J. R. GAMMETER.

FABRIC TENSION GOVERNOR FOR TIRE MAKING MACHINES.

APPLICATION FILED AUG. 25, 1913.

1,124,412.

Patented Jan. 12, 1915.

3 SHEETS—SHEET 1.

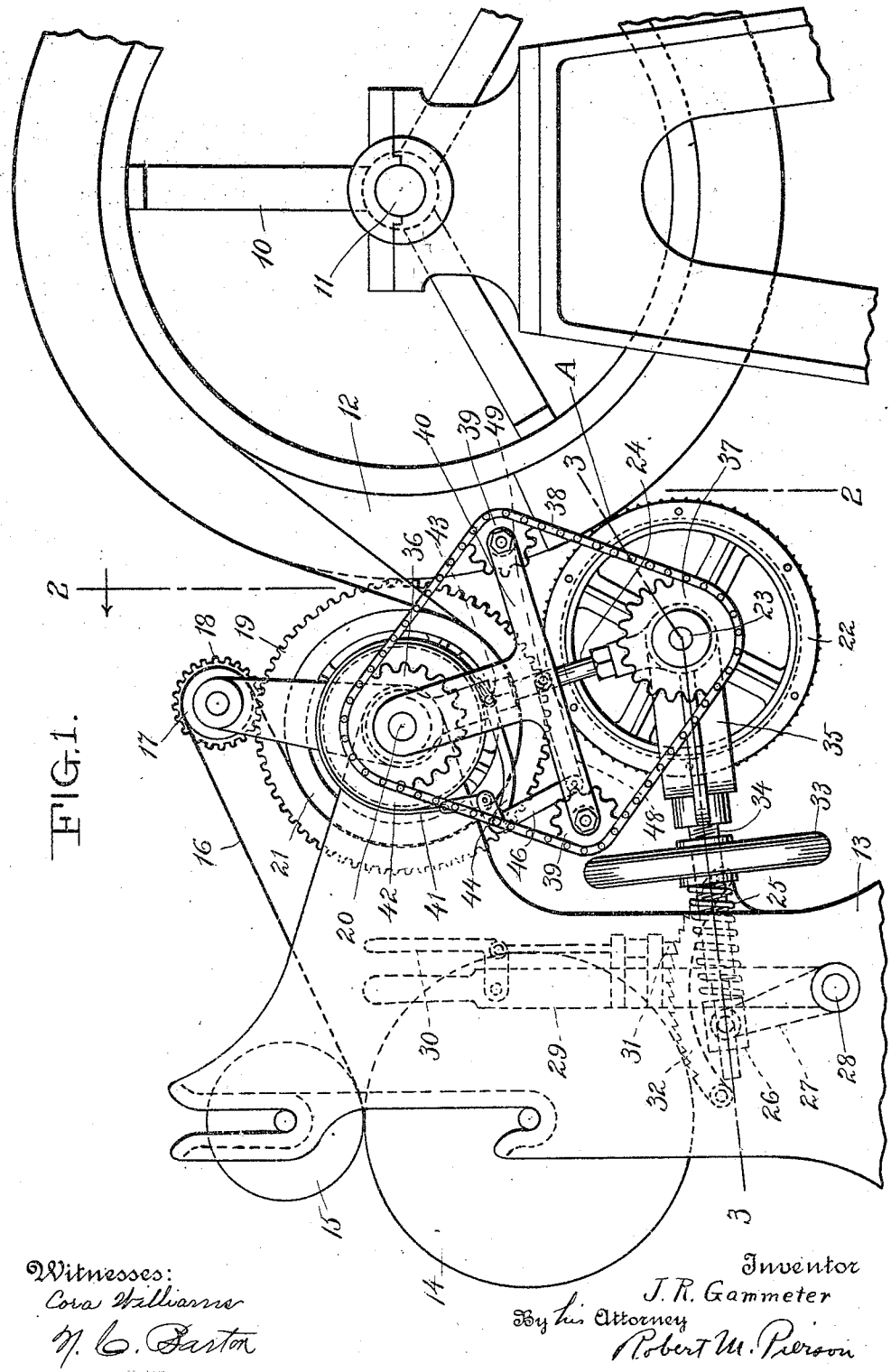


FIG. 1.

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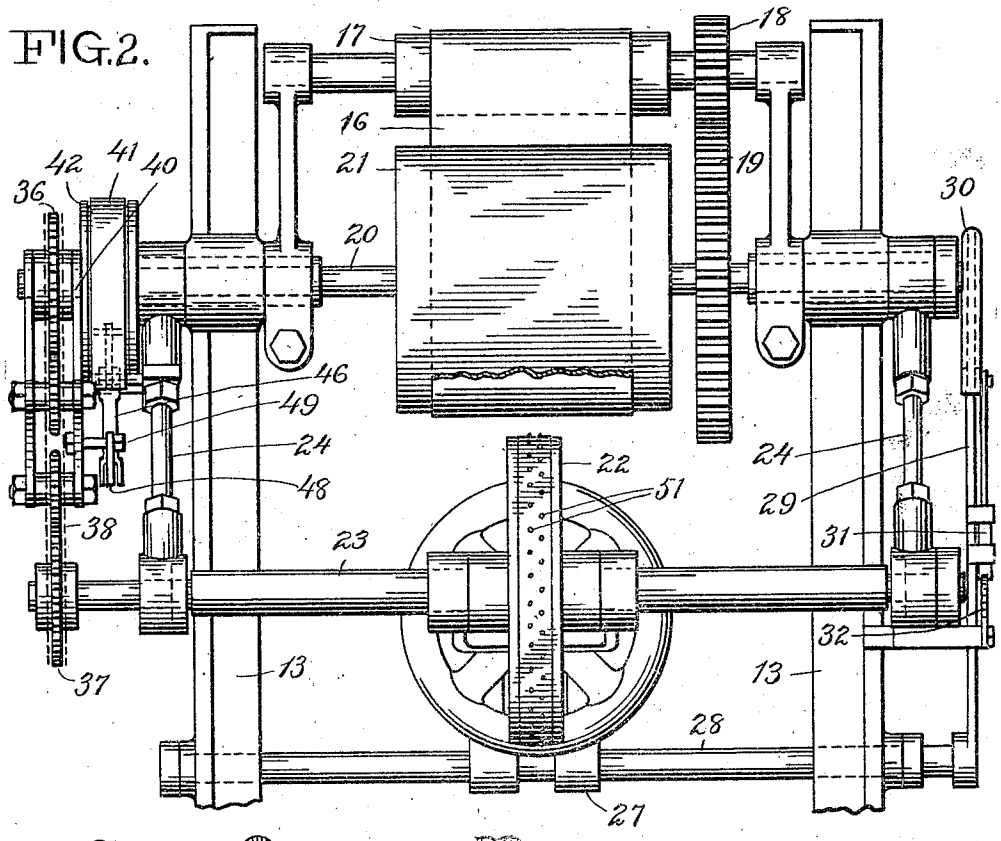
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3 SHEETS—SHEET 2.

FIG. 2.



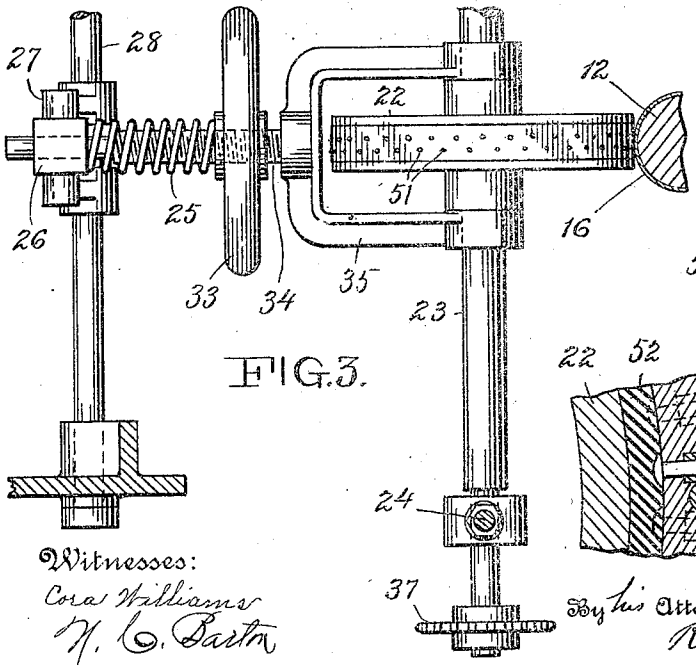


FIG. 3.

FIG. 4.

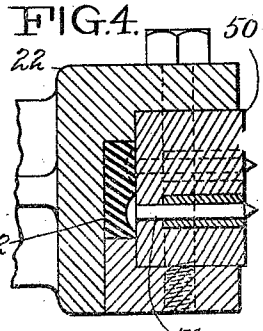


FIG. 5.

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3 SHEETS—SHEET 3.

FIG. 8.

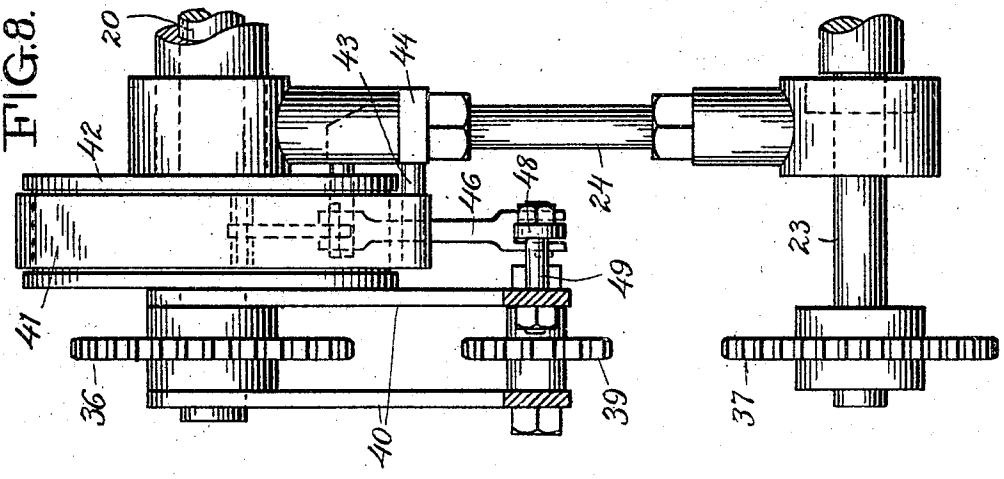


FIG. 7.

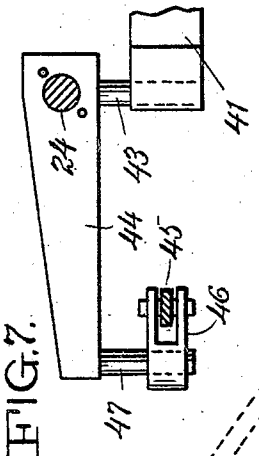


FIG. 6.

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UNITED STATES PATENT OFFICE.

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FABRIC-TENSION GOVERNOR FOR TIRE-MAKING MACHINES.

1,124,412. Specification of Letters Patent. **Patented Jan. 12, 1915.**

Application filed August 25, 1913. Serial No. 786,460.

To all whom it may concern:

Be it known that I, JOHN R. GAMMETER, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Fabric-Tension Governors for Tire-Making Machines, of which the following is a specification.

This invention relates to machines for winding a strip of fabric on a core or mandrel, as, for example, winding the canvas layers in the carcass of a pneumatic-tire casing. It is the practice in that art to join a number of lengths of frictioned duck, cut on the bias, so as to make a strip of a certain measured length adapted to inwrap the core a predetermined number of times. During the winding operation a strong tension is applied, whereby the middle of the strip is stretched to make it conform to the round core, and this tension must be maintained as nearly uniform as possible. It is naturally a difficult matter to make the original measured length of fabric, when stretched by the machine, correspond exactly to the desired number of turns or layers, without either shortage or excess, and the prior practice has been to leave enough excess to make up for any possible shortage. This occasions waste because of the amount which often has to be cut off from the end of the strip at the completion of the winding operation.

The principal object of my invention is to avoid such waste of fabric.

The present invention is an improvement on the fabric-tension device shown in my pending application Serial No. 783,736, filed August 8, 1913, which employed a friction wheel in contact with the periphery of the core or the layers of fabric thereon, said wheel controlling the speed of the fabric let-off roll through a direct chain-and-sprocket connection. This form of connection, while fully operative and successful in practice, is open to the objection above-noted, that its use involves a waste of fabric due to the allowance required for a possible shortage, the particular cause of uncertainty in that instance being the slippage which occurs between the friction measuring wheel and the core or the wound fabric.

In my present invention I employ a brake which furnishes the principal resistance to rotation of the fabric tension roll, and I control the pressure on said brake by means of the peripheral resistance at the point of contact between the measuring roll and the core or wound fabric, thus maintaining said resistance small in amount and substantially constant.

Of the accompanying drawings, Figure 1 represents a side elevation of a preferred form of my fabric-tension governor applied to a tire-making machine of which a portion of the core-support and a core thereon are shown. Fig. 2 represents an end elevation of the fabric-feeding mechanism viewed from the plane 2—2 of Fig. 1. Fig. 3 represents a plan view, partly in section, on the line 3—3 of Fig. 1. Figs. 4 and 5 represent a horizontal section and a vertical section of the rim of the measuring wheel. Fig. 6 represents a vertical section showing certain of the operating parts of the governor. Fig. 7 represents a section on the line 7—7 of Fig. 6. Fig. 8 represents an elevation, partly in section, at the line 8—8 of Fig. 6, showing mainly the brake and adjacent members.

In the drawings, 10 is a chuck mounted on a shaft 11, and carrying an annular tire-core, mandrel or ring 12 of the usual form. Shaft 11 is positively driven by suitable mechanism (not shown) and causes the core 12 to exert a pull upon the fabric.

13, 13 are frame standards carrying the fabric-feeding mechanism. The strip of frictioned duck is placed in the machine in the form of a roll 14, and the liner which separates the rubberized surfaces in this roll is taken up on a roll 15 as the fabric strip unwinds. From the roll 14, the strip 16 passes over an auxiliary fabric-tension roll 17 driven by gearing 18, 19 from the shaft 20 of a main fabric-tension roll 21, these tension rolls having a frictional surfacing so that they retard or exert a drag upon the strip as it passes onto the core 12, whereby the middle portion of the fabric is stretched and each layer is made to conform to the rounded contour of said core.

22 is a measuring wheel which rolls in contact with the periphery of the core 12 or the outer fabric layer thereon, and is connected with the tension roll 21 by a chain-and-sprocket gearing, to be described, so that the two rotate at equal angular velocities. The roll 21 however, is of smaller diameter, and hence of shorter circumference than the wheel 22, and this predetermined

ratio or difference between their circumferences represents the percentage of stretch imparted to the middle of the fabric strip. The wheel 22 is mounted on a shaft 23, carried by a pair of arms 24, which are loosely hung on frame bosses surrounding the shaft 20. Wheel 22 is yieldingly held against the core by a spring 25, having a follower 26 connected with a fork 27 on a rock-shaft 28, which is attached to a hand-lever 29 having an auxiliary lever 30 and a locking-pawl 31 working over a toothed segment 32, whereby the pressure of the measuring wheel on the core may be adjusted or entirely relieved. The spring pressure is transmitted through a nut and hand wheel 33 mounted on a screw stem 34, whereby further adjustment of the spring pressure may be effected, and said stem connects with the shaft 23 through a fork 35.

36, 37 are sprockets of equal pitch-diameter fastened to the shafts of the tension roll and measuring wheel, and 38 is a chain which passes over these sprockets and also over two idle sprockets 39, which are journaled on the arms of an inverted T-shaped, double-plate rock-frame 40, whereby the chain is spread into a diamond-shaped figure. The frame 40 is loosely hung on shaft 20 of the tension roll 21, and serves to control the pressure of a band-brake 41 applied to a brake-drum 42 on said shaft. One end of said brake is anchored on a pin 43 projecting from a bracket 44, which is mounted on one of the arms 24, and the other end of said brake is connected by a link 45 with the short arm of a bell-crank lever 46, pivoted on another pin 47 on said bracket. The long arm of the bell-crank lever is connected by a link 48 with a pin 49 on the rock-frame 40, and the arrangement is such that when said rock-frame swings to the right or toward the tire-core as viewed in Fig. 1, the brake pressure is decreased, while the contrary motion increases said pressure.

The tread-ring 50 of measuring-wheel 22 is composed of a suitable frictional material, such as compressed wood pulp, and to further increase its gripping power. I prefer to provide it with a number of radial pointed pins 51, which normally project beyond the tread of the wheel, but are backed by a soft-rubber ring 52 so that said pins may yield when they come in contact with the iron core 12.

In the operation of this device, the fabric strip 16, having been led from the roll 14, over the tension rolls 17 and 21, and applied to the surface of tire-core 12, said core is rotated by its driving mechanism and serves to propel the measuring-wheel 22 through frictional contact. The fabric feeds onto the core only as fast as the tension-roll 21 will let it, and since said roll is of smaller diameter than the wheel 22 and rotates turn for turn therewith, the fabric is correspondingly stretched over the middle or larger diameter of the core. The resistance to rotation of the roll 21, instead of being entirely furnished by friction at the point A between the core or the wrapped fabric thereon and the measuring-wheel, is furnished in large part by the brake 41, for it is evident that the pull exerted by the roll 21 on the wheel 22 through the right-hand side of the chain 38, as viewed in Fig. 1, will produce a continuous leftward pressure in the frame 40, causing the brake to contract upon its drum. The component of this resistance, furnished by the wheel 22 at the point A, is relatively small and insufficient to produce any slippage at that point. This component is automatically maintained substantially constant, for if the drag at point A (or in other words, the torque-resistance of the measuring-wheel) should tend to increase, this would produce an increase of tension on the right-hand side and a decrease on the left-hand side of the chain 38 and cause the brake component of the total resistance to increase. If on the other hand, the resistance at A should tend to decrease relatively to the brake pressure, this would cause a slackening of the right-hand side and a tightening of the left-hand side of the chain, and the brake pressure would thereupon be relieved until the resistance at A resumes its normal amount. In practice the movements of the frame 40 are of small amplitude, and the resistance at A is effectively and delicately controlled so that an original length of fabric, when stretched according to the ratio of diameters of the roll 21 and wheel 22, will exactly correspond to a desired number of turns or wrappings of the fabric on the core.

I claim:

1. In a fabric-tension device, the combination of a rotary fabric-pulling core, a retarding roll adapted to engage the fabric, a driving connection between said core and roll for causing the fabric to stretch by a predetermined amount in passing onto the core, and a brake for the roll whose pressure is controlled by said connection.

2. The combination, with the fabric-pulling core of a tire-making machine, of a roll adapted to exert a drag upon the strip of fabric fed to said core, a brake for said roll, and a measuring wheel frictionally driven by the periphery of said core and the outer layer of fabric thereon, and governing the pressure of said brake.

3. In a tire-making machine, the combination of a rotary core, a fabric-tension roll having a brake, a measuring wheel adapted to be frictionally driven from the periphery of said core, and having a peripheral speed greater, in a predetermined ratio, than that of the tension roll, and means responsive to

variations in the torque-resistance of said measuring wheel for controlling the brake pressure.

4. In a tire-making machine, the combination of a rotary core, a core-driven measuring wheel, a fabric-tension roll having a peripheral speed less than that of said measuring wheel, a brake for said roll, sprockets and a chain connecting said wheel and roll, and means controlled by differences in tension between the two sides of the chain for controlling the brake pressure.

5. In a tire-making machine, the combination of a rotary core, a core-driven measuring wheel, a fabric-tension roll having a brake, a driving connection between said wheel and roll including a chain, and a chain-spreader sensitive to differences of tension between the two sides of the chain and controlling said brake.

6. In a tire-making machine, the combination of a rotary core, a core-driven measuring wheel having a sprocket on its shaft, a fabric-tension roll of smaller diameter than said wheel having a brake-drum, and a sprocket on its shaft of the same diameter as the first-said sprocket, a brake for said drum, a chain connecting said sprockets, and a chain-spreader adapted to increase the brake pressure when the pull from the tension roll to the measuring wheel increases and vice versa.

7. In a tire-making machine, the combination of a rotary core, a fabric-tension roll having a sprocket and a brake-drum, a brake for said drum, a core-driven measuring wheel having a sprocket, a chain passing around said sprockets, and a chain-spreading rock-frame mounted to turn about the axis of said tension roll and connected with the brake, said frame having idle sprockets engaged with the chain.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses, this 21 day of August, 1913.

JOHN R. GAMMETER.

Witnesses:
WALTER K. MEANS,
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