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Owens et al.

[11] **3,762,662**

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[54] **OFF-LOOM CLOTH TAKE-UP OR WINDER**

[75] Inventors: **Carlos L. Owens; Arch E. Cutting,** both of Greenville, S.C.

[73] Assignee: **Southern Machinery Company** Greer, S.C.

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[52] **U.S. Cl.**..... **242/67.1**, 242/75, 242/75.2, 242/75.5

[51] **Int. Cl.**..... **B65h 17/02**, B65h 25/22

[58] **Field of Search**..... 242/67.1 R, 75, 75.3, 242/75.1, 75.2, 75.51, 75.52, 75.53, 76

[56] **References Cited**

UNITED STATES PATENTS

3,387,798	6/1968	Young	242/76
3,156,267	11/1964	Hooper	139/110
2,786,491	3/1957	Hunt	139/110
2,635,824	4/1953	Schneider	242/75
2,916,227	12/1959	Bowen	242/75.5

Primary Examiner—George F. Mautz
Assistant Examiner—Edward J. McCarthy
Attorney—B. P. Fishburne, Jr.

[57] **ABSTRACT**

A self-contained cloth take-up or winder separate from the weaving loom features a variable speed drive and a control means for the drive which senses tension in the cloth and causes the drive to maintain a constant tension in the cloth at all times. The mechanism can also be used to wind other sheet material, such as plastic, coming from an extruder.

5 Claims, 4 Drawing Figures

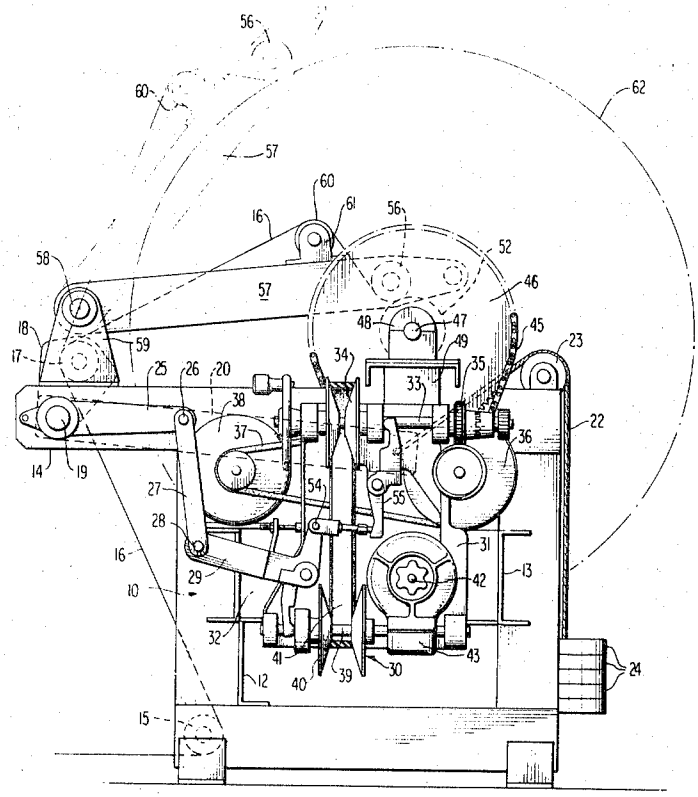
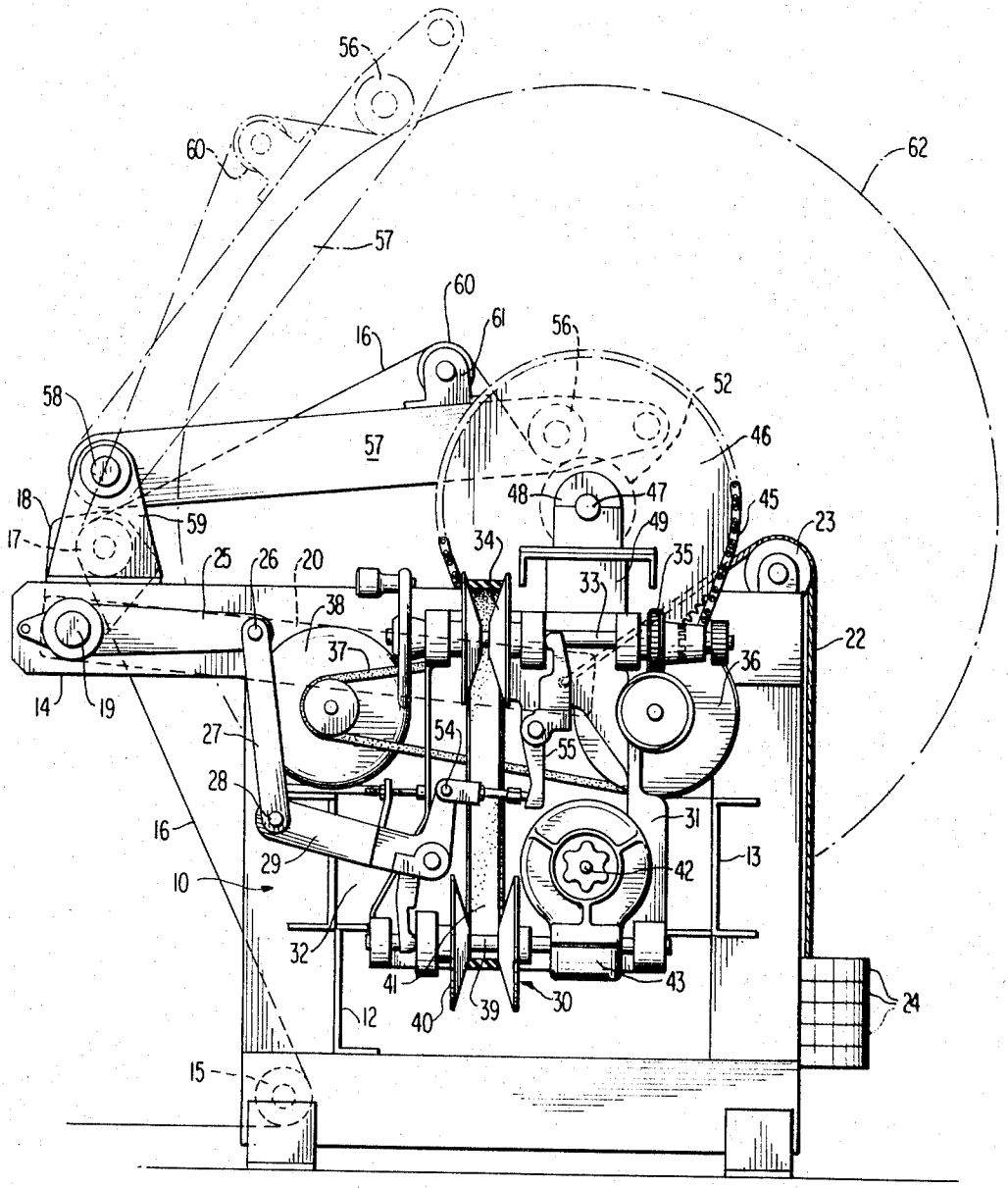


FIG. 1



INVENTORS
CARLOS L. OWENS
ARCH E. CUTTING

BY B. P. Williams, Jr.
ATTORNEY

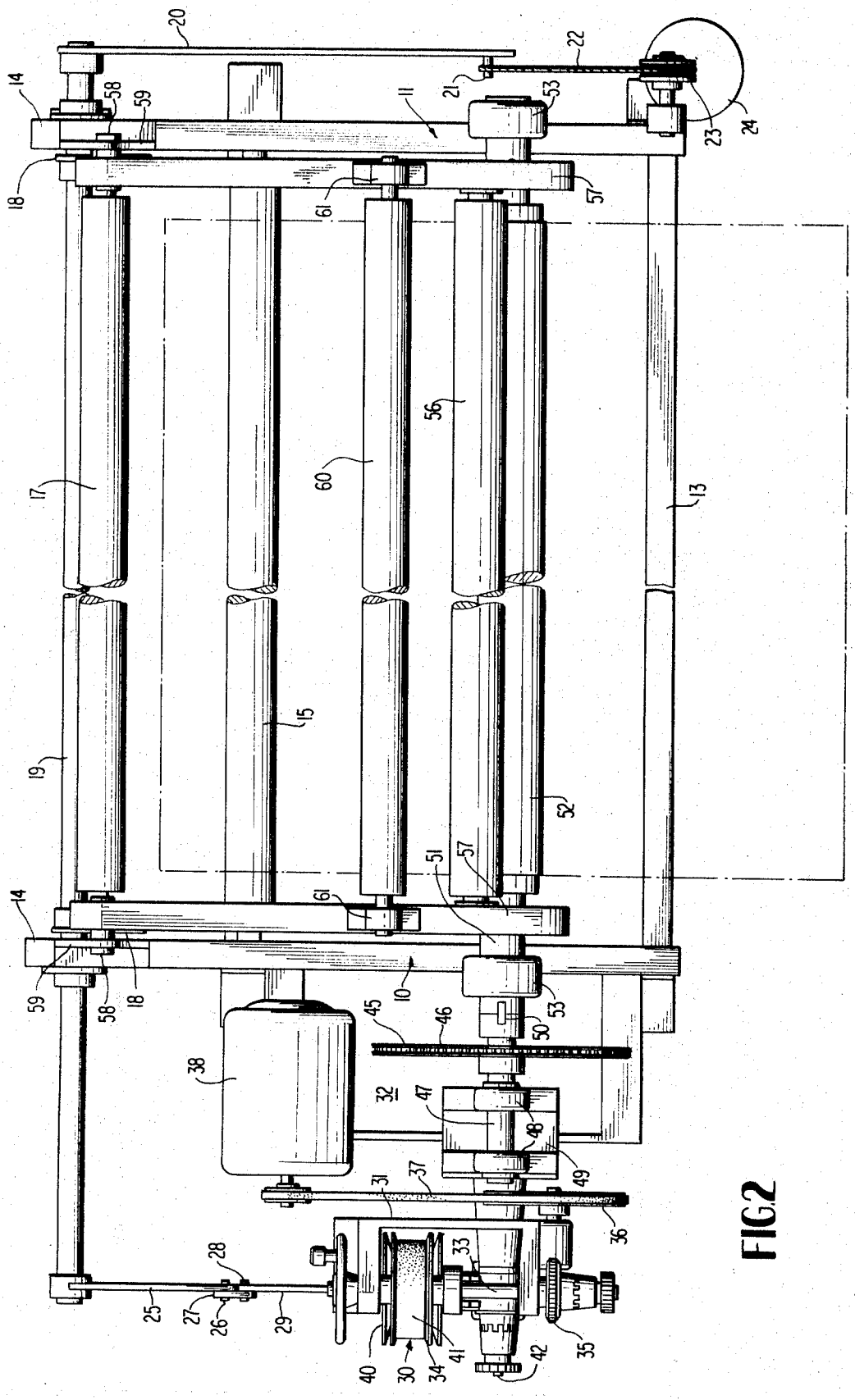
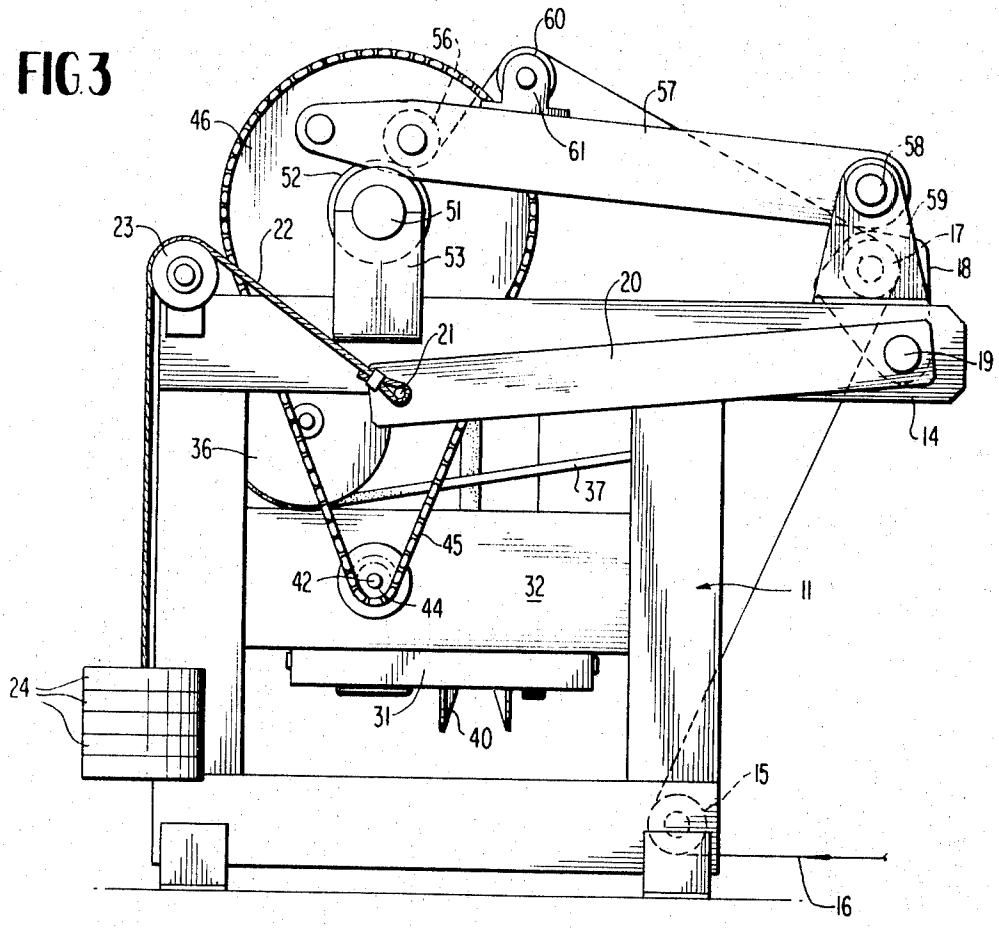

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FIG2

FIG.3


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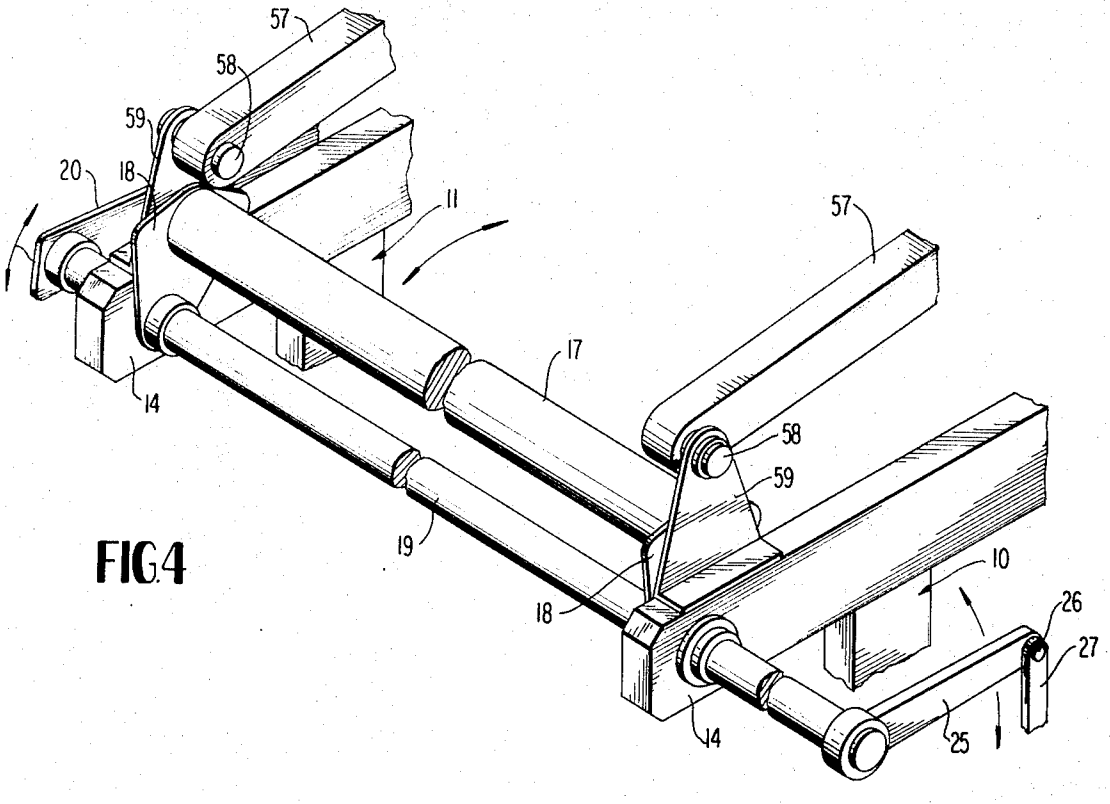

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FIG.4

OFF-LOOM CLOTH TAKE-UP OR WINDER

There is a need for a more efficient means to wind cloth as it emerges from a weaving loom. Customarily, the loom includes a cloth take-up roll and a cooperating sand roll which engages the surface of the cloth frictionally. This surface engagement is intolerable with certain fabrics including fiberglass and other low pick fabrics. Additionally, due to its location on the loom, the conventional cloth take-up roll has a very limited capacity, usually in the neighborhood of 250 yards of cloth. Other difficulties are encountered including lack of uniform density or compactness in the cloth roll and telescoping of the roll during its winding.

With the above in mind, it is the objective of the invention to provide a cloth winder which will assure constant tension in the cloth being wound because of the use of a highly efficient variable speed drive with a sensitive response to changes in cloth tension. This eliminates roll telescoping and forms a cloth roll of uniform hardness or compactness throughout. The winder also has the capability of varying this roll hardness when desired. Surface contact with the cloth or other material being wound is entirely eliminated by directly driving the center spindle of the take-up roll. Most importantly, the winder has a greatly increased capacity compared to the conventional on-loom cloth take-up arrangement and a continuous cloth roll up to 30 inches in diameter is obtainable. The winder can handle a wide range of fabrics. Its construction is simple and also sturdy and durable.

Other features and advantages of the invention will be apparent during the course of the following description.

BRIEF DESCRIPTION OF DRAWING FIGURES

FIG. 1 is a side elevational view of a cloth winder embodying the invention.

FIG. 2 is a plan view of the winder.

FIG. 3 is a further side elevation showing the opposite side to that in FIG. 1.

FIG. 4 is a fragmentary perspective view of cloth tension sensing control means for the variable speed drive of the winder.

DETAILED DESCRIPTION

Referring to the drawings in detail wherein like numerals designate like parts, the cloth take-up mechanism or winder embodies a sturdy floor-mounted support frame having opposite side rectangular frame sections **10** and **11** rigidly connected near their bottoms by cross beams **12** and **13**. The frame sides **10** and **11** include at their tops rigid projecting arms **14** for the support of certain elements to be described. The details of construction of the supporting frame are relatively unimportant to a proper understanding of the invention and a further description of the frame should be unnecessary.

During use, the arms **14** face the loom, not shown, or other source of material being wound, and a transverse guide roll **15** is suitably mounted between the frame sides **10** and **11** near the bottom of the frame and near the cloth intake side of the winder. The cloth or other sheet material web indicated at **16** coming from a loom or the like passes around the guide roll **15** and then upwardly and over a sensing roll **17** whose function is to constantly detect or sense the tension in the web **16** and through a linkage to be described regulate the operation of the variable speed drive for the winder. The sensing roll **17** is bodily carried by a pair of short arms or plates **18**, FIG. **4**, whose lower ends are secured to a rocker shaft **19** journaled in bearings near the ends of the arms **14**. One end of the rocker shaft **19** has secured to it a relatively long rearwardly extending generally horizontal counterweight crank arm **20** whose rearward end is connected at **21** with a cable **22** engaging over a pulley **23** near one rear upper corner of the main frame. Variable counterweights **24** are suspended from this cable, as shown.

The other end of the rocker shaft **19** has secured to it a somewhat shorter crank arm **25** pivoted at **26** to a generally vertical link **27** whose lower end is in turn pivoted at **28** to a control lever **29** of the variable speed drive, now to be described, and shown in its entirety at **30**.

The variable speed drive **30** is a drive constructed in accordance with the teachings of U.S. Pat. Nos. 2,786,491 and 3,156,267 to Hunt and Hooper, respectively, and these patents are incorporated by reference in this application. Briefly, the drive is essentially a self-regulating variable speed drive which responds to variations in tension in the material being wound. In the present invention, the drive maintains not only a constant cloth tension but insures uniform cloth roll compactness or density from the core of the roll outwardly to its periphery. The drive **30** as disclosed in said patents comprises a main mounting casting **31** or support suitably attached to a side extension **32** of the main support frame of the winder. Carried by the casting **31** is a rotary input shaft **33** carrying a variable diameter cone pulley **34** and having a driving worm gear **35** thereon. The worm gear **35** is driven by a worm, as shown in said patents operated by a pulley **36**, driven by a belt **37** from a suitable drive motor **38** mounted on the frame extension **32**.

The drive **30** embodies a lower output shaft **39** parallel to the input shaft **33** having a variable diameter cone pulley **40** mounted thereon, the pulleys **34** and **40** being connected by a transmission belt **41**. Also, as fully disclosed in said patents, the variable speed drive embodies another output shaft **42**, called a let-off shaft in the patents, and this shaft **42** is driven by worm gearing **43** connected with the shaft **39**. The shaft **42** drives a sprocket gear **44**, driving a sprocket chain **45**, engaging a much larger sprocket gear **46** on a short overhead shaft **47** journaled in bearings **48** carried by a post **49** rising from the frame extension **32**. The sprocket gear shaft **47** is coupled as at **50**, FIG. **2**, with the spindle **51** of a cloth roll **52** upon which the cloth or other sheet material is wound. The cloth roll spindle is journaled in sturdy bearings **53** rigidly secured to the tops of frame sides **10** and **11**. When the cloth roll is to be doffed, it is uncoupled from the shaft **47** and lifted from its bearings **53** which are constructed to facilitate this doffing or lifting.

The previously mentioned control lever **29** of the variable speed drive is connected at **54** to a cone pulley diameter adjusting linkage **55** which operates in the manner disclosed in said prior patents to automatically adjust the diameters of the pulleys **34** and **40**. Therefore, a further detailed description of the drive **30** should not be required for a proper understanding of the winder. Suffice it to say that the control lever **29** of the drive and the cone pulley linkage responds continuously and automatically to changes in tension in the

web 16 transmitted through the sensing roll 17 and counterbalanced by the weights 24 acting on the arm 20 attached to the rocker shaft 19. This mode of operation for maintaining a constant cloth or web tension is also exactly as described in said patents.

The cloth winder further comprises a presser roll 56 carried by the rear ends of a pair of presser roll arms 57 having their opposite ends pivoted at 58 to support brackets 59 mounted on the frame extensions 14. Additional guide roll means 60 for the web 16 is mounted in bearings 61 on the tops of arms 57. As shown in the drawings, the cloth or web extends upwardly and rearwardly after passing around the sensing roll 17 and engages the guide roll 60 and then descends and passes through the nip of the rolls 52 and 56 as it is gradually wound up on the roll 52 to produce a large roll of compact cloth whose periphery is schematically indicated in FIG. 1 at 62. As previously stated, a roll 30 inches in diameter or more may be created having more than 1,000 yards of cloth thereon. As the cloth roll grows in diameter, the presser roll 56, arms 57 and guide roll 60 automatically rise toward the position shown in broken lines in FIG. 1. The presser roll 56 helps to compact the cloth roll and maintain it smooth and prevents the cloth web from shifting laterally. The guide roll 60 maintains a fixed angle for the web 16 to the periphery of the cloth roll 52. This angle, together with the constant tension on the web assured by the drive 30, enables the formation of a cloth roll having uniform compactness from its core to its periphery. This compactness can be varied somewhat by increasing or decreasing the mass of the weights 24.

While the winder is shown and described with its own drive motor 38, in some cases, if preferred, the variable speed drive input pulley 36 may be driven by suitable gearing from the loom or other web producing machine.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

We claim:

1. A web winder comprising a supporting frame, a web winding roll journaled on the supporting frame, a variable speed drive for the web winding roll on the supporting frame including an input shaft and an output shaft and infinitely variable speed transmission means between said shafts, a motor and positive drive gearing coupled with said input shaft and driving the same, additional positive gearing interconnecting said output shaft and said web winding roll, a web tension sensing roll rockably mounted on the supporting frame, said variable speed transmission means having a pivoted speed control lever, mechanical linkage means interconnecting said lever and rockable web tension sensing roll, an adjustable counterbalancing means connected with the rockable web tension sensing roll, a floating presser roll bearing on the periphery of said web winding roll and having guide roller means engaging the web and directing it to the nip between the presser roll and web winding roll.

2. The structure of claim 1, and said supporting frame comprising a pair of spaced upstanding frame sides rigidly joined near their bottoms only to thereby provide a large unobstructed passage between the frame sides for the accumulation of a large quantity of sheet material on the web winding roll, said variable speed drive, motor and positive gearing being mounted on the exterior of one upstanding frame side remote from said unobstructed passage.

3. The structure of claim 2, and said frame sides including a pair of top horizontally projecting support arms extending beyond one side of the web winder, bearing supports for the rockable web tension sensing roll on said support arms, and additional bearing supports for said floating presser roll on said support arms.

4. The structure of claim 3, and an additional web guide roll on the supporting frame near the bottom thereof and near the side of the supporting frame having said horizontally projecting support arms, whereby a web passing around the additional web guide roll may be directed upwardly and over the web tension sensing roll and then over the guide roller of the floating presser roll.

5. The structure of claim 1, and said web tension sensing roll including a rocker shaft having a connection with said mechanical linkage means, said adjustable counterbalancing means comprising a rigid crank arm on the rocker shaft, and variable weight means connected with said rigid crank arm so that the same may variably resist and counterbalance the effect of the web tension sensing roll on said mechanical linkage means.

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