members and forming the compressed sheet in spiral convolutions about an axis.

2. The method of baling fibrous material, which method consists of drawing fibers in a spiral sheet of substantially uniform thickness from a mass of loose material into approximate parallelism and arranging a multiplicity of convolutions of such a sheet together to form a cylindric end-built bale and securing them together against reëxpansion.

3. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and expelling the air from and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, substantially as described.

4. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, substantially as described.

5. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and expressing the air therefrom and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, substantially as described.

6. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material, and pressing the resulting spiral sheet under strain, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of

said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, substantially as described.

7. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous materal, subjecting the resulting sheet to an initial compression and then finally compressing the sheet, increment by increment, spirally upon the end of a forming bale-trunk, substantially as described.

8. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and subjecting the resulting spiral sheet to an initial compression and then finally pressing said sheet, increment by increment, spirally upon the end of a forming bale-trunk, substantially as described.

9. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and by an initial compression expressing the air from the resulting spiral sheet, and finally pressing said sheet, increment by increment, spirally upon the end of a forming bale-trunk, substantially as described.

10. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material, subjecting the resulting spiral sheet to an initial compression, and thereafter pressing said sheet, increment by increment and under strain, spirally upon the end of a forming bale-trunk, substantially as described.

11. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material, subjecting the resulting sheet to an initial compression, placing and maintaining said sheet under tension from said initial compression and finally compressing the sheet, increment by increment, spirally upon the end of a forming bale-trunk, substantially as described.

12. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and subjecting the resulting spiral sheet to an initial compression and placing and maintaining said sheet under tension from said initial compression and finally pressing said sheet, increment by increment, spirally upon the end of a forming bale-trunk, substantially as described.

13. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and by an initial compression expressing the air from the resulting spiral sheet, placing and maintaining said sheet under tension from said initial compression and finally pressing said sheet, increment by increment, spirally upon the end of a forming bale-trunk, substantially as described.

14. The method of baling fibrous material, which method consists in generating from a mass of loose fibrous material a plurality of sheet-spiral streams of fibers leading out therefrom, and expressing the air from said streams by highly compressing the streams between opposed members and forming the compressed sheet-spiral convolutions about an axis.

15. The method of baling fibrous material, which method consists of drawing fibers in a plurality of spiral sheets of substantially uniform thickness from a mass of loose fibrous material into approximate parallelism and arranging a multiplicity of convolutions of such sheets together to form a cylindric end-built bale and securing them against reëxpansion.

16. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material and expelling the air from and pressing the resulting sheets, increment by increment, spirally upon the end of a forming bale-trunk, the axial edges of said sheets extending approximately to the axis of said bale-trunk and the peripheral edges of said sheets extending to the perimeter of the bale-trunk, substantially as described.

17. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and pressing the resulting spiral sheets, increment by increment, spirally upon the end of a forming bale-trunk, the axial edges of said sheets extending approximately to the axis of said bale-trunk and the peripheral edges of said sheets extending to the perimeter of the bale-trunk, substantially as described.

18. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and expressing the air therefrom and pressing the resulting spiral sheets, increment by in-

crement, spirally upon the end of a forming bale-trunk, the axial edges of said sheets extending approximately to the axis of said bale-trunk and the peripheral edges of said sheets extending to the perimeter of the bale-trunk, substantially as described.

19. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material, and pressing the resulting spiral sheets under strain, increment by increment, spirally upon the end of a forming bale-trunk, the axial edges of said sheets extending approximately to the axis of said bale-trunk and the peripheral edges of said sheets extending to the perimeter of the bale-trunk, substantially as described.

20. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material, subjecting the resulting sheets to an initial compression and then finally compressing the sheets, increment by increment, upon the end of a forming bale-trunk, substantially as described.

21. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material and paralleling and intertwining and subjecting the resulting spiral sheets to an initial compression and then finally pressing said sheets, increment by increment, spirally upon the end of a forming bale-trunk, substantially as described.

22. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and by an initial compression expressing the air from the resulting spiral sheets and then finally pressing said sheet, increment by increment, spirally upon the end of a forming bale-trunk, substantially as described.

23. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose, fibrous material, subjecting the resulting spiral sheets to an initial compression, and thereafter pressing said sheets, increment by increment and under strain, spirally upon the end of a forming bale-trunk, substantially as described.

24. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and expelling the air from and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and said sheet being inclined to the bale-trunk axis, whereby the convolutions of said sheet assume conoidal form and become nested, substantially as described.

25. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and said sheet being inclined to the bale-trunk axis, whereby the convolutions of said sheet assume conoidal form and become nested, substantially as described.

26. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and expressing the air therefrom and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and said sheet being inclined to the bale-trunk axis, whereby the convolutions of said sheet assume conoidal form and become nested, substantially as described.

27. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material, and pressing the resulting spiral sheet under strain, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and said sheet being inclined to the bale-trunk axis, whereby the convolutions of said sheet assume conoidal form and become nested, substantially as described.

28. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material, subjecting the resulting sheet to an initial compression and

then finally compressing the sheet, increment by increment, spirally upon the end of a forming bale-trunk, and said sheet being inclined to the bale-trunk axis, whereby the convolutions of said sheet assume conoidal form and become nested, substantially as described.

29. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and subjecting the resulting spiral sheet to an initial compression and then finally pressing said sheet, increment by increment, spirally upon the end of a forming bale-trunk, and said sheet being inclined to the bale-trunk axis, whereby the convolutions of said sheet assume conoidal form and become nested, substantially as described.

30. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material, and paralleling and intertwining said fibers and by an initial compression expressing the air from the resulting spiral sheet, and finally pressing said sheet, increment by increment, spirally upon the end of a forming bale-trunk, and said sheet being inclined to the bale-trunk axis, whereby the convolusions of said sheet assume conoidal form and become nested, substantially as described.

31. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material, subjecting the resulting spiral sheet to an initial compression, and thereafter pressing said sheet, increment by increment and under strain, spirally upon the end of a forming bale-trunk, and said sheet being inclined to the bale-trunk axis, whereby the convolutions of said sheet assume conoidal form and become nested, substantially as described.

32. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material, subjecting the resulting sheet to an initial compression, placing and maintaining said sheet under tension from said initial compresssion and finally compressing the sheet, increment by increment, spirally upon the end of a forming bale-trunk, and said sheet being inclined to the bale-trunk axis, whereby the convolutions of said sheet assume conoidal form and become nested, substantially as described.

33. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and subjecting the resulting spiral sheet to an initial compression and placing and maintaining said sheet under tension from said initial compression and finally pressing said sheet, increment by increment, spirally upon the end of a forming bale-trunk, and said sheet being inclined to the bale-trunk axis, whereby the convolutions of said sheet assume conoidal form and become nested, substantially as described.

34. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and by an initial compression expressing the air from the resulting spiral sheet, placing and maintaining said sheet under tension from said initial compression and finally pressing said sheet, increment by increment, spirally upon the end of a forming bale-trunk, and said sheet being inclined to the bale-trunk axis, whereby the convolutions of said sheet assume conoidal form and become nested, substantially as described.

35. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material and expelling the air from and pressing the resulting sheets, increment by increment, spirally upon the end of a forming bale-trunk, the axial edges of said sheets extending approximately to the axis of said bale-trunk and the peripheral edges of said sheets extending to the perimeter of the bale-trunk, and said sheets being inclined to the bale-trunk axis, whereby the convolutions of said sheets assume conoidal form and become nested, substantially as described.

36. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and pressing the resulting spiral sheets, increment by increment, spirally upon the end of a forming bale-trunk, the axial edges of said sheets extending approximately to the axis of said bale-trunk and the peripheral edges of said sheets extending to the perimeter of the bale-trunk, and said sheets being inclined to the bale-trunk axis, whereby the convolutions of said sheets assume conoidal form and become nested, substantially as described.

37. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and expressing the air therefrom and pressing

the resulting spiral sheets, increment by increment, spirally upon the end of a forming bale-trunk, the axial edges of said sheets extending approximately to the axis of said bale-trunk and the peripheral edges of said sheets extending to the perimeter of the bale-trunk, and said sheets being inclined to the bale-trunk axis, whereby the convolutions of said sheets assume conoidal form and become nested, substantially as described.

38. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material, and pressing the resulting spiral sheets under strain, increment by increment, spirally upon the end of a forming bale-trunk, the axial edges of said sheets extending approximately to the axis of said bale-trunk and the peripheral edges of said sheets extending to the perimeter of the bale-trunk, and said sheets being inclined to the bale-trunk axis, whereby the convolutions of said sheets assume conoidal form and become nested, substantially as described.

39. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material, subjecting the resulting sheets to an initial compression and then finally pressing the sheets, increment by increment, upon the end of a forming bale-trunk, and said sheets being inclined to the bale-trunk axis, whereby the convolutions of said sheets assume conoidal form and become nested, substantially as described.

40. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and expelling the air from and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

41. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

42. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and expressing the air therefrom and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

43. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material, and pressing the resulting spiral sheet under strain, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

44. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material, subjecting the resulting sheet to an initial compression and then finally compressing the sheet, increment by increment, spirally upon the end of a forming bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

45. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and subjecting the resulting spiral sheet to an initial compression and then finally pressing said sheet, increment by increment, spirally upon the end of a forming bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

46. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and by an initial compression expressing the air from the resulting spiral sheet, and finally pressing said sheet, increment by increment, spirally upon

the end of a forming bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

47. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material, subjecting the resulting spiral sheet to an initial compression, and thereafter pressing said sheet, increment by increment and under strain, spirally upon the end of a forming bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

48. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material, subjecting the resulting sheet to an initial compression, placing and maintaining said sheet under tension from said initial compression and finally pressing the sheet, increment by increment, spirally upon the end of a forming bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

49. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and subjecting the resulting spiral sheet to an initial compression and placing and maintaining said sheet under tension from said initial compression and finally pressing said sheet, increment by increment, spirally upon the end of a forming bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

50. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and by an initial compression expressing the air from the resulting spiral sheet, placing and maintaining said sheet under tension from said initial compression and finally pressing said sheet, increment by increment, spirally upon the end of a forming bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

51. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material and expelling the air from and pressing the resulting sheets, increment by increment, spirally upon the end of a forming bale-trunk, the axial edges of said sheets extending approximately to the axis of said bale-trunk and the peripheral edges of said sheets extending to the perimeter of the bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

52. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and pressing the resulting spiral sheets, increment by increment, spirally upon the end of a forming bale-trunk, the axial edges of said sheets extending approximately to the axis of said bale-trunk and the peripheral edges of said sheets extending to the perimeter of the bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

53. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material and paralleling and interwining said fibers and expressing the air therefrom and pressing the resulting spiral sheets, increment by increment, spirally upon the end of a forming bale-trunk, the axial edges of said sheets extending approximately to the axis of said bale-trunk and the peripheral edges of said sheets extending to the perimeter of the bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

54. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material, and pressing the resulting spiral sheets under strain, increment by increment, spirally upon the end of a forming bale-trunk, the axial edges of said sheets extending approximately to the axis of said bale-trunk and the peripheral edges of said sheets extending to the perimeter of the bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

55. The herein-described method of baling fibrous material, which method consists in drawing a plurality of thin, substantially continuous and uniform sheet-spiral streams of fibers from a mass of loose fibrous material, subjecting the resulting sheets to an initial compression and then finally pressing the sheets, increment by increment, upon the end of a forming bale-trunk, and transversely severing the completed portion of the bale-trunk, substantially as described.

56. The herein-described method of baling fibrous material, which method consists in forming a cylindrical bale-trunk, then sever-

ing the bale-trunk into individual bales by removing integral fibers in planes to which the axis of said trunk is perpendicular, substantially as described.

57. The herein-described method of baling fibrous material, which method consists in forming a cylindrical bale-trunk, then severing said trunk into individual sections or bales by the removal of integral fibers in planes to which the axis of said trunk is perpendicular, then embodying the fibers so removed with the fibers being formed into said bale-trunk, substantially as described.

58. The herein-described method of baling fibrous material, which method consists in forming a bale-trunk by applying a continuous spiral layer of fibrous material obliquely and spirally around the axis of said trunk, and severing said trunk into sections by removing integral fibers in planes to which said axis is perpendicular, substantially as described.

59. The herein-described method of baling fibrous material, which method consists in forming a bale-trunk by applying a continuous spiral layer of fibrous material obliquely and spirally around the axis of said trunk, and severing said trunk into sections by removing integral fibers in planes to which said axis is perpendicular, then again embodying said fibers in said trunk by merging said fibers into said layer and continuing the application of said layer to said trunk, substantially as described.

60. The herein-described method of baling fibrous material, which method consists in forming a bale-trunk by applying a continuous spiral sheet of compressed fibrous material spirally and under high compression to the end of said trunk, and severing said trunk into sections by removing integral fibers in planes to which said axis is perpendicular, substantially as described.

61. The herein-described method of baling fibrous material, which method consists in forming a bale-trunk by applying a continuous spiral sheet of fibrous material spirally and under high compression to the end of said trunk, and severing said trunk into sections by removing integral fibers in planes to which said axis is perpendicular, then again embodying said fibers in said trunk by merging said fibers into said sheet and continuing the application of said sheet to said trunk, substantially as described.

62. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and expelling the air from and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and surrounding the bale-trunk by extraneous binding means, substantially as described.

63. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and expelling the air from and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and, simultaneously with the application of said spiral sheet to the bale-trunk, surrounding the bale-trunk progressively with extraneous binding means, substantially as described.

64. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and surrounding the bale-trunk by extraneous binding means, substantially as described.

65. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and, simultaneously with the application of said spiral sheet to the bale-trunk, surrounding the bale-trunk progressively with extraneous binding means, substantially as described.

66. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and expelling the air from and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and, simultaneously with the application of said spiral sheet to the bale-trunk, applying radial pressure to the perimeter of the bale-trunk, and, simultaneously

with the application of said radial pressure, applying cover fabric to said trunk under tension, substantially as described.

67. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and, simultaneously with the application of said spiral sheet to the bale-trunk, applying radial pressure to the perimeter of the bale-trunk, and, simultaneously with the application of said radial pressure, applying cover fabric to said trunk under tension, substantially as described.

68. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and expelling the air from and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and, simultaneously with the application of said spiral sheet to the bale-trunk, applying radial pressure to the perimeter of the bale-trunk, and, simultaneously with the application of said radial pressure, applying a straight sheet of cover fabric spirally to said bale-trunk under tension, substantially as described.

In testimony whereof I have signed my name, in presence of two witnesses, this 24th day of August, 1904.

WILLIAM L. SPOON.

Witnesses:
J. M. CONKLIN,
M. R. SUTPHIN.

Order of Cancellation of Letters Patent No. 776,956.

DEPARTMENT OF THE INTERIOR,

UNITED STATES PATENT OFFICE,

WASHINGTON, D. C., ***October 10, 1908.***

In compliance with a decree of the Circuit Court of the United States for the Western District of North Carolina, entered at the October term, 1908, in a cause in equity entitled United States of America *ex rel.* Planters Compress Company, complainant, *v.* William L. Spoon, respondent, which decree is recorded in Liber Q79, page 482, of the assignment records of the United States Patent Office, Letters Patent No. 776,956, granted to William L. Spoon, December 6, 1904, are hereby canceled.

EDWARD B. MOORE,
Commissioner.

[*Official Gazette, October 20, 1908.*]

with the application of said radial pressure, applying cover fabric to said trunk under tension, substantially as described.

67. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and paralleling and intertwining said fibers and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and, simultaneously with the application of said spiral sheet to the bale-trunk, applying radial pressure to the perimeter of the bale-trunk, and, simultaneously with the application of said radial pressure, applying cover fabric to said trunk under tension, substantially as described.

68. The herein-described method of baling fibrous material, which method consists in drawing a thin, substantially continuous and uniform sheet-spiral stream of fibers from a mass of loose fibrous material and expelling the air from and pressing the resulting spiral sheet, increment by increment, spirally upon the end of a forming bale-trunk, the axial edge of said sheet extending approximately to the axis of said bale-trunk and the peripheral edge of said sheet extending to the perimeter of the bale-trunk, and, simultaneously with the application of said spiral sheet to the bale-trunk, applying radial pressure to the perimeter of the bale-trunk, and, simultaneously with the application of said radial pressure, applying a straight sheet of cover fabric spirally to said bale-trunk under tension, substantially as described.

In testimony whereof I have signed my name, in presence of two witnesses, this 24th day of August, 1904.

WILLIAM L. SPOON.

Witnesses:
J. M. CONKLIN,
M. R. SUTPHIN.

Order of Cancellation of Letters Patent No. 776,956.

DEPARTMENT OF THE INTERIOR,

UNITED STATES PATENT OFFICE,

WASHINGTON, D. C., ***October 10, 1908.***

In compliance with a decree of the Circuit Court of the United States for the Western District of North Carolina, entered at the October term, 1908, in a cause in equity entitled United States of America *ex rel.* Planters Compress Company, complainant, *v.* William L. Spoon, respondent, which decree is recorded in Liber Q79, page 482, of the assignment records of the United States Patent Office, Letters Patent No. 776,956, granted to William L. Spoon, December 6, 1904, are hereby canceled.

EDWARD B. MOORE,
Commissioner.

[*Official Gazette, October 20, 1908.*]

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