

Nov. 19, 1940.

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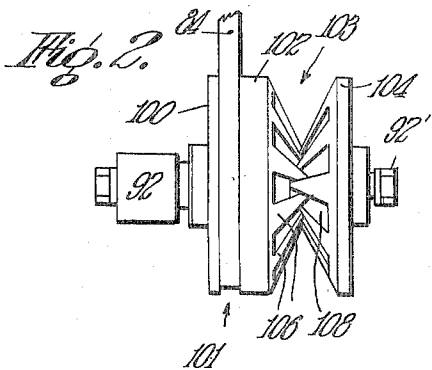
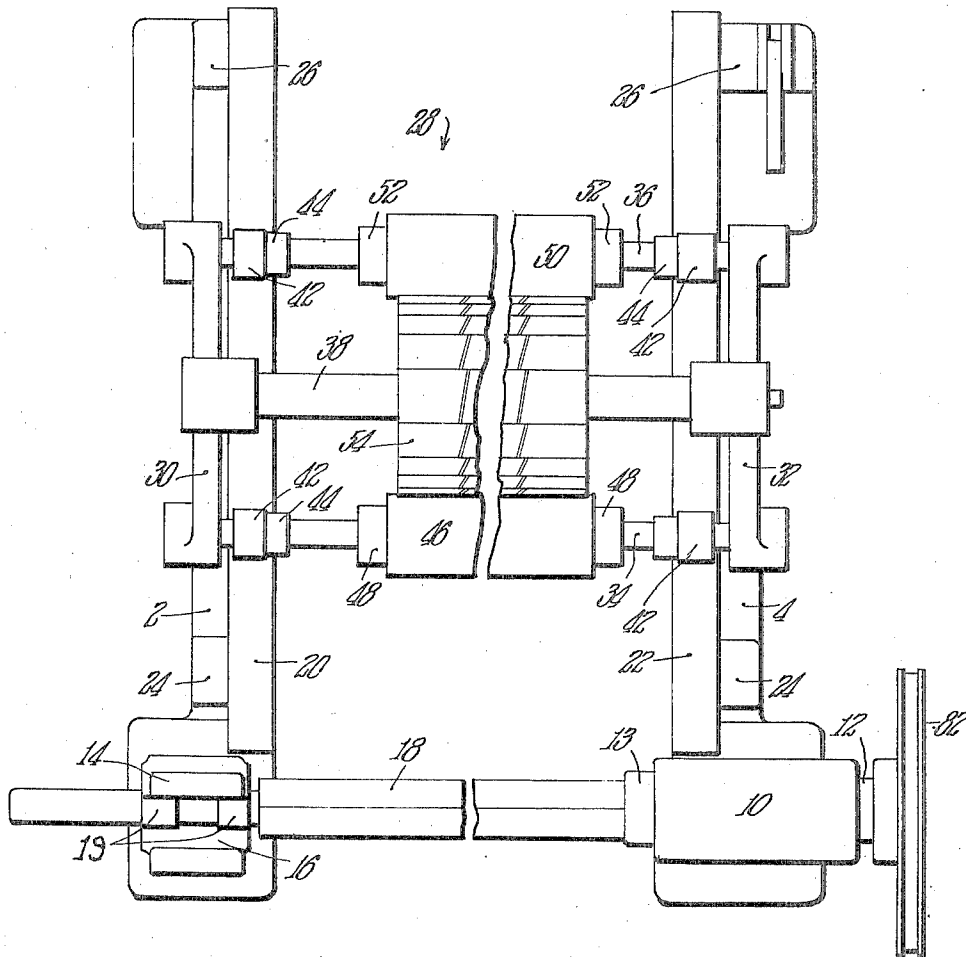
2,222,189

WINDING APPARATUS

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2 Sheets-Sheet 1

Fig. 1.



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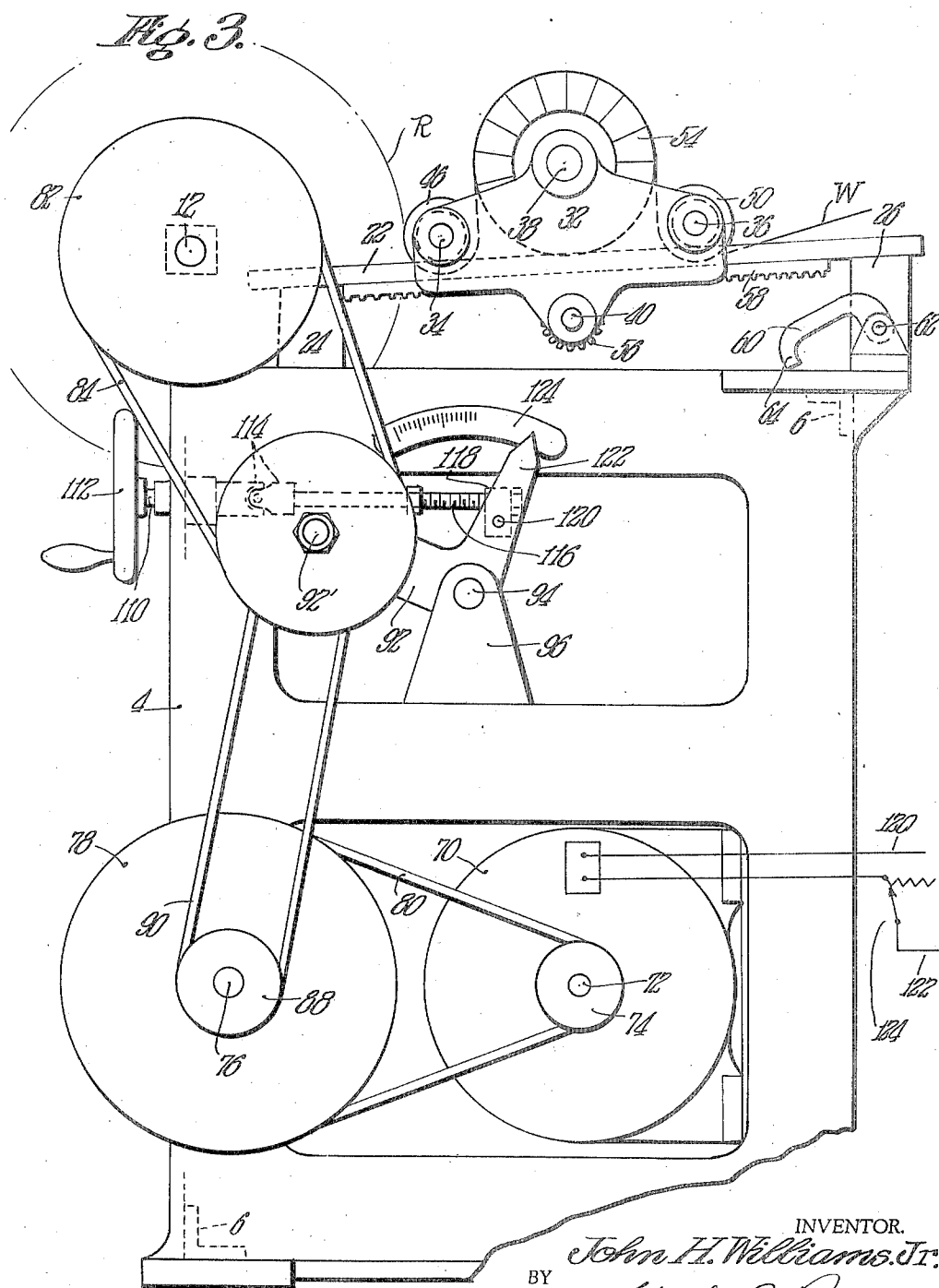
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WINDING APPARATUS

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2 Claims. (Cl. 242—62)

This invention relates to improvements in winding apparatus in general but it is directed particularly to winding machines known as batchers or batching frames.

5 In the textile industry, a batcher is employed for winding into a roll a web of fabric as it comes from a tenter machine or from some other apparatus. Such a machine includes a winding arbor on which is a core of four or five inches
10 in diameter and on this core the web is wound into a roll having a diameter of from twenty-four to twenty-eight inches.

The fabric web comes from the tenter machine or other apparatus at some substantially uniform lineal speed and it is desired and necessary to
15 wind up the web at a substantially uniform tension. The arbor of the batcher is, of course, rotated and as the winding operation progresses the diameter of the roll increases.

20 The arbor is driven by a direct current motor in the circuit of which there is a resistance so that the motor has a rather definite torque or pull. With this arrangement the motor will have a certain pull on the web so as to bring about a
25 more or less uniform tension and the speed therefore decreases as the roll diameter increases.

The motor however will have a rather definite capacity. That is, it may provide the desired tension and have the ability to operate successfully
30 from between an initial speed of 100 R. P. M. for the arbor when the roll is first started to a speed of 20 R. P. M. when the roll is completed.

Batchers are employed for winding operations with the material being delivered thereto at various
35 lineal speeds. That is to say, webs may be delivered for the winding operation at various lineal speeds calling for an arbor speed at the beginning of fifty or several hundred revolutions per minute. In other words, the speeds at which
40 the webs are delivered vary within a very wide range and require a wide range of arbor speeds for the beginning of the winding which results in a similarly wide range of speeds at the completion of the winding operation. The objection
45 is that the capacity of the motor is not sufficient to cover the range. According to this invention means is provided to facilitate utilization of the capacity of the motor for that part of the range within which it is desired to operate and the
50 same is accomplished by a novel construction and arrangement which is not only simple in form but also efficient in operation.

According to another feature of the invention, means is provided for maintaining the carriage,
55 which has a roll engaging the roll being wound,

in alignment so that the said roll's axis is at all times parallel to the axis of the winding arbor.

Various novel features of the invention will be hereinafter referred to in connection with the
5 accompanying description of the preferred form of the invention, reference being had to the drawings wherein:

Fig. 1 is a plan view of an apparatus embodying the novel features of the invention;

Fig. 2 is a partial side elevational view of the
10 mechanism for driving the arbor of the machine shown in Fig. 1; and

Fig. 3 is a side elevational view of the machine shown in Fig. 1.

Referring now to the drawings in detail the
15 machine of the invention will be fully described.

End frames 2 and 4 are provided which may be connected together in some suitable manner as by members such as 6 so as to provide a rigid
20 frame work.

A bearing 10 on the forward end of frame 4 has rotatable therein a shaft 12, the inner end 13
of which is provided with an arbor socket (not shown). A bearing 14 on the forward end of
25 frame 2 has a slot 16. An arbor 18 is provided and is formed so that its end, which is not shown, is receivable in the socket of the shaft end 13 while its other end is provided with one or more
30 pin bearings such as 19 so as to facilitate the rotation of the arbor by the shaft 12.

Rails 20 and 22 are associated with end frames 2 and 4 and are secured to the frames at their forward ends by brackets 24 and at their rear
35 end by brackets 26. As shown in Fig. 3, the tracks are disposed in an inclined relation.

A carriage 28 is movable on the tracks 20 and 22 back and forth or towards and away from the
40 arbor 18. The carriage there has side brackets 30 and 32 in which are fixed a forward shaft 34, a rear shaft 36 and an intermediate shaft 38. There is a rotatable shaft 40 below shaft 38. Pin bearings such as 42 are rotatable on the
45 shafts 34 and 36 and these roll on the tracks 20 and 22, they being held against shifting movements by collars 44.

A forward roll 46 is rotatable on shaft 34 and it is held against axial movements by collars 48.
A similar roll 50 is likewise rotatable on the shaft 36 and it is held against axial movements
50 by collars 52. An expander or spreader roll 54 is rotatable on the shaft 38.

In the operation of the apparatus, a web of material W such as a fabric from a tenter machine or the like passes beneath roll 50 and up
55 and over roll 54 and beneath member 46 in the

path as indicated in Fig. 3. As the web is wound up on a core which may be carried by the arbor 18, the expander or spreader tends to straighten the web or to pull it outwardly from the center so that the web of material is made flat and is unwrinkled.

As the web is wound up onto the roll by the rotation of the arbor 18 the carriage is disposed so that the roll 46 bears against the roll of material on the arbor. As the diameter of the roll increases the carriage moves rearwardly or away from the arbor. The tracks 20 and 22 being inclined the carriage tends to move forwardly so the roll 46 bears against the roll of material with the desired pressure. In Fig. 3, a roll of material is represented by R against which roll 46 bears. In Fig. 1 the carriage is shown spaced from the arbor in order to illustrate the parts more clearly.

To insure, however, that the roll 46 is maintained in alignment with the arbor, the opposite ends of the carriage are geared to the track. This is accomplished by means of gears 56 on shaft 40 which are in mesh with racks 58 on the under side of the tracks. By this means, the axes of the shafts of the carriage are maintained in alignment with the axes of the arbor in all positions of the carriage.

A latch hook 60 is pivoted at 62 to the bracket 26 associated with the frame 4 (see Fig. 3). The forward hook end 64 of the hook is adapted and arranged to hook over the shaft end 40 when the carriage is in its rearward position so as to hold the carriage against forward movement.

A motor 70 is provided which is carried by the frame work and it has a shaft 72 which carries a pulley 74. A jack shaft 76 which is rotatable in the frame carries a pulley 78 which is connected by a belt 80 to the pulley 74 of the motor. A pulley 82 which is fixed on shaft 12 receives belt 84 while a pulley 88 on shaft 76 receives a belt 90. An arm 92 is pivoted at 94 to a bracket 96 associated with frame 4.

A stud 92' in the end of arm 92 has rotatable thereon a plurality of members 100, 102, and 104. The intermediate member 102 is shiftable axially relatively to the members 100 and 104. Adjacent faces of the members 100, 102 and 104 are inclined towards one another so that the adjacent faces form cone pulleys 101 and 103. The said adjacent faces are provided with interengaging tongues and slots 106 and 108 respectively which are arranged and adapted so as to permit axial movements of the intermediate member 102 relative to members 100 and 104 but retain the three members in driving relation.

In Fig. 2, the central member 102 is positioned so that a cone pulley 101 at the left is provided which is of a larger diameter than a cone pulley 103 at the right thereof. By moving the central member 102, the diameters of the cone pulleys may be varied. As the arm 92 is swung clockwise, the belts 84 and 90 act on the member 102 so that it is moved outwardly to increase and decrease the diameters of the cone pulleys. When the arm is swung counter-clockwise, the reverse is true. Therefore, by swinging the arm up or down, the elements 100, 102, and 104 are adjusted so that the arbor is driven at various speeds from shaft 76.

A shaft 110 is rotatable in frame 4 and has a hand wheel 112 fixed thereto. A universal joint 114 connects shaft 110 to a screw member 116 which threadedly operates in a nut 118 pivoted at 120 to an extension 122 of arm 92. A plu-

rality of graduations such as shown on a plate 124 may represent feet or yards per minute or the like. As hand wheel 112 is rotated, the arm 92 is swung in one direction or the other so that the pointed end of member 122 as shown traverses the graduations.

Lines 120 and 122 represent a power line to the motor and there is a rheostat or variable resistance 124 in said line.

In the operation of the apparatus, it is desired to wind up or to batch a web of material which may come from various machines and at different lineal speeds. The said web may come from a certain tenter and will, of course, be delivered therefrom at a certain lineal speed, such as so many yards or feet per minute. It is desired that the said web be wound up on the core carried by the arbor at a uniform tension. Since one tenter machine may deliver the web at one speed, and another tenter machine or the like may deliver the goods at a very much greater or lesser speed, it is to accommodate various speeds and to provide the desired tension that the apparatus of this invention is adapted.

The resistance may be adjusted so that the motor provides the desired pull on the web so as to obtain the desired web tension. The arm 92 is adjusted so that the arbor is rotated at the beginning of the winding operation at such a speed as will take up the web at the speed delivered to the machine and as will give the desired tension.

As the winding proceeds the roll of web being formed increases in diameter so that the speed of the arbor at the beginning of the roll is less than that at the completion thereof. As the roll diameter increases, the torque or pull of the motor being rather constant, the said motor speed decreases so that the lineal speed of the web is uniform throughout the winding operation.

By means of the apparatus, it is possible to wind up a web at a desired tension and at a desired lineal speed, which factors are substantially uniform throughout the winding operation. The ability of the motor to exert a certain pull according to the setting of the resistance throughout a certain somewhat limited range is made use of throughout a very much greater range by means of the novel construction and arrangement of parts.

While I have described the invention in great detail and with respect to the present preferred form thereof, it is not desired to be limited thereto since many changes and modifications may be made therein without departing from the spirit and scope of the invention. What it is desired to claim and secure by Letters Patent of the United States is:

1. A batching machine comprising in combination, a framework, an arbor rotatable on a horizontal axis in the forward end thereof for winding a web into a roll, tracks at opposite sides of the framework extending rearwardly from the arbor in planes inclining upwardly relative to the horizontal, a carriage having end members and forward, rear, intermediate, and lower shafts extending between said end members, roller members rotatable on opposite ends of said forward and rear shafts rollable on said tracks whereby said carriage may move freely by gravity towards said arbor and be moved away therefrom, a spreader roll rotatable on said intermediate shaft, other rolls rotatable on the forward and rear shafts for engaging a web passing upwardly onto

and downwardly from said spreader roll onto said arbor, racks associated with said tracks, and pinions fixed on opposite ends of said lower shaft engageable with said racks.

- 5 2. A batching machine comprising in combination, a framework, an arbor rotatable on a horizontal axis in the forward end thereof for winding a web into a roll, tracks at opposite sides of the framework extending rearwardly from the
10 arbor in planes inclining upwardly relative to the horizontal, a carriage having end members and forward, rear, intermediate, and lower shafts extending between said end members, roller members rotatable on opposite ends of said forward and rear shafts rollable on said tracks

whereby said carriage may move freely by gravity towards said arbor and be moved away therefrom, a spreader roll rotatable on said intermediate shaft, other rolls rotatable on the forward and rear shafts for engaging a web passing upwardly 5 onto and downwardly from said spreader roll into said arbor, racks associated with said tracks, and pinions fixed on opposite ends of said lower shaft engageable with said racks, and a pawl 10 pivoted to the rear end of said framework adapted to engage said lower shaft when the carriage is in a position away from the arbor to hold said carriage against movement toward the arbor.

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