Feb. 24, 1953 F. G. KRAFT 2,629,181

CUTOFF GAUGE FOR WINDING MACHINES

Filed Nov. 26, 1949 2 SHEETS—SHEET 1

Fig. 1.

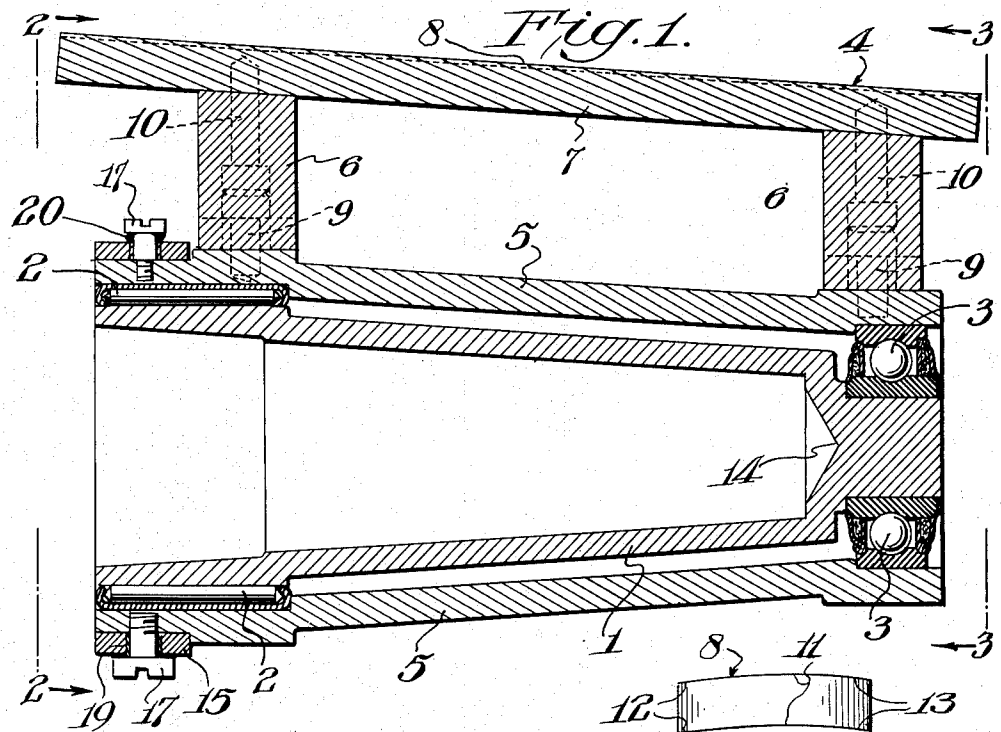

Fig. 2.

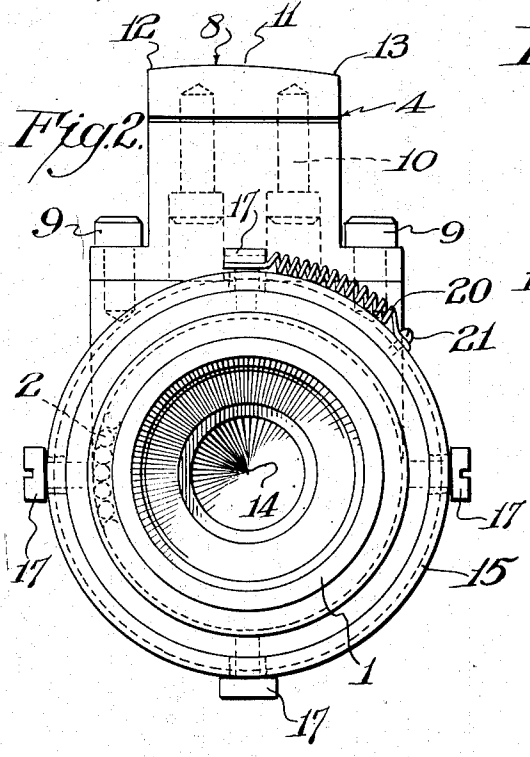

Fig. 3.

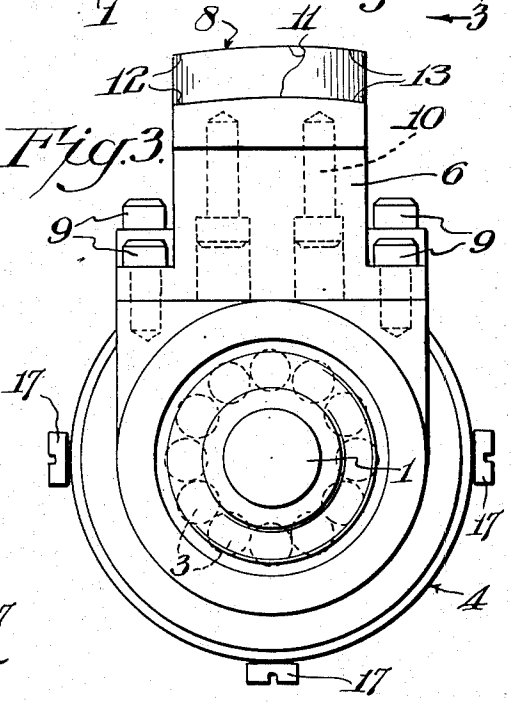

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Fig. 4.

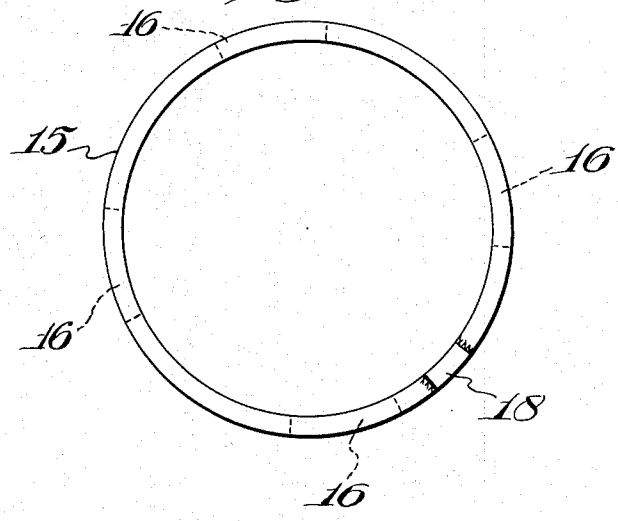


Fig. 5.

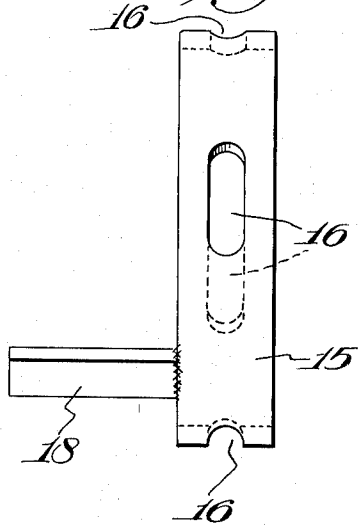
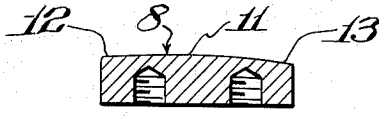


Fig. 6.



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UNITED STATES PATENT OFFICE

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CUTOFF GAUGE FOR WINDING MACHINES

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1 Claim. (Cl. 33—181)

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This invention relates to a gauge for adjusting the trip mechanism that controls the size to which packages of yarn, such as cones of yarn, are wound on winding machines.

Cone winding machines are usually equipped with devices on each spindle which will shut them off at the position when a cone of yarn of desired size is obtained. It is necessary to reset these individual devices when production changes are made which involve producing cones of a different nominal size, such as 2, 3, 4 and 5 lb. cones. It is highly desirable that these sizes be held to close tolerances. When cones are oversized they will not fit into the packing cases and when undersized, the finished carton or case contains less poundage than is desired.

One of the methods used in the past to make these adjustments involved placing on the stationary spindle a dummy cone of wood or lightweight metal the same size as that of the cone to be produced. The traverse button was then brought against the surface of the dummy cone and the trip mechanism adjusted so that it was approximately in the "kickoff" position. Generally, the dummy cone used for making the adjustment was constructed so that its outline on the plane normal to the axis of rotation was not truly circular. In the area where contact for adjustment purposes was to be made, which constituted a strip parallel to the axis of rotation about 1½" in width along the entire length of the sloped side, the radius normal to, and at every point along, the axis of rotation varied from slightly less than to slightly more than the corresponding radius of the final build-up of yarn desired. Then by slowly rotating the dummy on the stationary spindle from one extreme to the other and testing the setting made on the trip mechanism at these points, it was assumed that the spindle in operation would kick off when the yarn package reached this equivalent radius. It has been found, however, in actual practice, that with this type of device the first cones produced after a new setting are seldom within the required tolerances. One or more readjustments after the first and succeeding cones are generally necessary.

Another method used for making the adjustment is the use of a wooden or light metal dummy cone with a true conical surface having diameters slightly below those of the minimum package desired. A trial setting of the trip mechanism is made and then yarn is wound onto the dummy for test of the setting. If the diameter of the yarn after the spindle has stopped is not

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correct, a second, and sometimes a third, setting and trial run is necessary before the desired package size is obtained. This method is accurate but is very time consuming.

It is an object of this invention to provide a new type of setting gauge which will overcome the above-mentioned erratic results in cone or other package sizes. A further object is the provision of a new type of setting gauge which permits a single setting to be made readily and with accuracy. Other objects will be apparent from the description that follows.

The objects of this invention are accomplished by the use of a gauge comprising an outer member comprising a work arm mounted parallel to the axis of rotation substantially along the entire length of the anticipated built up cone of yarn, having a working or measuring surface said work arm being rotatably mounted on an aligner in such a fashion that said work arm does not rotate or at most rotates within a restricted arc during the setting while the aligner may be rotated at speeds corresponding to the winding speeds to be employed. The measuring surface which contacts the trip mechanism during the setting operation, is coextensive with the work arm and has a curvature normal to the axis of rotation such that its radius normal to, and at every point along, the axis of rotation varies gradually from slightly less than to slightly more than the corresponding radius at any particular point of the final build-up of yarn desired. This variation in radius is very small and, accordingly, the traverse button, after setting and upon contact shuts down the winding machine within close tolerances, allowing for the production of packages of uniform weight and size. By the use of this invention, the setting is made under conditions approximating those prevailing during winding, in that the spindle is rotating and vibrating in the normal manner. A very accurate setting is thereby made possible.

The gauge comprises two main components, an aligner shaped to fit the winding machine cone holder and an outer member rotatably mounted thereon. The outer member consists, for convenience in manufacture of several parts as follows: a tube, two spacers, a working arm having a curved working surface as described above, and a stop ring. With the apparatus of this invention it is possible to check a trial setting of the trip mechanism with the spindle and traverse guide in motion. With this difference, i. e., the spindle and guide are in normal motion instead of stationary, the testing of a trial setting is

made in much the same manner as in the prior art previously discussed. The outer member is held against rotation by hand. Then starting with the traverse guide sweeping back and forth, along its normal path, along the lower or shorter radius edge of the working surface, the whole outer member is rotated slowly so that the guide sweep moves toward the upper or maximum radius edge of the working surface. Upon operation of the trip mechanism during this movement of the guide up the slope of the working surface, a test taking only a matter of seconds as compared to several minutes required for the winding of a layer of yarn on a dummy cone, the winder position being tested can be depended upon to produce a cone of the correct size.

The invention is described below by reference to the figures which are given for illustrative purposes only and of which:

Figure 1 is a longitudinal cross-section of the cone size assembly of this invention,

Figure 2 is an end view on line 2—2 of Figure 1,

Figure 3 is a front end view on line 3—3 of Figure 1,

Figure 4 is an end view of the stop ring,

Figure 5 is a side view of the stop ring, and

Figure 6 is a cross-section of the working arm of the sizer showing the sloping surface of the arm.

Referring to Figure 1, the cone sizer body or aligner 1 is in the shape of the conical core normally used. Other shapes may be used for the aligner to make it conform to the spindle and cone core holder. The aligner is usually made of steel but any of the many construction materials may be used. It is adapted to fit snugly on the driving spindle (not shown) and to be rotated by the spindle under conditions prevailing during package formation. At one end is a needle bearing 2 and at the other is a ball bearing 3. These bearings permit the rotation of aligner 1 while the outer member 4, which is composed of supporting tube 5 and work arm 7 having a working surface 8 said work arm and said supporting tube being separated by and attached to spacers 6, remains stationary. For convenience a ball bearing is used at the small end of the rotating member and a needle bearing at the bigger end. Of course, any other types of anti-friction bearings or plain sleeve bearings can be used as desired.

The whole outer member 4 may be manufactured as a single unit as by molding and several such units may be made of varying size corresponding to the package sizes desired. More conveniently, the spacers 6 are interchangeable and are made of various heights to correspond to desired package sizes. As many sets of spacers may be provided as there are standard sizes.

In assembling outer member 4, tube 5 is press fitted around bearings 2 and 3; and then said tube 5 carrying the bearings is fitted around the aligner 1; working arm 7 bearing the working surface 8 is attached to spacers 6 by cap screws 10; and spacers 6 are attached to arms of supporting tube 5 by means of cap screws 9. The spacers 6 are attached to supporting tube 5 after the arm 7 is fastened to the spacers 6.

As shown in Figures 2, 3 and 6, the working surface 8 of work arm 7 is sloped so that, as shown in Figure 6, the center surface 11 and edge surfaces 12 and 13 are of different radial distances from the center 14 of the spindle aligner 1. Also as shown in the figures, fitted on the supporting tube 5 of this invention, at the larger end, is a stop ring 15. Figures 4 and 5 show this ring in detail. This ring is provided with slots 16, preferably four in number. These slots are about $1\frac{1}{16}$ inches long and provide for the mounting of stop ring 15 to the supporting tube 5 by shoulder screws 17 with limited freedom of motion. On ring 15 there may be a finger or bar 18 which projects backwards to be engaged on some stationary portion of the winder frame (not shown). This contact prevents the stop ring 15 and thereby the outer member 4 from being carried continuously around the spindle during the setting.

In making the setting the operator rotates the outer member bearing the working surface on the work arm through the range permitted by the slots in the ring which angle of rotation permits settings over the entire arc of the working surface. The traverse button machine is traversing to its normal stroke. As the operator rotates the working surface in the permitted range, he checks the traverse button on the working surface at the middle and at the two edges to see that the winding machine shuts down properly. As can be seen three of the shoulder screws bear collars 19. To the uncollared shoulder screw located on the radial line passing through the center of the working surface 8 is fastened one end of a wire tension spring 20. The other end is fastened to ring 15 by means of a machine screw 21 located as shown or so as to keep the ring slots normally pressing against the several shoulder screws of rollers thereon.

The effective radius of the assembly corresponds very closely to the radius of the package desired and obtains, thereby, a package of the weight desired. The working surface on the work arm is not a true arc but the one edge surface 13 is of slightly shorter radius while the other edge surface 12 is slightly more than the radius at the center surface 11. Thus, the trip mechanism can be adjusted to shut down the winding machine at a point when the package is very close to the weight of package desired. If a change to a different weight package is to be made, the working surface and support blocks are detached from member 4 and reassembled with a new set of spacer blocks to relocate the working surface in accordance with size of package desired.

Using this invention it has been found possible to change from one size of yarn package to another without repeated adjustments and checking of the new package; whereas, heretofore, it frequently required three or four and sometimes more separate adjustments, each consuming several minutes to reach the desired package size. These repeated adjustments were not only costly in time but between each adjustment one or more packages must be wound, measured and weighed to check the results and not infrequently these first run packages had to be altered in size by stripping or adding more yarn or rewinding, sometimes thereby degrading that production. Through this invention, this uncertainty is eliminated and the spindles can be set to wind the desired package size from the initial setting of the "kick-off" cam.

Any departure from the above description which conforms to the present invention is intended to be included within the scope of the claim.

I claim:

A gauge for adjusting a trip mechanism for the shut off of a machine for winding a cone of yarn, which comprises an aligner adapted to fit and rotate with a winding machine cone holder,

said aligner having mounted thereon, so as to be independently partially rotatable thereon about the axis of rotation of said aligner, a work arm which contacts said trip mechanism during setting operations and which extends substantially along the entire length of the aligner, said work arm having along its entire length a surface curved normal to the axis of rotation, said surface being so curved and so spaced from said axis of rotation that its radius normal to, and at every point along the axis of rotation, varies gradually from slightly less to slightly more than the corresponding radius of the final build up of yarn desired.

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