Oct. 14, 1952 H. C. RIORDAN ET AL 2,613,400

METHOD AND MACHINE FOR MAKING GLOBULAR SURGICAL SPONGES

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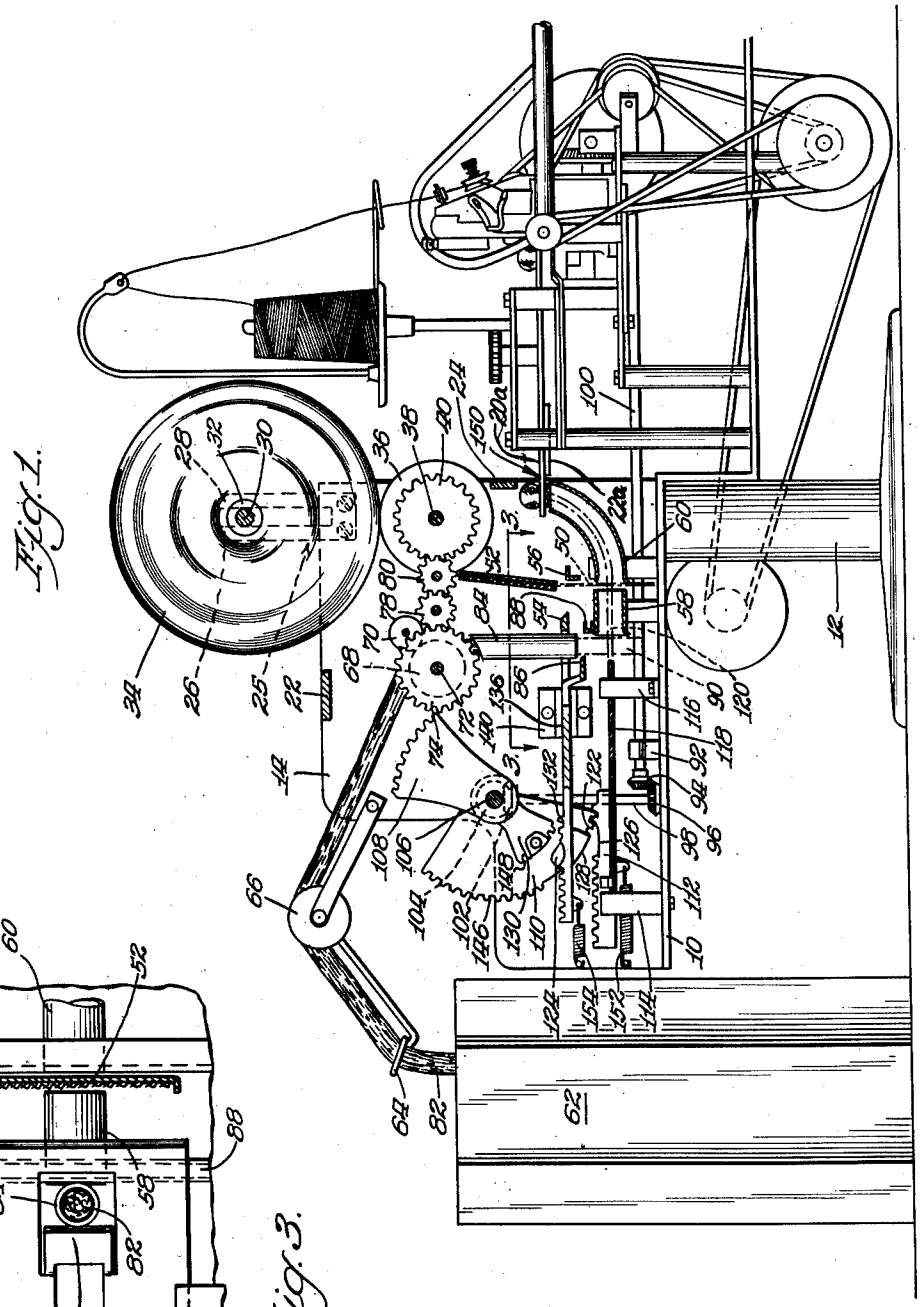


Fig. 1.

Fig. 3.

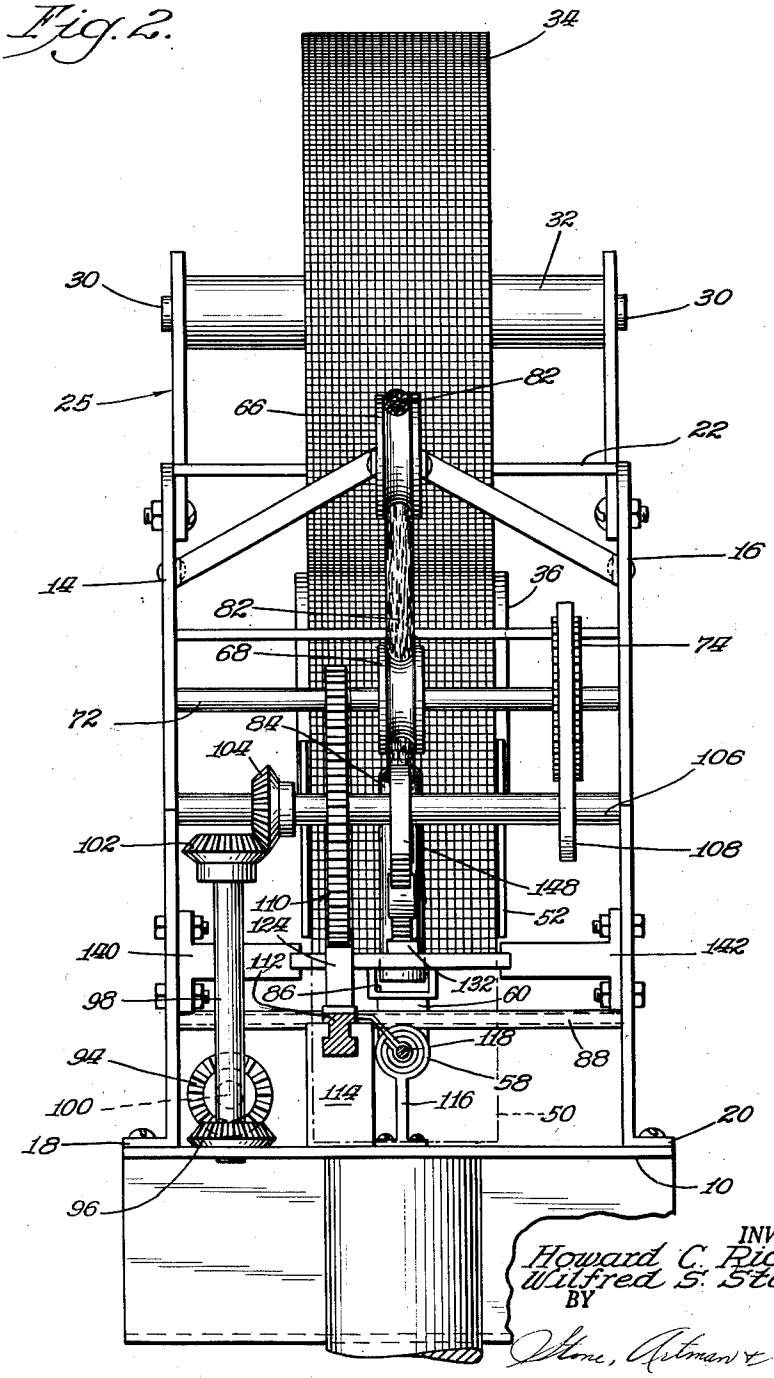
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Fig. 2.

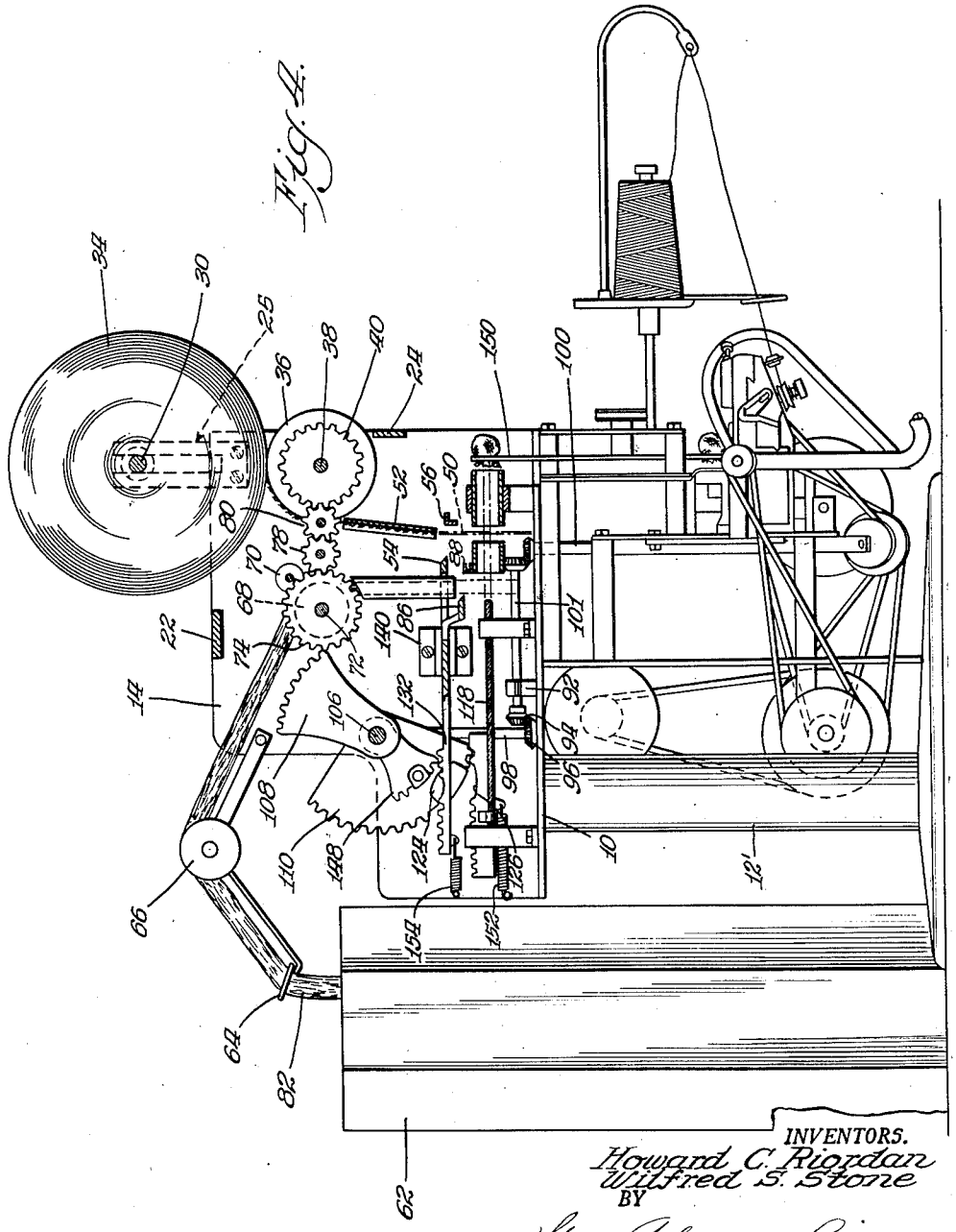


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2,613,400

METHOD AND MACHINE FOR MAKING GLOBULAR SURGICAL SPONGES

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7 Claims. (Cl. 19—144.5)

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This invention relates to an improved method of making that type of surgical dressing wherein a piece of absorbent material such as cotton batting is positioned within a porous envelope such as gauze, and for a machine for practicing this invention. Applicant Riordan is the assignee of United States Patent No. 2,400,250, covering a method and machine for making such sponges.

The specific object of the present invention is to eliminate the heavy movable carriage employed in the Mott machine. As explained in that application, gauze and cotton rope are limp and the inventor Mott conceived the idea of moving them downwardly with gravity in order to obtain the correct relative position of the rope to the gauze. He further conceived the idea of then moving the cotton rope and the gauze so related into a horizontal position where the ends were severed from the main rolls of rope and gauze and moved thereafter into assembled relationship. The device which performed this movement of the gauze and rope from a vertical position into a horizontal position was the heavy carriage 126. For each surgical sponge made, this carriage must move around a pivot ninety degrees and then back to the first position. This slowed the rate of operation of the machine.

In the present invention, the applicants fully employ Mott's basic principle of feeding the cotton rope and gauze downwardly with gravity until the rope and the gauze are in the proper relative position. At this point, instead of moving these elements of the surgical sponge into horizontal position, they are severed from the main rolls of rope and gauze while being held in proper relationhip. The cotton is then surrounded by the gauze and carried through a tube having a ninety degree bend in it and forced into the forming device on the assembling table.

The assembling device and transfer table will not be described for they are identical with that shown in the Mott Patent No. 2,400,250.

A second object of this invention is to perform this new method of forming the sponge which consists essentially of the steps of holding the rope, severing an end section, pushing the end section against the gauze, severing the end section of the gauze, and then pushing both the rope and the gauze into a restrictive orifice, with the Mott assembling and transfer table on its side or vertical position instead of horizontal position. A second embodiment of the invention is therefore shown in the accompanying drawings and briefly described.

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These and such other objects as may hereinafter appear are attained in the two embodiments of the invention shown in the accompanying drawings wherein:

Fig. 1 is a side view of a machine constituting a preferred embodiment of the invention;

Fig. 2 is an end elevation taken from the left side of Fig. 1;

Fig. 3 is a view taken on the line 3—3 of Fig. 1;

Fig. 4 is a side view of the second embodiment of the invention with the transfer table vertically positioned.

Referring to Fig. 1, the numeral 10 identifies a base plate supported on a pedestal 12. Upon the base 10 are two side members 14 and 16 rigidly fastened to the base by brackets 18 and 20 and held in spaced relationship by cross bars such as 22 and 24. On the upper part of the side members 14 and 16 are supported vertical guideways 25 formed by pairs of spaced arms such as 26 and 28. Into these guideways may be inserted the reduced end portions such as 30 of a shaft 32 which has mounted upon it a spool of cotton gauze 34.

The spool 34 rests upon a drive roller 36 mounted on the shaft 38 which carries a pinion gear 40. The end of the gauze 50 is fed forwardly down a chute 52 between a movable knife 54 and a fixed knife 56 to a position where the swatch is centered between two tubular members 58 and 60.

The cotton rope is drawn from a container 62 through a guide 64 over a sheave 66 into the bight of a driven roller 68 and a pressure roller 70. The driven roller 68 is mounted on shaft 72 which carries gear 74 which is identical in size to the gear 40 on the shaft 38. A pair of like-size idler gears 78 and 80 drivingly connect the two gears 74 and 40. It follows that shaft 72 rotates at the same speed as shaft 38. The driven roller 68 is one-half the diameter of the drive roller 36 and hence on each rotation of the drive shaft 100, while the drive roller 36 is feeding four inches of gauze, the roller 68 will feed two inches of rope. The rope designated by the numeral 82 is fed down an oversize guide tube 84 which passes the rope between a movable knife 86 and a fixed knife 88 down to a position indicated by the numeral 90 adjacent the ring member 58.

The left-hand end of the shaft 100 is journaled in a block 92 and carries a miter gear 94 in engagement with a miter gear 96 mounted on a shaft 98. The upper end of this shaft carries a miter gear 102 in engagement with the miter gear 104 mounted on the shaft 106. The ratio of

the gears 94 and 96 is one to one, and the ratio of the gears 102 and 104 is one to one so that the shaft 106 rotates once for each rotation of the main shaft 100. This shaft carries a plurality of gear segments. The gear sector 108 has a circumferential length equal to one-fourth of the circumference of the gear 74. On each rotation of the shaft 100, the gear sector 108 will rotate the shaft 72 by ninety degrees thus feeding approximately two inches of rope downwardly. In the position shown, the shaft 106 turns counterclockwise and the feeding of the rope and the gauze has just been terminated. At this moment a second gear sector 110 has engaged a rack 112 mounted in guides 114 and 116. Mounted on the right-hand end of the rack 112 is a flexible poker 118. It will be observed that the tooth section 122 on the sector 110 is short and will move the flexible poker 118 into the dotted-line position 120, thereby holding the rope against the ring member 58. As the tooth 122 clears the rack, a locking plate 124 engages a concave surface 126 in the rack which has approximately the same radius as has the circumferential edge 128 of the locking plate 124. This holds the poker still for a moment and at that moment a third gear sector 130 engages a rack 132, by a short extent of teeth. The rack 132 is fastened to the two knives 54 and 86 which are mounted in grooves such as 136 and 138 in side supports 140 and 142. The length of the teeth in engagement with the rack 132 is such that the knife 86 engages the fixed knife 88 and severs the cotton rope, but the knife 54 stops before engaging the knife 56. Immediately thereafter the teeth 146 of the sector 110 engage the balance of the teeth on the rack 112 which forces the flexible poker 118 on through the ring member 58 so that the cotton rope section engages the gauze end 50. As this occurs, the teeth 143 on the sector 130 finish driving the knife 54 against the knife 56 which severs the gauze. The poker 118 continues to move forwardly and pushes the gauze and the rope upwardly around the curved tube 60 through the opening in the assembling plates at 150. The racks are returned to normal position by means of springs 152 and 154. The assembling plates at 150 comprise an upper plate 20*a* having a hole therethrough and a lower plate 22*a*. When the poker 118 pushes the cotton section and gauze through this hole, the lower plate 22*a* pinches the tails of the gauze against the edge of the hole, all of which is described in detail in Mott, 2,400,250, particularly with respect to its Fig. 24.

This method of making the surgical sponge differs from the preceding one essentially in that the cotton rope section is assembled in the gauze without moving them into horizontal position. The assembling really occurs inside the tube 60 which performs the function which the member 50 in the Mott Patent No. 2,400,250, showed.

The embodiment that has been described, is advantageous to applicant because his existing Mott machines may be adapted to this design by building the unit as shown in Fig. 1 and replacing the unit shown in Fig. 13 of the Mott patent. The entire transfer table and stitching mechanism is satisfactory in its present form.

However, a new machine is projected in which the transfer table and stitching assembly is laid on its side as illustrated in Fig. 4. This need not be described in detail because the drawing shows the stitching assembly of Fig. 1, and the gauze and cotton rope assembly, also of Fig. 1, at right angles to each other. Shaft 100 drives a shaft 101 at a one-to-one ratio and the machine functions as heretofore described.

Having thus described our invention, what we claim as new and useful is:

1. The method of making a globular surgical sponge from a spool of gauze and cotton rope which comprises the steps of feeding downwardly in side-by-side relationship the ends of the gauze and rope so that the rope is adjacent one surface of the gauze and disposed centrally of two sides thereof, of severing an end section of rope and an end section of gauze from the main body of the gauze while concurrently pushing the rope section along a substantially horizontal path against the gauze and into a formative member, pushing the cotton and gauze sections through an assembling plate, and of then fastening the tails of the gauze around the cotton rope core to form a surgical sponge.

2. The method of making a globular surgical sponge from a spool of gauze and cotton rope which comprises the steps of feeding downwardly in side-by-side relationship the ends of the gauze and rope so that the rope is adjacent one surface of the gauze and disposed centrally of two sides thereof, of severing an end section of rope and an end section of gauze from the main body of the gauze while concurrently pushing the rope section along a substantially horizontal path against the gauze and into a formative member, of then converting the movement of the rope surrounded by the gauze from a horizontal movement into a vertical movement, and of thereafter fastening the tails of the gauze around the cotton rope core to form a surgical sponge.

3. The method of making a globular surgical sponge from a strip of gauze and cotton rope which comprises the steps of feeding downwardly in side-by-side relationship unsevered end sections of gauze and rope disposed at respective ends of a horizontally disposed open-ended tubular member, of pushing the end section of the rope axially against its end of the tube while concurrently severing such end section from the main body of the rope, of then pushing the severed cotton section through the tubular member against the gauze section and thus pushing the gauze section against an end of a second tube in coaxial spaced relation with the first tube while concurrently severing the gauze section from the remainder of its strip, of pushing the cotton and gauze sections through the second tube so as to draw the corners of the gauze around the cotton rope section as tails, pushing the cotton and gauze sections through an assembling plate, and of thereafter securing the tails of the gauze together to form a surgical sponge.

4. The method of making a globular surgical sponge from a strip of gauze and cotton rope which comprises the steps of feeding downwardly in side-by-side relationship unsevered end sections of gauze and rope disposed contiguously to respective ends of a horizontally disposed open-ended tubular member, of pushing the end section of the rope into its end of the tubular member while concurrently severing such end section from the main body of the rope, of then pushing the severed cotton section through the tubular member against the gauze section and thus pushing both of them into an end of a second tubular member while concurrently severing the gauze section from the remainder of the gauze strip, of pushing said sections through the second tubular member so as to draw the corners of the gauze around the cotton rope section as tails, of then

changing the direction of movement of the rope surrounded by the gauze from the horizontal to vertical, and of thereafter fastening the tails of the gauze around the rope to form a surgical sponge.

5. A machine for making surgical sponges comprising a horizontally positioned tube, means for feeding selected length end sections of a cotton rope and a gauze strip downwardly across the ends respectively of said horizontally positioned tube, a poker movable along the axis of said tube, a second tube having one end thereof in axial alignment with said first tube but spaced therefrom so that the gauze section may hang between opposed ends of the tubes, knives for severing the cotton and gauze sections while disposed co-axially with the tubes, actuating means for severing said co-axially disposed cotton and gauze sections during horizontal endwise movement of the poker first into and through the first tube and continued movement of the poker through the second tube so as to gather the severed gauze around the severed rope section, means adjacent the opposite end of the second tube for receiving and holding the gauze-wrapped cotton, and means for fastening the gauze around the cotton to form a surgical sponge.

6. A machine for making surgical sponges comprising means for feeding selected length end sections respectively of a cotton rope and of a gauze strip into side-by-side relationship in an assembling zone, a curved tube having a receiving open-end portion disposed with its axis in the horizontal and also disposed in said assembling zone adjacent the gauze section, said tube also having a discharge end portion disposed remotely from said zone and arranged with its axis vertically, a flexible poker movable along a horizontal path through the assembling zone into and through the curved tube, knives operable for severing the cotton and the rope sections in the assembling zone, actuating means for concurrently operating the knives and moving the poker in the assembling zone, means for further moving the poker through the curved tube, means at the discharge end of the curved tube for receiving the severed cotton and gauze sections as they are poked therefrom by the poker, and means cooperable with said receiving means for securing the gauze section about the cotton section.

7. In a surgical sponge producing machine, a frame, a pair of substantially horizontal tubes fixedly mounted upon said frame and having coaxial and contiguously opposed ends, means for intermittently feeding a gauze strip endwise downwardly for disposing a leading end portion of such strip within the space between the contiguous spaced ends of the tubes, severing means operable to sever such end portion from the gauze strip, means for intermittently feeding an elongated piece of filling material endwise to place a leading end portion thereof transversely across the opposite end of one of said tubes, severing means operable to sever such end portion from the filler material piece, an elongated poker, means reciprocally mounting the poker upon said frame in horizontal co-axial relation with the one tube to facilitate endwise entry of the poker into the one tube through such other end and continued movement of the poker axially through both tubes, means operable to horizontally endwise advance the poker to cause entry thereof into the tubes and alternately withdraw the poker from the tubes, and means for operating the poker operating means and both of said severing means in timed relation with the intermittent feeding of said gauze strip and of said elongated piece of filler material, said operating means being operable to effect sequential operation of the poker and severing means such that the poker approaches the one tube to commence poking the end portion of the filler material into such one tube substantially concurrently with the severing operation of the filler material severing means and force the severed end portion of filler material through the one tube and against the gauze end section for pressing the latter into the other tube substantially concurrently with the operation of the gauze severing means while the poker continues to advance the severed gauze and filler material sections into the other tube while cooperating therewith to wrap the severed gauze piece about the severed section of the filler material, means at the opposite end of said other tube for receiving the gauze piece and retaining the same wrapped about the filler material section, and means cooperable with said receiving means for permanently fastening the gauze section about the filler material section.

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The following references are of record in the file of this patent:

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