Nov. 1, 1966 J. B. CHAVIS 3,282,517

STOP MOTION FOR YARN WINDING MACHINES

Filed July 23, 1964 3 Sheets-Sheet 1

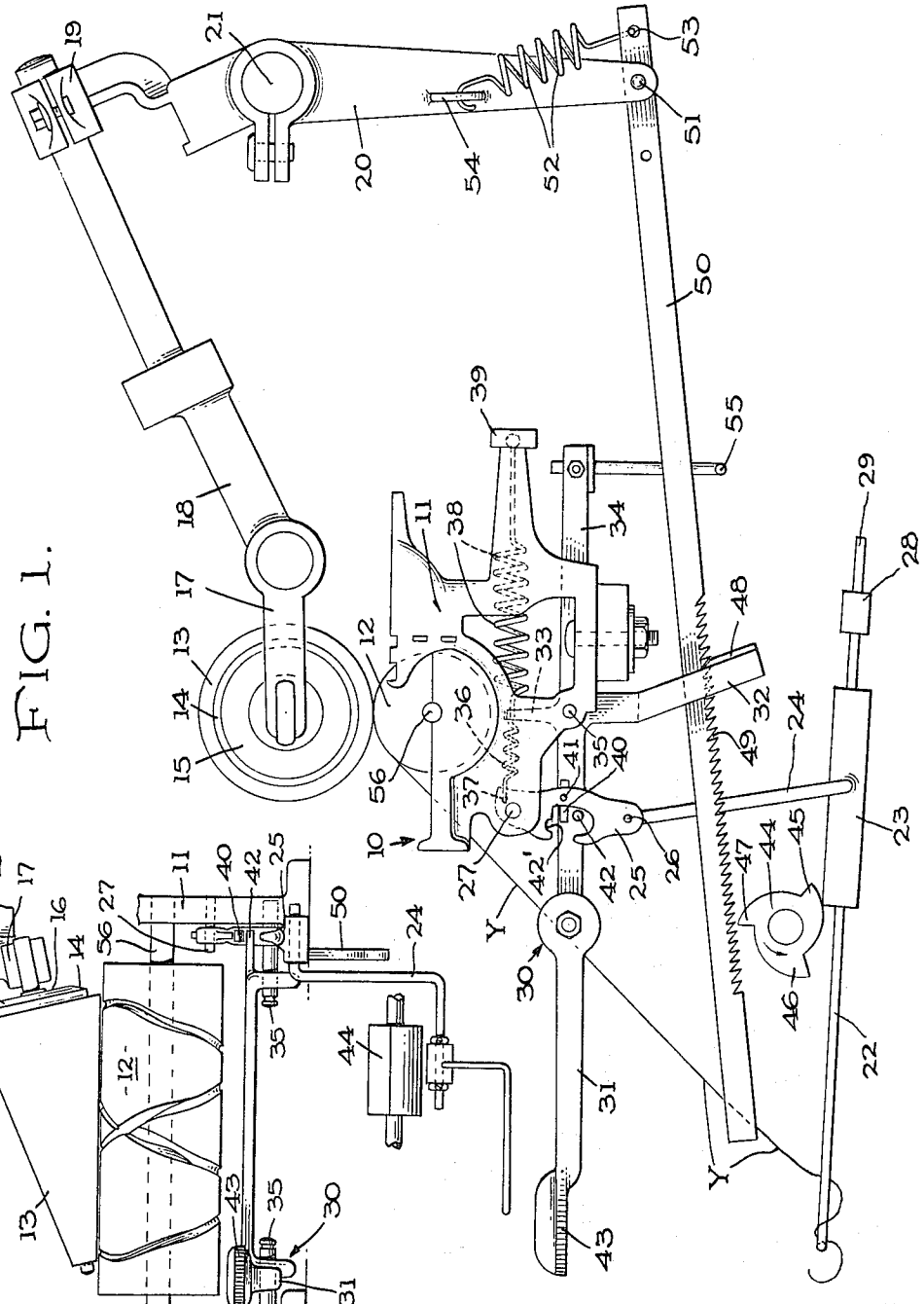


FIG. 1.

FIG. 4.

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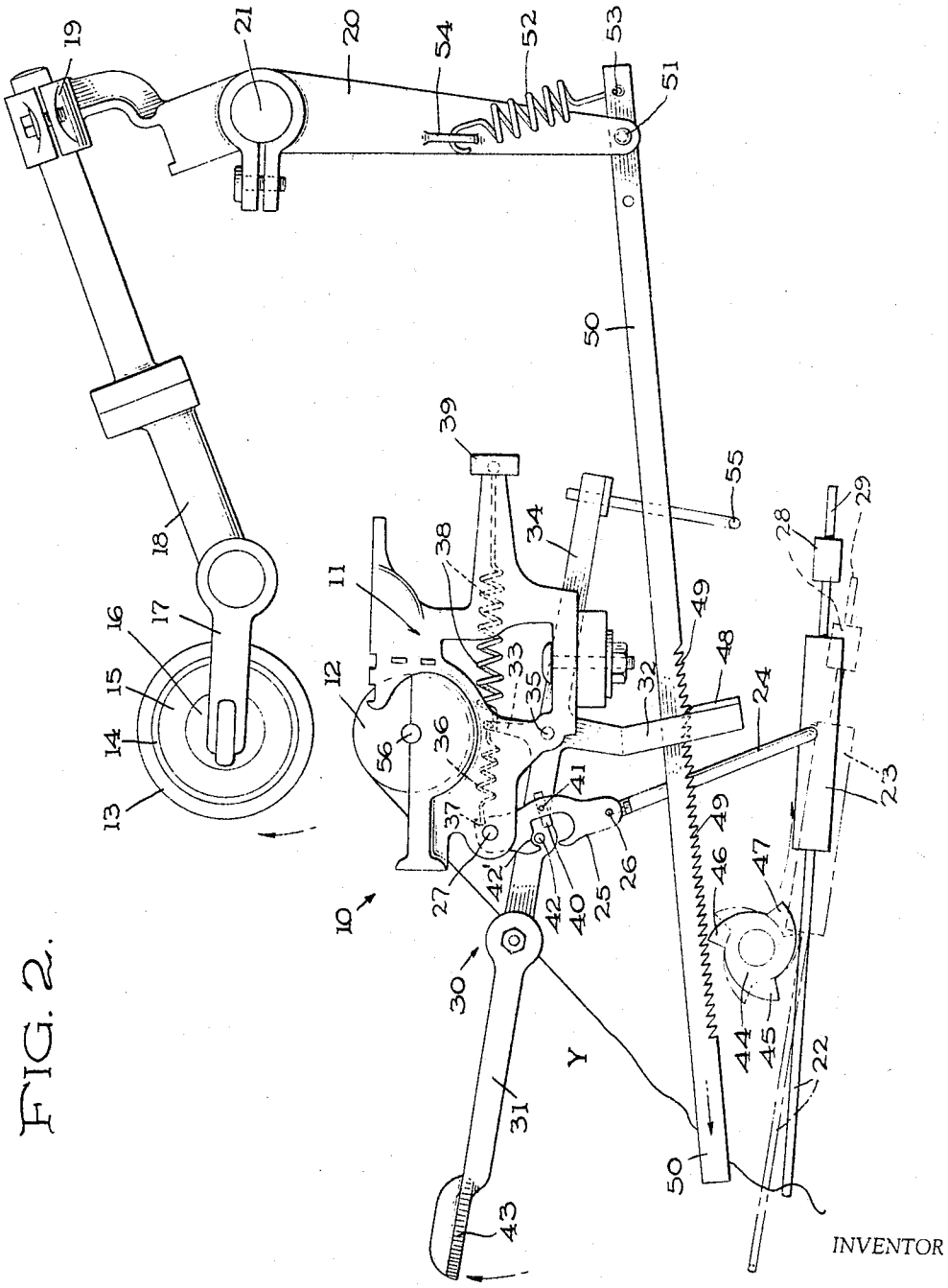


FIG. 2.

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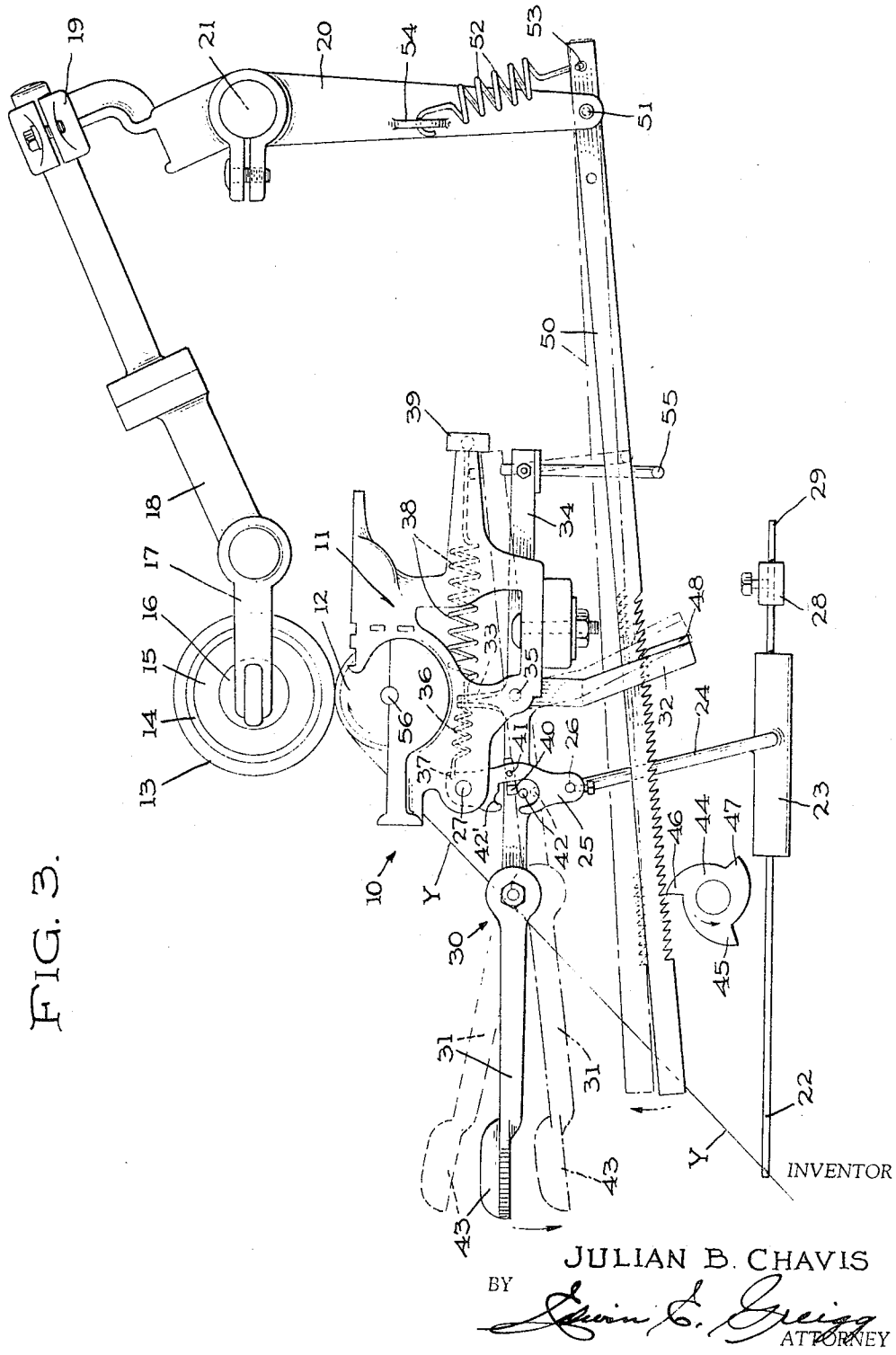


FIG. 3.

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STOP MOTION FOR YARN WINDING MACHINES

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2 Claims. (Cl. 242—37)

This invention relates to a stop motion for a winding machine, and, more particularly, to a stop motion for a Foster 102 winding machine.

Machines of this type, known as quick traverse winders, are used for winding rather large cone-shaped packages of yarn wherein a yarn traverse is used to lag the yarn in the well-known cross wind or Fiji wind. In the type of machine identified as the "Foster Machine," the yarn traverse is by means of a pair of oppositely directed intersecting grooves helically formed on the surface of a drum, which drum also frictionally drives the yarn package for winding the yarn.

In machines of this general type, there is usually a plurality of packages being wound, and it is desirable to stop the operation of winding of a single package when the supply of yarn to that package is interrupted, either by exhaust or by rupture. Such devices, often called knock-offs, stop the operation of a single winding spindle by removing the package from frictional contact with the winding and traverse drum or cam upon the absence of a yarn supply. A detector engages the yarn in its passage from a source to the winding package to permit normal operation of the machine. Upon exhaust or rupture of the traveling yarn, the detector moves to put into operation the stop device or knock-off.

Accordingly, an object of this invention is the provision of an improved knock-off means to be applied to a Foster 102 winder.

Another object of this invention is the provision of a knock-off operated by a constantly rotating multi-lobed cam acting upon a portion of the detector upon failure of the yarn supply.

Still another object of this invention is the provision of a spring operated knock-off, for a winding machine, released by a constantly rotating multi-lobed cam engaging a part of the detector means upon any failure of a yarn through either rupture or exhaust.

An additional object of this invention is to increase the speed of winding by employing a light weight combination friction and traversing drum formed of a suitable thermosetting material.

Other objects and advantages will become apparent upon consideration of the following specification taken with the accompanying drawings which together form a complete disclosure of my invention.

In the drawings, wherein like characters of reference indicate like parts throughout the several views:

FIG. 1 is an end view, partially in section, showing the normal operating position of the winder and the position taken by the detector upon yarn failure;

FIG. 2 is a similar view showing in dotted lines the position taken by the detector upon yarn failure and in full lines the position of the detector upon activation of the knock-off, the other parts being shown in full lines in knock-off position;

FIG. 3 is a similar view showing the resetting operation and

FIG. 4 is a partial front view showing the novel cam drum.

Turning now to FIG. 1, the winder **10** comprises a suitable frame, a portion of which is shown at **11**. The frame **11** supports a constantly driven drum or cam **12** which normally rotates the yarn package **13**, being wound on the sleeve or cone **14**, by frictional contact therewith. The sleeve **14** is mounted on a cone **15** rotatably mounted

on a hub **16** carried by the arm **17** which in turn is adjustably mounted on an arm **18**. The arm **18** is mounted at its end in a clamp **19** carried by a lever **20**, pivoted at knuckle **21** on the frame of the machine in a known manner. The yarn Y travels from a source of supply to the helical grooves formed in the face of the cam **12** and thus onto the cone **14** in a known manner. Suitable tension is maintained to keep the yarn taut in its path of travel to the cone **14**.

A detector means **22** bears at its outer end against the yarn Y, and has an abutment **23** carried on a rearward extension thereof. The abutment portion **23** is rotatably mounted on a rod **24** which in turn is mounted on a latch **25** by means of a pin **26**. The latch **25** is pivotally supported on the frame **11** by means of the pin **27** best shown in FIG. 4. The detector means **22** is counter-balanced by a weight **28** adjustably mounted on a rod **29** extending rearwardly from the abutment portion **23** to over-balance the same on yarn failure. A four armed lever **30** having arms **31**, **32**, **33** and **34** is adapted to pivot about pin **35** on the frame **11**. A spring means **36** connects the arm **33** with a point **37** on the latch **25**, above the pivot **27**. Another spring shown at **38** also connects the arm **33** with the bearing stand **39**. A lug **40** adjustably mounted on the latch **25** by means of the stop pin **41** holds the parts in their normally operative position by engagement over the pin **42** which offstands from the arm **31** of the lever **30**. A finger piece **43** is formed on the outer end of the arm **31** for operating the lever **30** for resetting the machine for normal operation and this will be understood as the description progresses.

A constantly rotated multi-lobed cam **44**, having in the present instance, three lobes **45**, **46** and **47**, is rotatably mounted adjacent the abutment **23**. A dog **48** is mounted on the lower end of the arm **32** of the lever **30** to engage the depending teeth **49** of the elongated rack bar **50**. The rack bar **50** is pivoted on the lever **20** about pin **51** and is urged in a downward direction, as best shown in FIG. 1, by means of the spring **52** connected between the opening **53** in the outer free end of the rack bar **50** and the offstanding ear or lug **54** carried on the lever **20**. A loop or hook **55** is mounted at the free end of the arm **34** of the lever **30** for a purpose later to appear.

When a yarn Y breaks or becomes exhausted, the detector means **22** rises to the position of FIG. 1, so that the abutment portion **23** may be contacted by a lobe such as **46** of the cam **44**. At this time by referring to FIG. 2 it will be observed that this contact drives the abutment and the latch to the right as shown in this view so that the lug **40** clears the pin **42** and allows the spring **38** to pull the arm **33** to the right as shown in FIG. 2. The arm **32** moves to the left, as shown in FIG. 2, and by means of the dog **48** moves the rack bar **50** to the left, rocking the lever **20** clockwise, as shown in FIG. 2, and lifting the package **13** off the cam **12**, to the position shown in FIG. 2. The winding operation of the particular spindle **16** is now stopped, while other spindles on the machine are still operating.

For restarting, the parts are as shown in FIG. 2, and the knob **43** occupies the dotted line position of FIG. 3. Only this fragmentary position is shown here in order to reveal the relation to other motions. When the yarn Y is pieced-up or a new supply is positioned in place, and connected to the old yarn, winding may be started by depressing the knob **43** and therethrough lever **31** to the dot-dash line position. This brings the pin **42** below the lug **40** (see FIGS. 1 and 3) and the spring **36** tends to swing the arm **24** clockwise as shown in these figures. This movement also overcomes the resistance of the spring **38** and causes the lever **20** to rotate counter-clockwise, as shown in these figures, to lower the package **13** onto

the cam **12**. The counter-clockwise rotation of the lever **20** is permitted by the loop or hook **55** lifting the rack bar **50** away from the dog **48**, as shown by the dot-dash line position in FIG. 3. Thus, as the winding starts, pressure is exerted on the knob **43** until the stretch of yarn Y, passing from the supply to the package on the cone **15**, is taut. In this condition the detector means **22** will not trip the knock-off, and winding can continue in a normal manner. When pressure on tthe knob **43** is released, the lever **30** and the parts operated by it return to the position shown in FIG. 1 and in solid lines in FIG. 3 until the occurrence of another failure in the yarn Y.

It has been found that by making the cam **12** of the light weight material, such as a well-known thermosetting resin, preferably a phenolic condensation product known as Bakelite, the speed of winding can be materially increased.

The cam **12** is fixedly mounted on a shaft **56** suitably mounted on the frame **11**. The shaft **56** is rotated by suitable connections with the machine drive elements in a known manner. The shaft **56** may extend the length of the machine and it may have a plurality of cam drums **55** mounted thereon.

Having described the invention in a preferred form, it is to be understood that departures from the specific arrangement, shown and described, may be made within the skill of the art and the scope of the appended claims.

That which I claim is:

1. In a quick traverse winding machine having a frame and a plurality of winding units mounted thereon, each winding unit including a holder having a winding package thereon and a cam drum rotating said package by frictional engagement therewith, means for stopping the operation of a single winding unit comprising an integral four-armed lever pivoted on said frame, latch means pivoted on said frame, a stop pin on a first arm of said four-armed lever, an adjustable stop on said latch means, spring means connecting said latch means and a second arm of said four-armed lever to hold said stop in engagement with said stop pin, a continuously rotating cam, a yarn fault detector rotatably mounted on said latch means, an abutment on said detector intermediate the ends thereof, whereby yarn failure causes said detector to move upwardly, bringing said abutment into engagement with said rotating cam, engagement of said rotating cam with said abutment causing said latch means to pivot, thereby disengaging said stop and stop pin, a rock frame carrying said package and holder, means connecting said rock frame and the third arm of said four-armed lever, spring means connecting said frame and said second-named arm of said four-armed lever for causing said third arm to move said connecting means to operate said rock frame upon disengagement of said stop and stop pin, means on said fourth arm of said four-armed lever for releasing said connecting means from said third arm, and a finger piece on said first arm of said four-armed lever for operating said lever to restore the parts to winding position.

2. The structure as defined in claim **1**, wherein the means connecting the rock frame and the third arm of said four-armed lever comprises a rack bar pivotally mounted on said rock frame having teeth thereon adjacent its free end, said third arm of said four-armed lever including a dog thereon for engaging said teeth to move said rack bar longitudinally.

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