July 22, 1941. F. W. THOMAS 2,249,988

MACHINE FOR HANDLING THREAD

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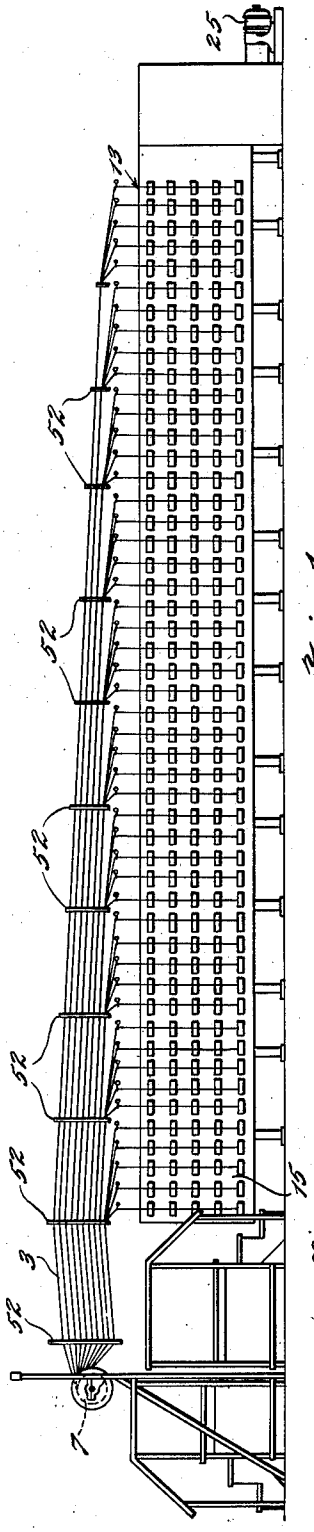


Fig. 1.

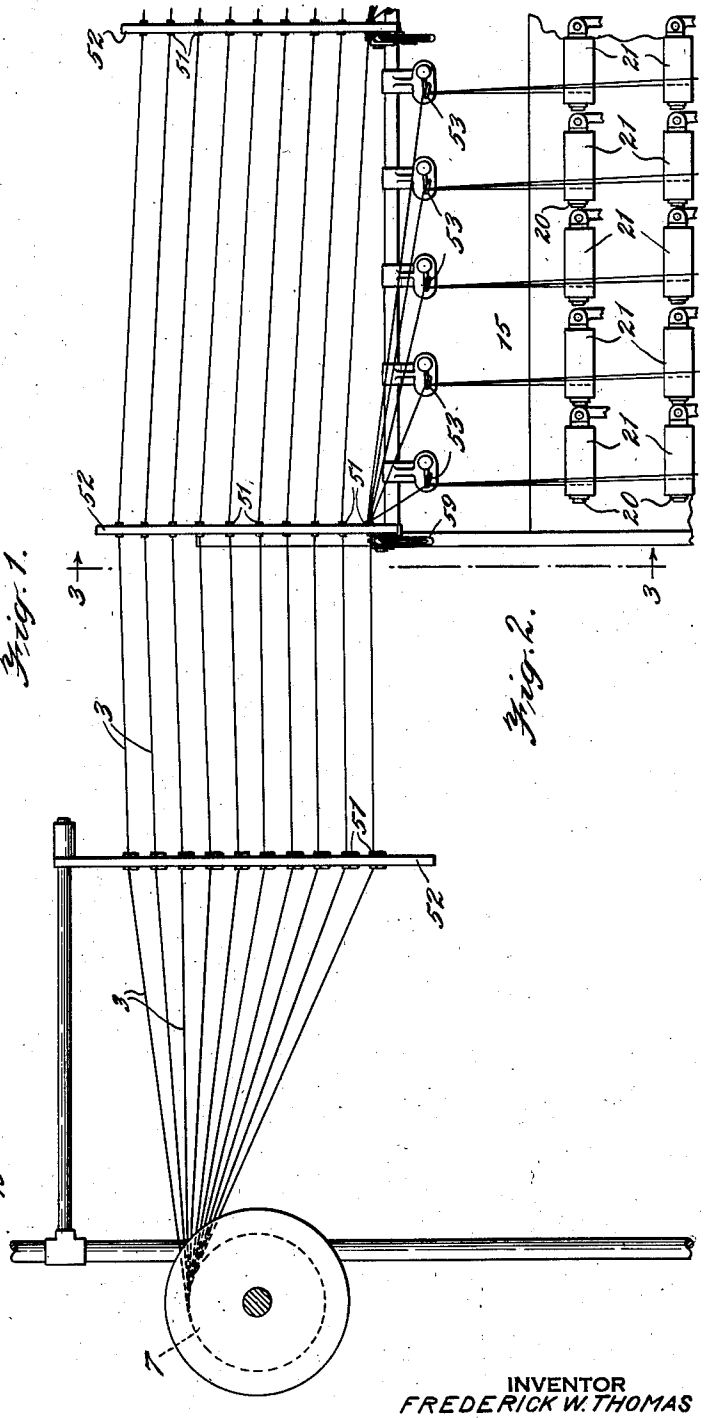


Fig. 2.

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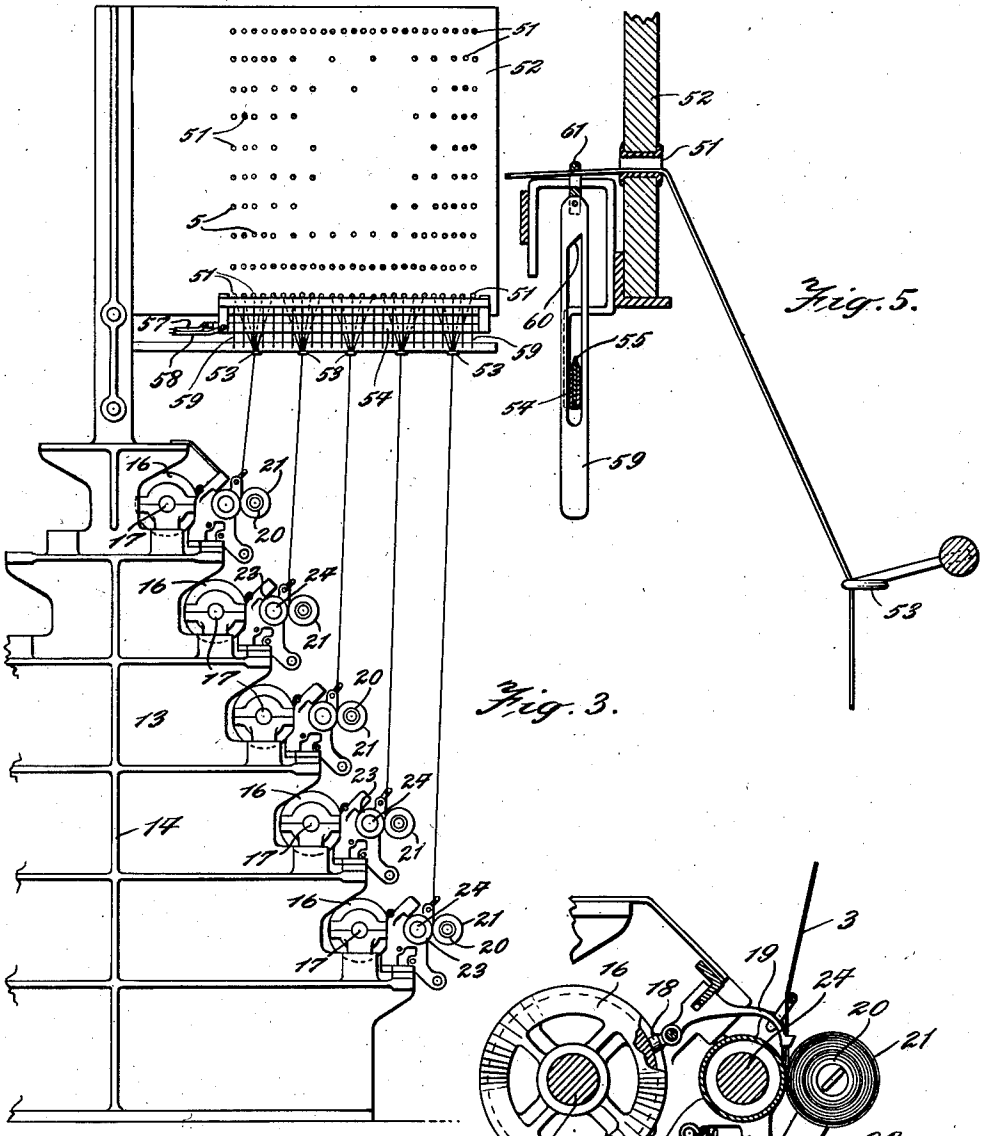


Fig. 5.

Fig. 3.

Fig. 4.

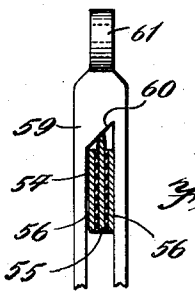


Fig. 5a.

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Fig. 7.

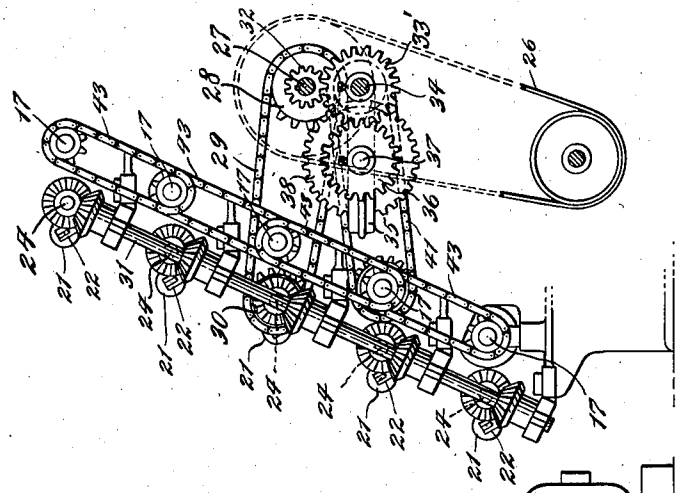
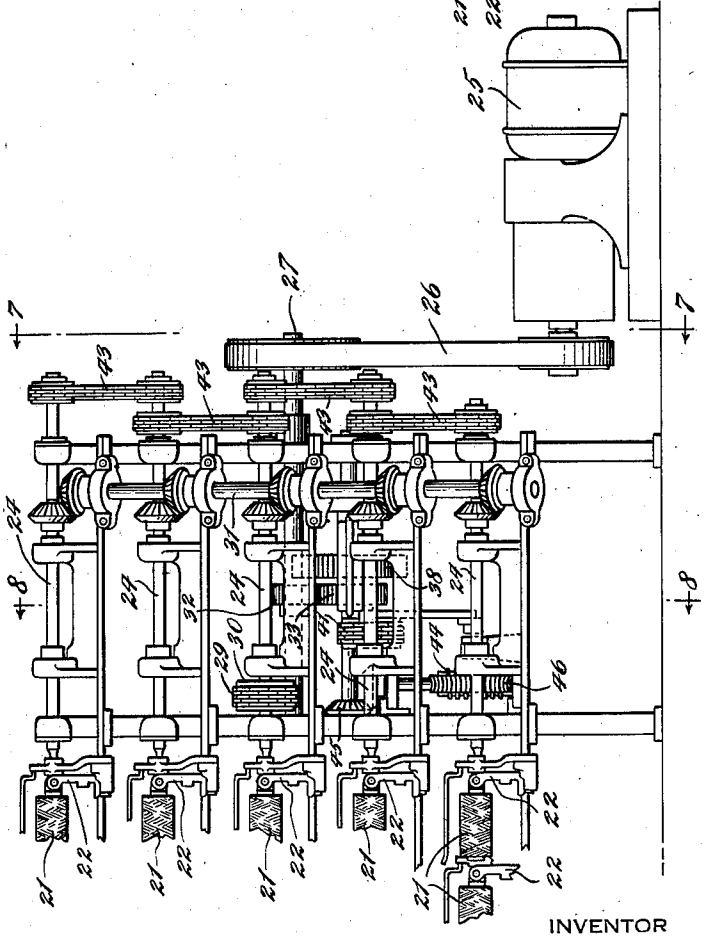


Fig. 6.



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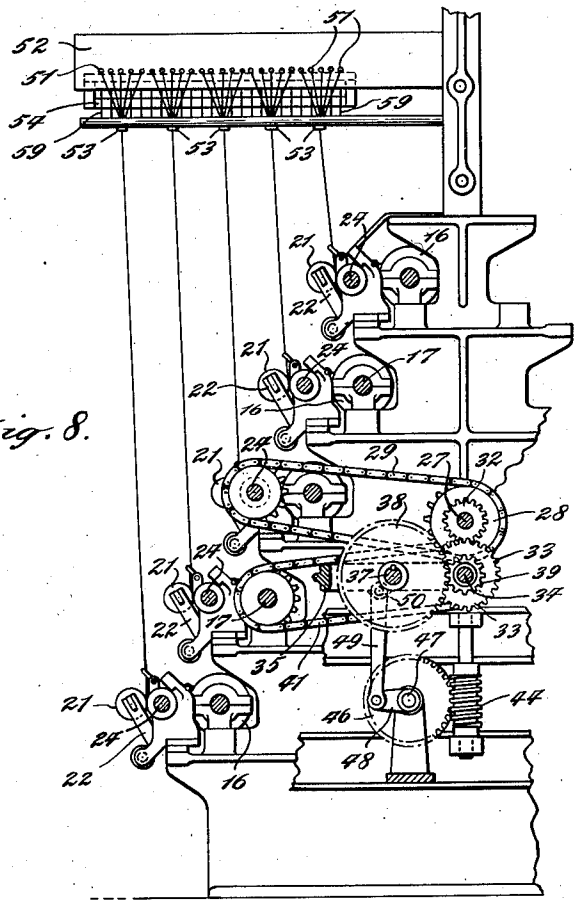


Fig. 8.

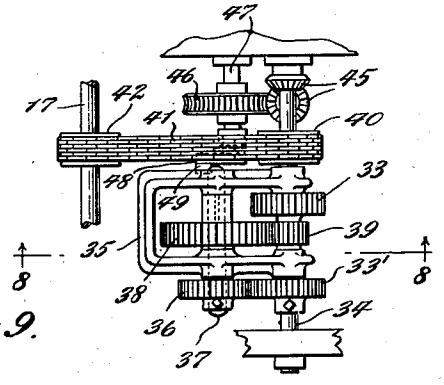


Fig. 9.

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Patented July 22, 1941 2,249,988

UNITED STATES PATENT OFFICE

2,249,988

MACHINE FOR HANDLING THREAD

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Application October 6, 1938, Serial No. 233,588

2 Claims. (Cl. 242—37)

This invention relates to a novel and improved machine for handling thread. In the attached drawings I have shown a selected embodiment of such a machine, and in those drawings:

Fig. 1 is a front view of my novel winding machine;

Fig. 2 is a view taken on the same plane as Fig. 1 but on a greatly enlarged scale, showing part of the structure appearing in Fig. 1;

Fig. 3 is a view taken approximately on the line 3—3 of Fig. 2 but on a smaller scale and showing more of the apparatus than appears in Fig. 2;

Fig. 4 is a vertical sectional view through one of the winding mechanisms taken on a plane parallel to the plane of Fig. 3 but on an enlarged scale;

Fig. 5 is a sectional view through the lower part of one of the panels;

Fig. 5a is a view of part of the apparatus shown in Fig. 5, but in different relative positions;

Fig. 6 is a front view of part of the right-hand part of the apparatus shown in Fig. 1 and indicating the driving connections;

Fig. 7 is a view taken from the right of Fig. 6 approximately on the line 7—7 thereof;

Fig. 8 is a view approximately on the lines 8—8 of Fig. 6 and Fig. 9;

Fig. 9 is a fragmentary plan view of part of the apparatus appearing in Fig. 8.

The invention relates particularly to a machine for handling sewing thread and, for the sake of convenience, reference will be made to sewing thread herein as the material being handled. It is to be understood, however, that the invention may be used with other material where found applicable.

The ends 3 of sewing thread or other material are shown as wound on a beam, in parallel relation to each other, and the machine of this application is designed to draw all the ends from the beam and wind them into packages, at one operation.

The wound beam is indicated at 7 in Figs. 1 and 2 and the ends 3 are shown as being drawn therefrom at right angles to the axis of the beam. Likewise extending generally at right angles to the axis of the beam is a machine designated generally by the numeral 13. As shown, for example, in Fig. 3, this machine comprises a bank of winding mechanisms inclined at an angle to the vertical and disposed beneath the ends which are being drawn from the beam. One such inclined bank is shown on one side only of the machine, although it is to be understood that, if desired, a similar bank may be arranged on the other side of the center 14 of the machine.

All of the winding mechanisms 15 are preferably of similar construction and may take any desired form. Since the details of an individual winding mechanism are not necessary to an understanding of the invention, they will not be described, such details being well known in the art. For the purposes of this application it will be sufficient to say that each mechanism may comprise a cam 16 (Fig. 4) mounted on a cam shaft 17 and engaging a cam follower 18 which is secured to a traveler 19 engaging one of the ends 3 and serving to wind it upon a core 20 to form a package 21. The core 13 is mounted upon an arm 22 which is spring-pressed towards a drum 23, as is known in the art. The cam 16 is adapted to cause the traveler 19 to move lengthwise of the core, and the drum 23 is mounted on a shaft 24 which is positively driven to draw the end from a source of supply to wind it upon the core, by rotating the package. Five cam shafts 17 are shown, each one having thereon fifty cams 16. Similarly, there are five shafts 24, each carrying fifty drums 23, one for each cam.

All of the winding mechanisms are driven together from a motor 25 through any suitable driving mechanism, which is here shown as a belt 26 engaging a pulley on the motor shaft and also a pulley on a drive shaft 27 on which is mounted a sprocket 28 engaging a chain 29 which in turn engages a sprocket 30 on one of the shafts 24. All of the shafts 24 are driven in unison by means of a connecting shaft 31 which is connected to these shafts by bevel gearing, as plainly indicated in Figs. 6 and 7.

The shafts 17 are all driven in unison from the shaft 27 as by a pinion 32 on the shaft 27 and which engages a gear 33 rotatable on the shaft 34. Also rotatable on the shaft 34 is a floating frame 35 carrying a gear 36 which is driven by a gear 33' secured to the shaft 34. The gear 36 is secured to a shaft 37 rotatably mounted in the frame 35, and on this shaft is also secured a gear 38 meshing with a pinion 39 which is rotatably mounted on the shaft 34, but is operatively connected to the gear 33 to rotate therewith. The shaft 34 carries a sprocket 40 over which runs a chain 41 meshing with a sprocket 42 on one of the cam shafts 17 and these cam shafts are connected together by chain drives 43, as plainly shown in Figs. 6

and 7. The cam shafts are given a variable speed by means of a worm 44 which is rotated from the shaft 34 by bevel gearing 45, and this worm in turn engages a worm gear 46 on a shaft 47 having a crank arm 48 connected to a link 49 which in turn is connected to a crank arm 50 secured to the shaft 37. By this arrangement it will be seen that the worm 44 will continuously rotate the gear 46 and thus cause a planetary reciprocating movement of the frame 35 and its associated gearing around the shaft 34, thus giving the required variable speed of rotation to the shafts 17.

The driving connections just described are merely given as illustrative and are not claimed per se.

The ends coming from the beam are led through guides 51 which may be in the form of eyelets in panels 52, and these guides are arranged in groups, as best shown in Fig. 3. Assuming that there are 250 ends on the beam, as shown in the illustrated embodiment, then these ends may conveniently be separated into ten groups of 25 ends in a group. For example, the grouping may be arranged as shown, with the 25 ends in each group arranged in a horizontal line and with the ten groups arranged vertically above each other. The 25 ends in the lowest group may conveniently be led to the 25 winding mechanisms in what may be conveniently termed a section of the bank of mechanisms, this section being located at the extreme left-hand end of the bank, as viewed in Fig. 1. The next 25 ends may conveniently be led to the next section of 25 mechanisms and so on until all ends have been led to winding mechanisms, one end to each mechanism.

For the above purpose I have conveniently shown a succession of panels 52 having guides therethrough, and it will be seen that between each two successive panels, 25 ends are led to winding mechanisms through suitable guides 53 which are shown as of the pigtail variety. Of course, each successive panel 52 is of smaller dimensions than the preceding one, as it has 25 fewer ends to guide to the winding mechanisms.

Adjacent the bottom of each panel is mounted a conductor rod 54 of known construction, which is best understood from Fig. 5a. The rod preferably comprises a central bar 55 separated from two side bars 56 by means of insulation and extending upwardly above these side bars, as plainly shown. The central bar is connected to one conductor 57 and the two side bars are connected to a conductor 58 (Fig. 3). Riding on each bar 54 is a plurality of slotted detector bars 59, each provided at the upper end of its slot with an inclined surface 60 so that, in case it drops downwardly into contact with the bar 54 as shown in Fig. 5a, it will cam over to one side and thus establish a contact between one side bar 56 and the central bar 55. It is understood that all of the parts 55, 56, and 59 are of conducting material so that, when the parts are in the position shown in Fig. 5a, an electric contact will be made. The arrangement thus forms a switch completing a circuit through the conductors 57 and 58 to any suitable control device which will stop the operation of the motor 25. Such control devices are well known in the art and may take any suitable form, and since a knowledge of their details is not necessary to an understanding of my invention, those details will not be described.

One of the bars 59 is supplied for each one of the ends 3, and a series of these bars is arranged to receive the bottom group of ends at each one of the panels 52 except the first one. At its upper end each bar 59 has an eyelet 61 to receive one of the ends in the bottommost group passing through that panel. Thus if any thread in the bottom group breaks or accumulates an excess of slack therein, a switch is closed which will operate a control device to stop the motor. It will be seen that with the arrangement described, the breaking of any end being wound or accumulation of slack in any one of the ends will cause stopping of the motor.

While I have shown the invention as embodied in a specific form, it is to be understood that various changes in details may be made without departing from the scope of the invention as defined by the appended claims.

I claim:

1. In a machine of the class described, means for supporting a beam with a multiplicity of ends wound thereon, a bank of winding mechanisms, one mechanism for each of said ends, means to separate said ends into a plurality of vertically spaced rows, panels spaced lengthwise of said bank and having guides for certain of said ends, each successive panel having guides for one less row of ends than the preceding panel, guides between each two panels to guide the ends in the bottom row at that location to a section of winding mechanisms, means to operate said mechanisms, a tension responsive device engaging each end in said bottom row, and means arranged to cooperate with any one of said devices to stop operation of said mechanisms.

2. In a machine of the class described, means for supporting a beam with a multiplicity of ends wound thereon, a bank of winding mechanisms, one mechanism for each of said ends, means to separate said ends into a plurality of vertically spaced rows, panels spaced lengthwise of said bank and having guides for certain of said ends, each successive panel having guides for one less row of ends than the preceding panel, guides between each two panels to guide the ends in the bottom row at that location to a section of winding mechanisms, means to operate said mechanisms, a conductor bar extending transversely of said ends adjacent each panel and below the lowermost guides therein, a detector bar supported by each of the ends in the bottom row passing through said panel and adapted to contact with said conductor bar upon breaking of said end or the development of undue slack therein, and means operated by engagement of any one of said detector bars and said conductor bar to stop operation of said mechanisms.

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