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G. C. TRUSLOW ET AL
CONDENSER TAPE TENSION DEVICE

2,736,927

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3 Sheets-Sheet 1

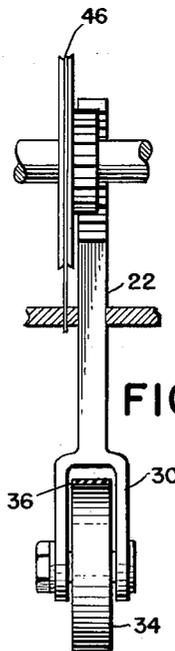
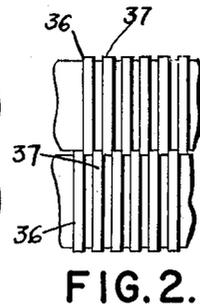
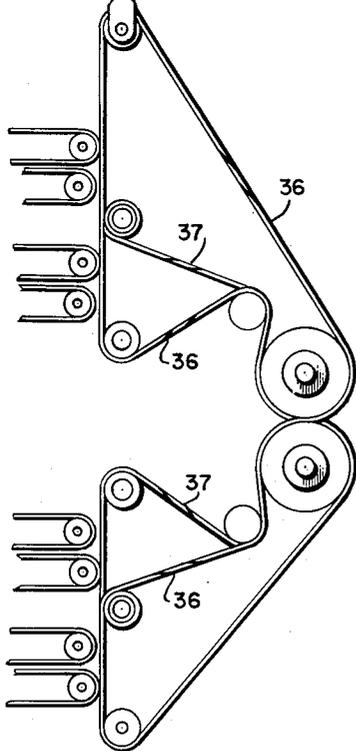
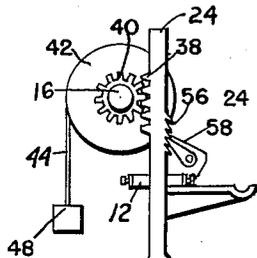
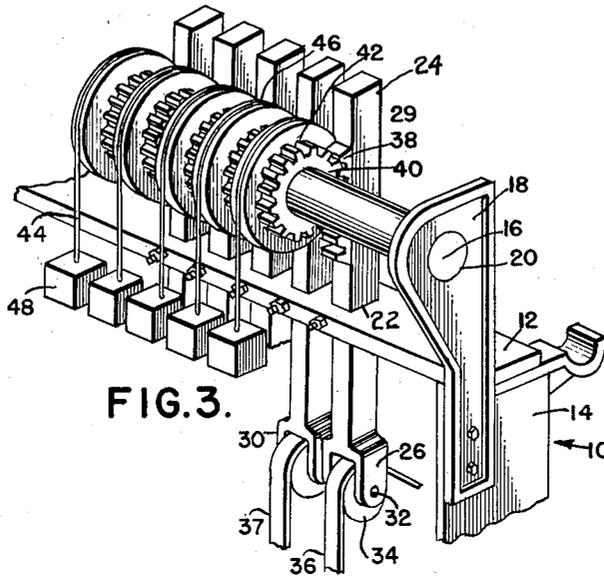
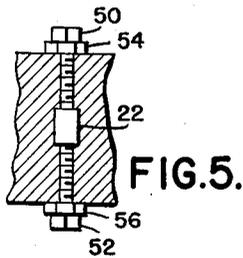


FIG. 1.

FIG. 2.

FIG. 4.

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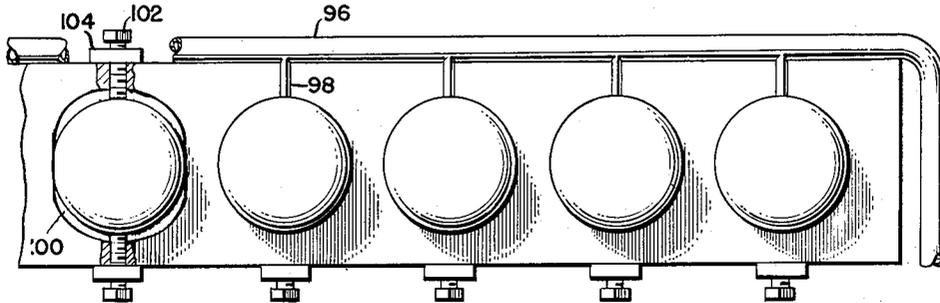


FIG. 8.

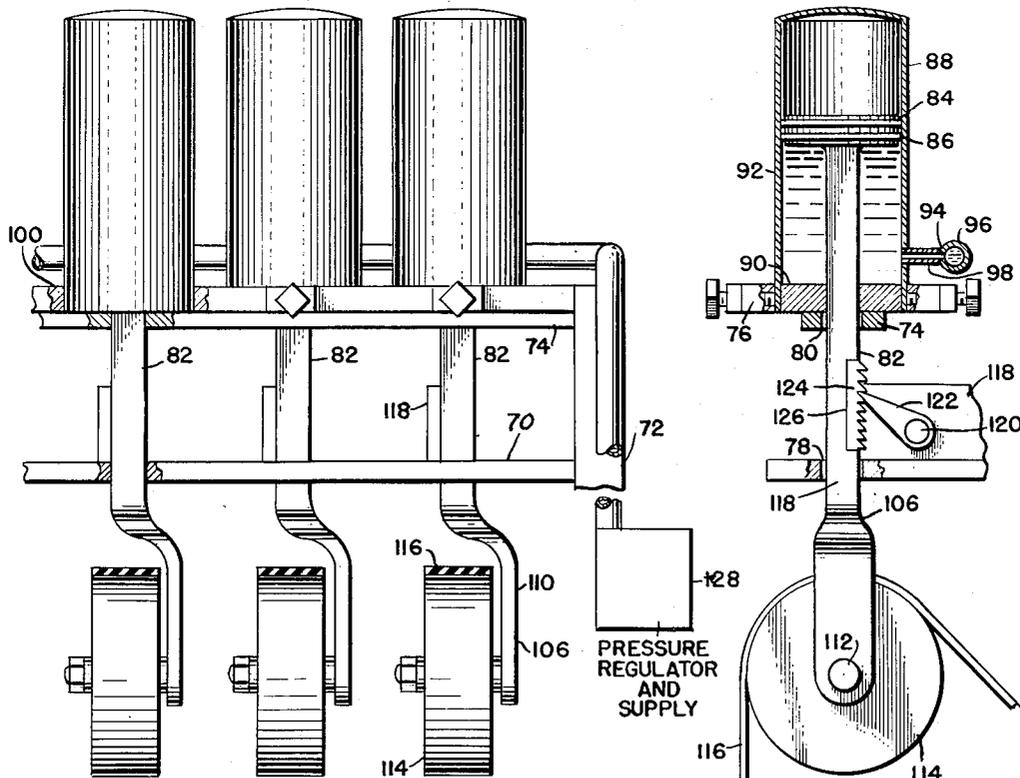


FIG. 6.

FIG. 7.

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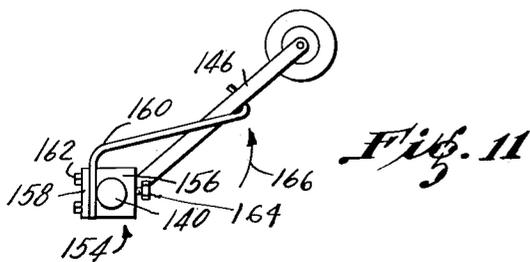
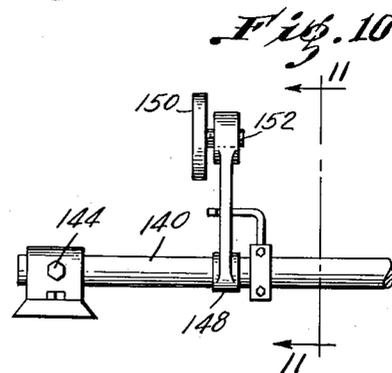
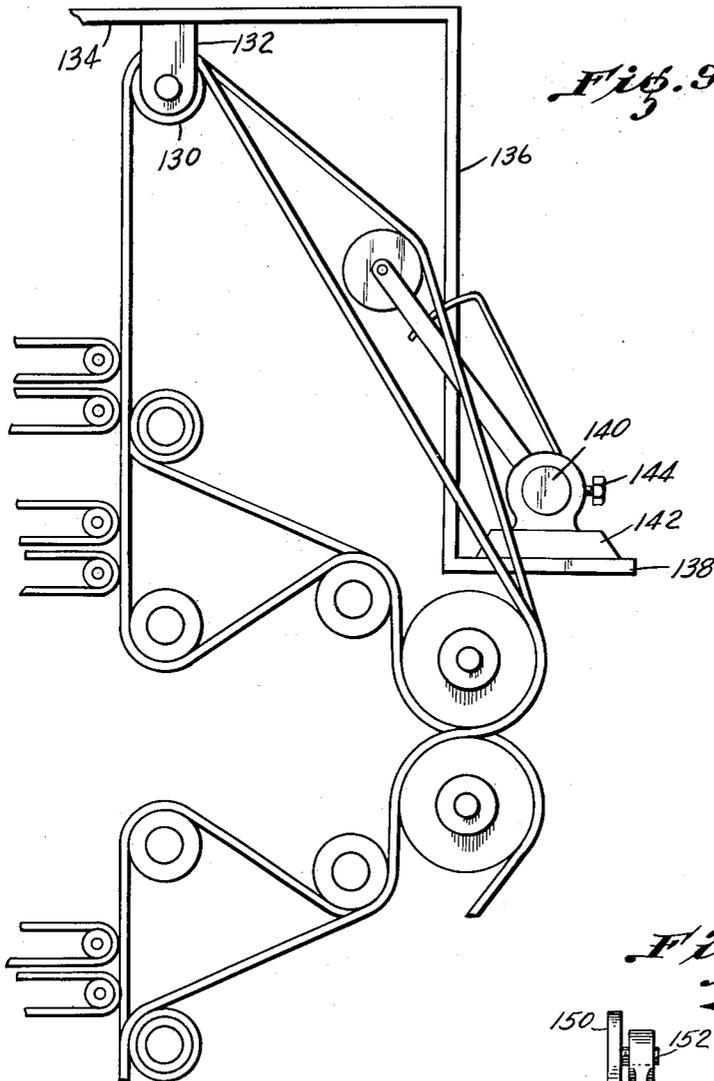
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CONDENSER TAPE TENSION DEVICE

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12 Claims. (Cl. 19—151)

This invention relates to card condensers and particu- 15
larly to a condenser tape tension device.

In the process of obtaining spools of thread or "roving" or "roping" there is commonly employed what is referred to as a tape condenser. Such condensers utilize a group of tapes for dividing the slivers or web delivered from a carding machine. As is also well known in the art, carding machines collect the fibers such as rayons, nylons, synthetics, wools, etc. and deliver a fine veil-like collection of such fibers in the form of a sheet or web. The purpose of the condenser is to break the webs into roving or roping and wind the broken segments on a spool or cheeser. Once the fibers are wound on the spool they are ready for spinning. The tapes serve to split the web delivered to the condenser into segments or strands of "roving," and deliver it to the aprons which rub the fibers to form a compact roll. The roving goes directly from the aprons to the spindles or spools.

It is apparent that in order to obtain uniformity in the cloth it is essential that the ropings be maintained as uniformly in weight as possible. However, it is well known that the weight and quality of the strands and threads vary considerably and that cloth often consists of strands of varying weight. The reason for this is the fact that the tapes which serve to "cut" the web for the condenser are not tensioned properly. Under present day practice condenser tapes are tensioned by adjusting one of the roller shafts, usually the top roller shaft. The roller shaft extends across the frame of the condenser and all the belts run on this single roller. When a change in tension of the tapes is to be made, usually when an increase is necessary, the upper roller is moved upwardly by adjusting screws positioned on opposite ends of the shaft. If all tapes were of the same length and degree of tension a good adjustment could be obtained. However, all tapes do not have the same length or tension for some tapes may be slacker than others. 50

It is often necessary to stop the whole card production to make adjustment on individual slack tapes because the adjustment of the upper roller cannot accommodate individual requirements of the individual tapes. Such shutting down does not occur often since it is obviously not desirable to stop production. Therefore, on many occasions the tapes are allowed to remain in a condition such that there is unevenness in the rovings. The tighter tapes get the greater portion of the web and make a heavy delivery while the slack tape is robbed of part of its fiber and makes a light end delivery. This is known in the trade as a robbing from one tape to the other. The tight tapes grasp more of the web from the card than the lightly tensioned tapes. It is an object of this invention to provide tape tensioning apparatus which eliminates the common running condition of having tight and loose tapes. 65

An object of this invention is to provide a tape tensioning arrangement in which tapes are automatically tensioned uniformly. Constant attention by an operator is not required, nor is reliance on the degree of tension obtained from the operators. With an automatic tension 70

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regulator for tapes constructed in accordance with our invention, we obtain a uniform weight per yard of the roving delivery, increased production because of reduced need for tape repairs, adjustments, etc., and longer life of the tapes. Longer tape life is obtained because of the uniform tension.

Another feature of our invention, which will be seen hereinafter, is that the tension on an individual tape can be released when the lint has been allowed to accumulate around the tape rollers, making the rollers larger in diameter. On the old take-up tape rolls a tape that accumulates lint is often stretched out of shape and made longer. Such a tape will become a slack tape when the lint is removed. With our invention, when the lint gathers around the roll, the tension remains the same. The tape does not stretch, and when the lint is removed the tape immediately returns to its proper tension and proper position. This results in a considerable saving in time, as well as more uniform roving.

Referring now particularly to the drawings:

Figure 1 is an elevational schematic view showing the tape tension regulator constructed in accordance with our invention and showing the tapes commonly employed on tape condensers;

Figure 2 is a fragmentary end elevational view showing a portion of the tape condenser illustrated in Fig. 1;

Figure 3 is a fragmentary perspective view showing tape tension regulators constructed in accordance with our invention;

Figure 4 is a front elevational view of our new type tension regulator;

Figure 5 is a fragmentary view showing an adjustment means forming a part of our invention;

Figure 6 is an elevational view showing yet another form of tape tension regulator constructed in accordance with our invention;

Figure 7 is a side elevational view partly in cross section of the tension regulators shown in Fig. 6;

Figure 8 is a top plan view of the regulators of Fig. 6.

Figure 9 is a side elevational view of a tape condenser and yet another form of tape tension regulator.

Figure 10 is a front elevational view of the regulator of Figure 9.

Figure 11 is a fragmentary view taken along line 11—11 of Figure 10.

Similar reference characters in the several figures indicate similar elements.

Referring more particularly to the drawings, reference character 10 indicates a portion of the tape frame of the type commonly used with tape condensers. The tape frame usually serves solely to support the tape rollers and tapes and is separable from the apron frame. As shown at its upper end the tape frame is provided with a horizontal plate 12 which extends from one side of frame element 14 to the opposite frame element, not shown. An axle 16 is supported in a flange portion 18 by means of aligned apertures 20 provided in each flange. Plate 12 has spaced vertically extending openings 22 which are generally rectangular in cross section as shown in Fig. 5. A rod or bar 24 is slidingly received in each opening 22. At their lower ends each bar has U-shaped or bifurcated flanges 26 and 30. Shaft 32 is supported at one end in flange 26 and at its other end in flange 30. A take-up roller 34 is supported on shaft 32 by means of bearings. Each take-up roller serves as the upper tension roller for its associated tape 36—37. It is seen that each take-up roller and bar 24 is independent of the adjacent take-up rollers and bars. At its upper end each bar 24 is provided with a rack gear 38. Each rack gear can be removably attached to bar 24 by suitable nuts and bolts or any other convenient arrangement. A spur gear 40 is rotatably mounted on axle 16

adjacent each rack 38 and has meshing contact therewith. The spur gear can be mounted on any suitable bearings, which are not shown. Each spur gear has fixedly attached thereto a pulley 42 which is also freely rotatable on axle 16. A cable or wire 44 seats in a groove 46 provided in each pulley. One end of the cable is attached to the pulley and the cable is passed around a few turns. At its opposite or free end each cable is provided with a weight 48. The weight 48 constantly urges the rod 24 vertically upward. It is seen by such arrangement that by selection of a proper weight the proper tension can always be maintained on each individual tape 36. As illustrated in Fig. 5 supporting plate 12 can have adjustment screws 50 and 52 threadingly mounted therein. Such screws extend inwardly to the opening 22 and together with lock nuts 54 and 56 provide a means for adjusting rack 38 with respect to gear 40. Opening 22 may be made slightly larger than 24 in order to accommodate such movement as would be necessary in order to so adjust. Also opening 22 may have mounted therein bearing elements insuring substantially frictionless sliding contact between rod 24 and the perimeter of opening 22 as well as adjusting screws 50 and 52. As illustrated in Fig. 1 each rod 24 may be provided with a pawl and ratchet arrangement comprising ratchet teeth 56 mounted on rod 24 and pawl 58 rotatably mounted on cross support plate 12. It is seen that as rod 24 moves upwardly under the influence of weight 48 pawl 58 will prevent a sudden loss of tension of the tape should for some reason or other weight 48 become detached from cable 44 or some other breakage occur.

The adjustment of the tension of the tape is automatically accomplished with the tension arrangement which we have indicated. Each tape of the condenser is separately and individually adjusted. There is no need to seek a compromise adjustment as is obtained in present condensers. Furthermore, each tape is automatically continuously tensioned to the proper amount. There is no period of optimum adjustment followed by a period of slackness as occurs in present condensers, nor is it necessary to practice the expedient of over-tensioning the tapes so as to permit a greater period of operation between tensioning adjustments.

Figures 6 and 8 illustrate another form of our invention. As illustrated in Fig. 6 support plate 70 extends between the two stands 72, one of which is not shown, and corresponds to the support plate 12 shown in Fig. 3. In addition an upper support plate 74 extends between the two side flanges 72. Yet a third frame element 76 overlies support 74 in abutting relationship therewith. Frame element 70 is pierced at 78 and support plate 74 is pierced at 80 to accommodate an operating rod 82. Operating rod 82 comprises a piston rod and has at its upper end a piston 84 having packing rings 86 mounted in a cylinder 88. Cylinder 88 has a base flange 90 supported on support plate 74 and detachably connected to the cylinder proper 92. An inlet port 94 connected to a supply main 96 by conduit 98 is provided in the side of the cylinder 92. Opening 90 and opening 78 are both of sufficient size to permit lateral movement of the operating rod 82. Frame element 76 is provided with openings 100 for receiving the lower end of the cylinders 88. The openings are larger than the cylinder laterally of frame element 76 so as to permit lateral adjustment of the cylinders. By adjusting the cylinders laterally the operating rod 82 is adjusted to its proper position over the tape rollers. Cylinders 84 and 88 are adjusted laterally by means of screws 102 and lock nuts 104. The supply main 96 as well as connecting conduits 98 can be formed of flexible material such as rubber or plastic and permit independent adjustment of the various cylinders 88. Operating rod 82 is threadingly connected to a pulley support 106 at 108. Tape 116 is shown in position in Figs. 6 and 7. Support plate 70 may have a series of flanges 118 mounted thereon adjacent the operating rods

82. The flanges each have a shaft 120 on which is pivotally mounted a pawl 122. Pawl 122 has operating engagement with ratchet 124 mounted in notch 126 provided in rod 82. Screws may be used for positioning the ratchet to the operating rod.

The main 96, conduit 98 and interior of the cylinder below the piston 84 are filled with a fluid such as air or hydraulic oil. The fluid is maintained under pressure which is adjusted to maintain the proper tension on tapes 116. Conduit 96 connects to a pressure regulator and fluid supply including pumps indicated at 128. By means of the regulator and pumps, or other pressure supplying device, the fluid in the cylinders 88 is maintained at the proper pressure. The regulator can be adjusted, as is commonly known, to provide any desired tension. It is thus seen that we have provided an automatic tensioning device for condenser tapes. Should the tension on one of the tapes 116 start to reduce due to its being stretched the operating rod 82 will move upwardly and increase the tension to the proper amount.

In the form of the invention shown in Figures 9 to 11 the upper tape roller 130 is a single cylinder such as is commonly used in tape condensers. The cylinder is supported at both ends in journals mounted in blocks 132 attached to frame 134.

Frame 134 has vertical legs 136 and flanges 138 at each side or end. Both are suitably braced and connected to the frame proper by means not shown. Axle 140 is supported in stands 142 attached to each flange 138. The axle is fastened in position by set screws 144.

Tension arms 146 each have a boss 148 rotatably mounted on axle 140. At one end a pulley 150 is rotatably mounted in each arm 146 by means of axle 152. Adjacent each boss 148 there is provided a fitting 154 comprising a base 156 and a cooperating cover 158. Base 156 is formed to receive shaft 140 and cover 158 has a slot for spring 160. Spring 160 is held against base 156 by nuts 162. Lock nut 164 prevents rotation between fitting 154 and shaft 140. Spring 160 can be formed of spring wire bent as shown and is tensioned to move arm 146 and roller 150 in the direction of arrow 166. A lip on the end of spring 160 prevents disengagement from arm 146. Spring 160 is chosen to give the desired tension. It is obvious that any degree of proper tension can be obtained by choosing a proper spring. The functioning of the form of the invention shown in Figures 9 to 11 is similar to that of the other forms illustrated.

While we have shown and described a preferred form of our invention, it will be understood that variations in details of form may be made without departure from the invention as defined in the appended claims.

We claim:

1. A tape condenser comprising tapes operable to carry strands from a carding delivery, and means for continuously independently tensioning each of said tapes with a substantially constant uniform force.

2. A tape condenser comprising tapes operable to carry strands from a carding delivery, and means for continuously individually tensioning each of said tapes with a constant substantially uniform force during operation of said condenser.

3. A tape condenser comprising tapes, and means for continuously individually tensioning said tapes with a constant substantially uniform force during operation thereof to maintain each of said tapes at a selected tension.

4. In a tape condenser comprising a stand, a series of tapes, upper supporting rollers for said tapes, each of said upper rollers being individually movable with respect to said stand so as to individually tension said tapes, and means for constantly uniformly exerting independent forces of substantially the same value on said rollers to continuously individually tension said tapes.

5. In a tape condenser comprising a series of tapes adapted to deliver roving, a frame, a plate supported thereon, each of said tapes being supported by a roller,

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a separate bar connected to each of said rollers and extending through said plate, each of said bars being connected to means constantly urging the associated roller to tension its associated tape.

6. In a tape condenser comprising a series of tapes, a frame, rollers mounted on said frame, each of said rollers movably contacting one of said tapes, and separate means connected to said frame for urging each of said rollers to independently constantly tension its associated tape with a uniform continuous force.

7. In a tape condenser comprising a series of tapes adapted to deliver roving, a frame, a plate supported on said frame, a series of rollers, each of said rollers supporting one of said tapes, a separate bar connected to each of said rollers and extending through said plate, each bar being connected to means constantly urging the associated roller to tension its associated tape, the last named means comprising a separate piston connected to each bar, a cylinder surrounding each piston and means for constantly exerting a fluid pressure within the cylinders to urge said pistons to tension said tapes.

8. In a tape condenser comprising a stand, a series of tapes, a series of supporting rollers for said tapes with each of said rollers supporting one of said tapes and being individually movable with respect to said stand so as to individually tension said tapes, and means for constantly uniformly exerting independent forces of substantially the same value on said rollers to continuously individually tension said tapes, the last named means comprising a series of hydraulic motors, with each of said rollers having one of said motors connected thereto, and means for constantly exerting a fluid pressure within said motors to urge said motors to continuously tension said tapes.

9. A tape condenser comprising tapes, means for continuously individually tensioning each of said tapes with a constant substantially uniform force during operation thereof to maintain each of said tapes at a selected tension comprising a separate hydraulic motor connected to each of said tapes, and means for constantly exerting fluid pressure within each of said motors to urge said motors to continuously individually tension their associated tapes.

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10. In a tape condenser comprising a stand, a series of tapes, a series of rollers with each roller supporting one of said tapes and each roller being individually movable with respect to the said stand so as to individually tension each tape, and means for constantly uniformly exerting independent forces on said rollers to continuously individually tension each tape, the last named means comprising a series of weights, and means for connecting each of said tapes to one of said weights.

11. A tape condenser comprising tapes, means for continuously individually tensioning each of said tapes with a constant substantially uniform force during operation thereof to maintain each of said tapes at a selected tension, the last named means comprising a series of weights, and means for connecting each of said tapes to one of said weights.

12. A tape condenser comprising tapes, means for continuously individually tensioning each of said tapes with a constant uniform force during operation thereof to maintain each of said tapes at a selected tension, the last named means comprising a series of pulleys, each of said tapes being reeved over one of said pulleys, and tensioning means connected to each of said pulleys urging its connected pulley to constantly tension the tape associated with the pulley.

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