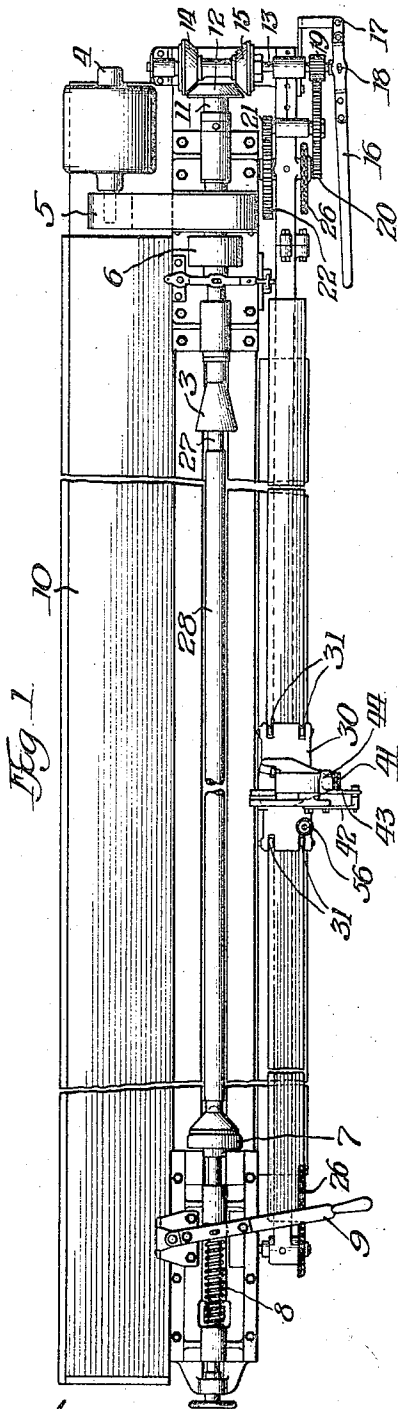


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TUBE WRAPPING MACHINE.
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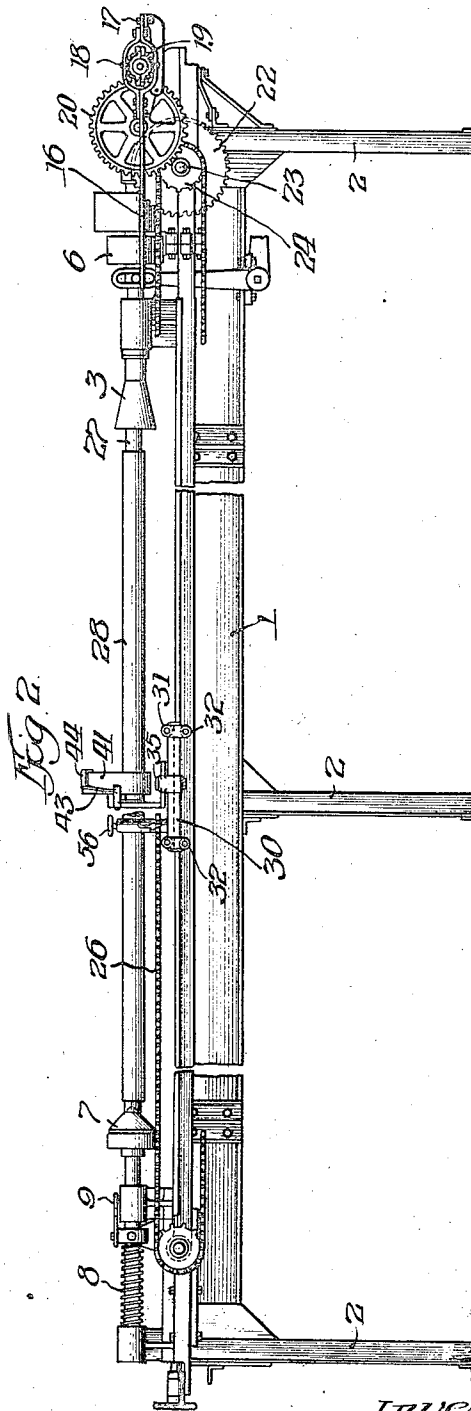
1,435,091.

Patented Nov. 7, 1922.

3 SHEETS—SHEET 1.



Witness
J. E. Harrison



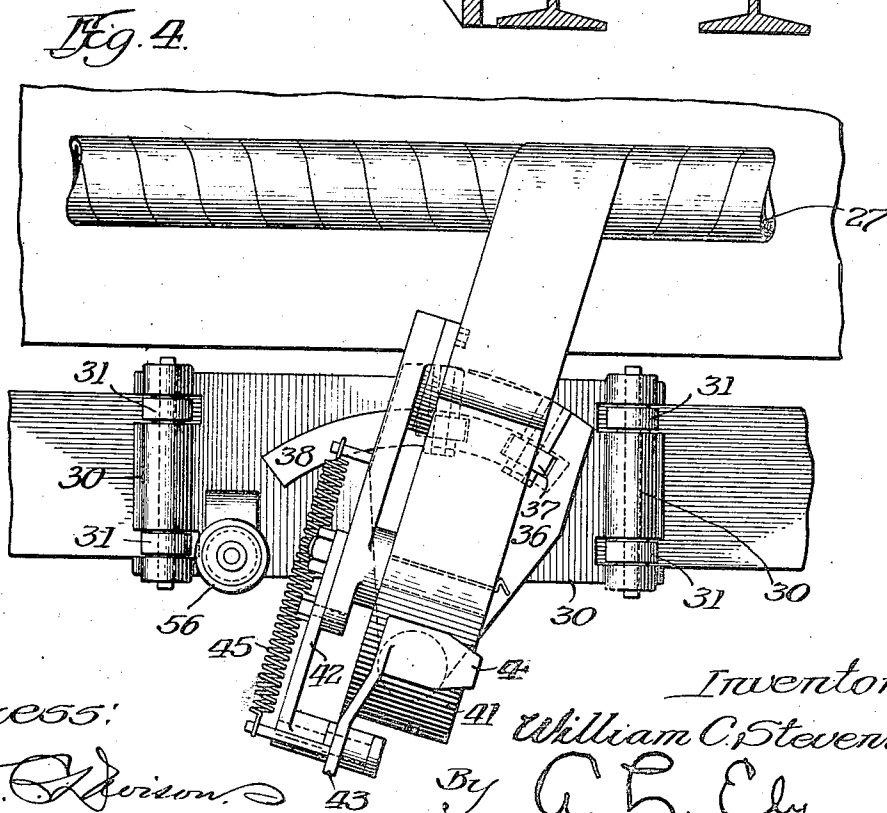
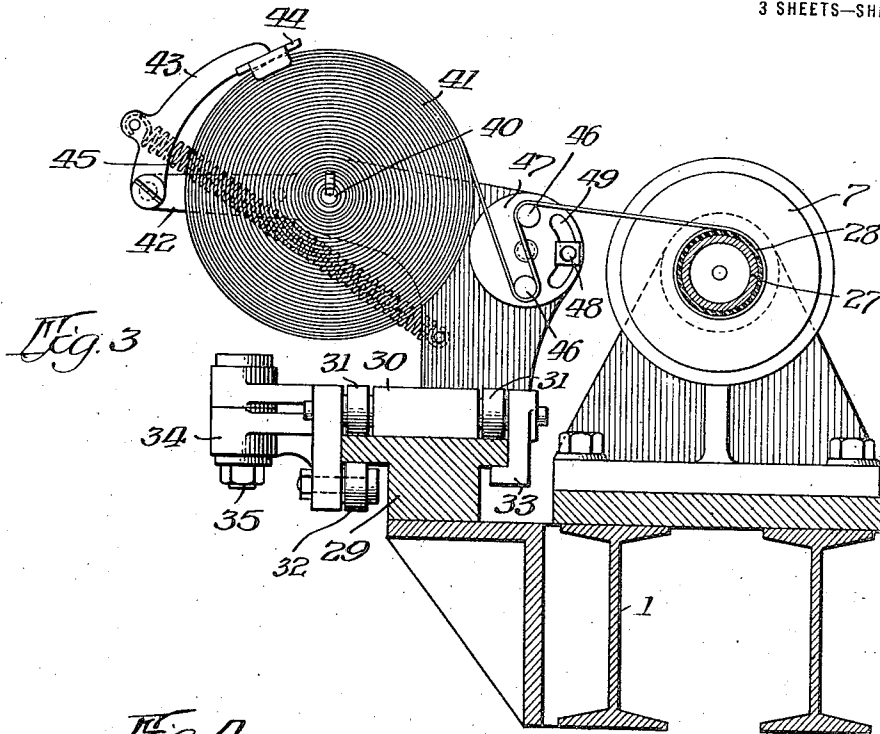
Inventor
William C. Stevens.
By A. L. Ely Atty.

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3 SHEETS—SHEET 2.



Witness:

Geo. A. Wilson

Inventor

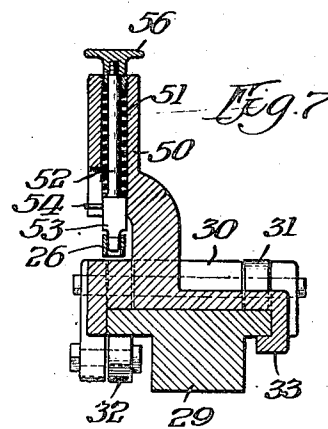
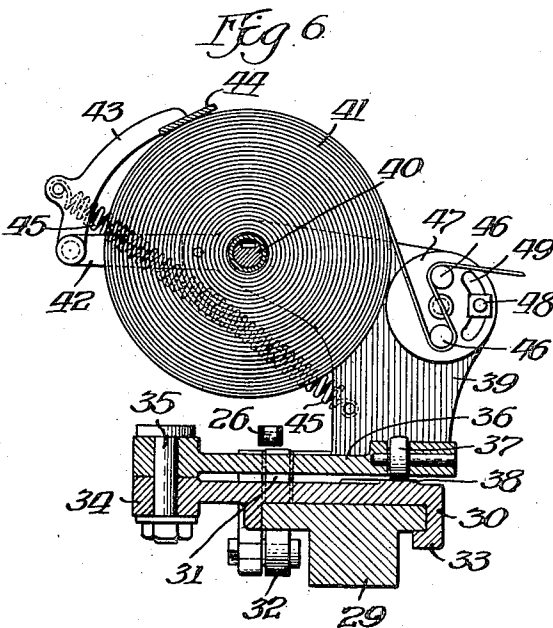
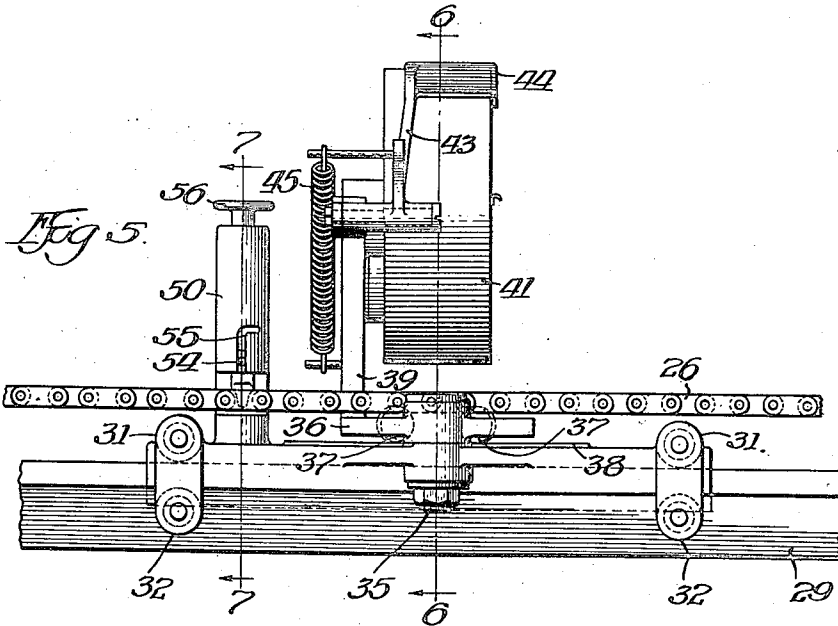
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Witness:
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Inventor
William C. Stevens
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UNITED STATES PATENT OFFICE.

WILLIAM C. STEVENS, OF SUMMIT COUNTY, OHIO, ASSIGNOR TO THE FIRESTONE TIRE & RUBBER COMPANY, OF AKRON, OHIO, A CORPORATION OF OHIO.

TUBE-WRAPPING MACHINE.

Application filed December 3, 1917. Serial No. 205,095.

To all whom it may concern:

Be it known that I, WILLIAM C. STEVENS, a citizen of the United States, residing in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Tube-Wrapping Machines, of which the following is a specification.

This invention relates to the art of vulcanizing rubber, and particularly to that branch of the art relating to the manufacture of rubber tubing, and more especially to the process of vulcanizing inner tubes for tire casings, although the invention is not limited to this single use but is adaptable to analogous purposes. It is the universal practice to form these tubes of raw unvulcanized rubber on a straight iron core or mandrel, on which the tube is tightly wrapped with wet cloths and then placed in the vulcanizing chamber. As far as is known to me the wrapping heretofore has been done by operators who hold a spool of narrow cloth on a stick and then while the mandrel is rapidly rotated, walk up and down along it allowing the cloth to pass from the spool around the tube. The proper tension is obtained by holding the tape against a curved board or plate known as a "tension board" parallel with the mandrel. In practice it is necessary to place a longitudinal wrapper or cover over the tube before the spiral outside wrapping is applied in order to be certain that every portion of the tube is covered as the men are apt to slight their work and this precaution is necessary in order that all of the tube may be properly covered.

My invention insures the application of the wrapping firmly and with equal tension throughout. No missed places are liable to occur as the wrapping is fed evenly over the tube, and it is possible to dispense with the longitudinal wrapper, thereby eliminating the labor and expense incident to its application, and insuring a better tube in all respects. Taken in connection with the fact that the work is done more rapidly than by the old hand method and with less labor, it will be seen that my invention constitutes an improvement over the prior art.

Other objects will appear as the descrip-

tion proceeds, as will be apparent to those skilled in the art.

Fig. 1 is a top plan view of a mandrel holder of any approved type with my invention applied in combination therewith.

Fig. 2 is a front elevation.

Fig. 3 is an enlarged transverse section through the carriage showing a tube on the mandrel in the process of wrapping.

Fig. 4 is a top plan view of the parts shown in Fig. 3.

Fig. 5 is a front elevation of these parts.

Fig. 6 is a section on the line 6—6 of Fig. 5, through the reel containing the wrapping material.

Fig. 7 is a section on the line 7—7 of Fig. 5 taken through the catch or dog which causes the traverse of the carriage.

Referring to the drawings, the mandrel holding and revolving table or stand is shown at 1 being supported on legs 2 at a convenient height for the operator. This table is of any well-known type, the essential features being a fixed mandrel chuck 3 at one end having means for rotating it, shown here as embodied in a motor 4, belt drive 5, and clutch 6, also an idler mandrel chuck 7 slidably mounted at the other end of the table and held against the mandrel by a spring 8. A pivoted lever 9 is jointed to the chuck 7 and operable to pull it back against the force of the spring when the mandrel is being placed in the stand. On the rear of the stand is a shelf 10 on which wrapped mandrels may be placed before being removed to the vulcanizer. The standard tension board is removed from the table which is in other respects described like the usual tube wrapping stand.

The shaft 11 of the fixed chuck 3 is extended toward the right of the operator who stands facing the table at a point opposite the chuck. A bevel pulley 12 is carried on the end of the shaft 11. Mounted on the stand at the end of the shaft is a drive-shaft 13 having oppositely faced bevel pulleys 14 and 15. The shaft 13 may be moved longitudinally in its bearings to bring either pulley 14 or 15 in driving relation with the pulley 12 by means of a lever 16 pivoted on the machine as at 17 and connected by a swivel 18 to the shaft. By this mechanism

the shaft 13 may be revolved in either direction at the will of the operator. A long pinion 19 is carried on the shaft and meshes with a gear 20 the shaft of which carries a second pinion 21 in mesh with a gear 22 the shaft 23 of which carries a sprocket wheel 24.

At the end of the stand opposite the parts just described is rotatably mounted a second sprocket wheel 25 and over the wheels 24 and 25 is trained a sprocket chain 26 which traverses the entire length of the table and causes the wrapper carriage to move back and forth parallel with the mandrel, which is indicated by the numeral 27, the tube being indicated by the numeral 28.

Secured to the front of the stand is a rail or guideway 29 which serves as a support for the traveling carriage. In the machine as shown this part is in the form of a T-shaped trackway on the upper surface of which is mounted a movable carriage indicated by the numeral 30, the same being supported on four rollers 31. A pair of rollers 32 on the underside of the rail and a depending and inturned flange 33 prevent the carriage from leaving the rail 29.

The front of the carriage is formed with a projecting bearing formation 34 in which is carried a pivot pin 35 on which is rotatably mounted a freely swinging sector-shaped plate 36, the moving end being supported by a pair of rollers 37 bearing on an arc-shaped rail 38 formed in the upper surface of the carriage 30. At one side of the swinging plate is formed a wrapping support and tension carrier in the form of an upright 39 in one corner of which is rotatably mounted a pin 40 designed to carry a spool of wrapping cloth 41. To an extension 42 of the upright is pivoted a lever 43 having a brake plate 44 at its outer end. A spring 45 is secured to the lever and to the upright and holds the brake against the spool of wrapping, thus exerting the proper tension and preventing the spool from overrunning. From the spool the wrapping passes through a further tensioning device consisting of two pins 46 carried by a plate 47 rotatably mounted on the upright and arranged to be held in any position of adjustment by a set-screw 48 in an arc-shaped slot 49.

Formed on the carriage 30 at one side of the upright is a vertical post 50, the upper side of which overhangs the sprocket chain 26 and is formed with a vertical bore 51 in which is slidably mounted a pin 52, the lower end of which is formed with a finger 53 which will engage in the chain for the purpose of driving the carriage over the rail in either direction. A pin 54 is secured to the finger and moves in a bayonet slot 55 formed in the barrel. A handle 56

is carried on the upper end of the pin by which the pin may be pulled up out of engagement with the chain and locked in that position while the carriage is moved as desired.

The machine being ready to wrap a tube the clutch 6 is disengaged and the chuck 7 withdrawn. The mandrel with the uncured tube is inserted between the chucks and the clutch engaged. The carriage 30 is moved to the right hand end of the track 29 and the leading end of the fabric attached to the mandrel which is revolving. A few turns of the wrapper are taken and then the lever 16 thrown in the direction required to feed the carriage along the rail toward the left, the motion being transmitted by the pin 53. When the carriage has traveled to the far end of the mandrel the lever 16 is reversed and the carriage starts on its return journey, the second winding piling up on the first. This action is kept up until the tube has been sufficiently wrapped for vulcanization. The fabric is usually wound up in strips of a length sufficient to wind one tube. The pin 53 is now withdrawn and the carriage brought back to its starting point, which may be done at any time in its position on the machine. By making the wrapping support freely movable about the pivot 35 it will automatically assume the desired angle to give it the required lead which is necessary to make a smooth even wrapping. In constructions in which such provision is not made the wrapping will be tighter on one side than on the other, but in this construction the pull on the cloth is the same throughout its entire width.

The wrapped tube and mandrel may be removed and others substituted in its place, and new spools may be added to the machine as required.

Changes and modifications may be made as required without altering the nature of the invention or sacrificing any of its benefits. This invention is not limited to the wrapping of straight mandrels, but its principles may be embodied in a machine for wrapping curved ones if desired.

I claim:

1. In a wrapping machine including a removable mandrel for supporting and rotating a tubular article, a reversible friction drive for rotating the mandrel, a trackway disposed in parallelism with the mandrel, a movable carriage upon the trackway, means upon the carriage engaging the trackway to prevent tilting of said carriage, an endless chain connected to the reversible drive for moving the carriage along the trackway, a support pivoted to the carriage in offset relation to the trackway, and a fabric reel upon the support having its axis of rotation disposed intermediate the pivot and the mandrel.

2. In a wrapping machine including a removable mandrel for supporting and rotating a tubular article, a reversible friction drive for rotating the mandrel, a trackway disposed in parallelism with the mandrel, a movable carriage upon the trackway, means upon the carriage engaging the trackway to prevent tilting of the carriage, an endless chain connected to the reversible drive for moving the carriage along the trackway, a support pivoted to the carriage in offset relation to the trackway, a fabric reel upon the support having its axis of rotation disposed intermediate the pivot and the mandrel, and a rotatably adjustable tension device for the fabric from the reel mounted upon the support.

3. In a wrapping machine including a removable mandrel for supporting and rotating a tubular article, a reversible friction drive for rotating the mandrel, a trackway disposed in parallelism with the mandrel, a movable carriage upon the trackway, means upon the carriage engaging the trackway to prevent tilting of the carriage, an endless chain connected to the drive for moving the carriage along the trackway, a device upon the carriage operable to clutch the chain, a support pivoted to the carriage in offset relation to the trackway, and a fabric reel upon the support having its axis of rotation disposed intermediate the pivot and the mandrel.

WILLIAM C. STEVENS.