

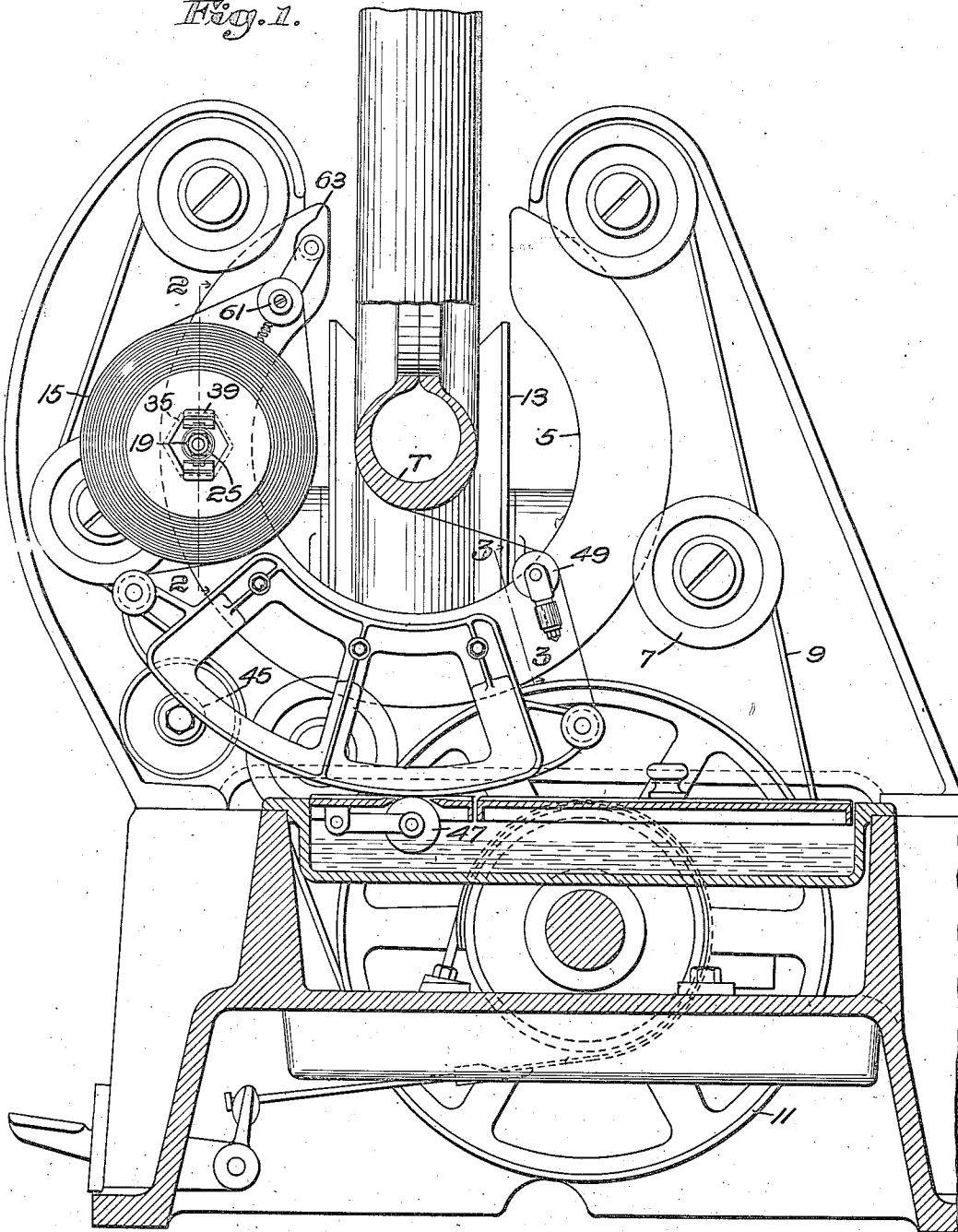
W. M. WHEILDON.
WRAPPING MACHINE.
APPLICATION FILED APR. 1, 1919.

1,409,504.

Patented Mar. 14, 1922.

2 SHEETS—SHEET 1.

Fig. 1.



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Fig. 2.

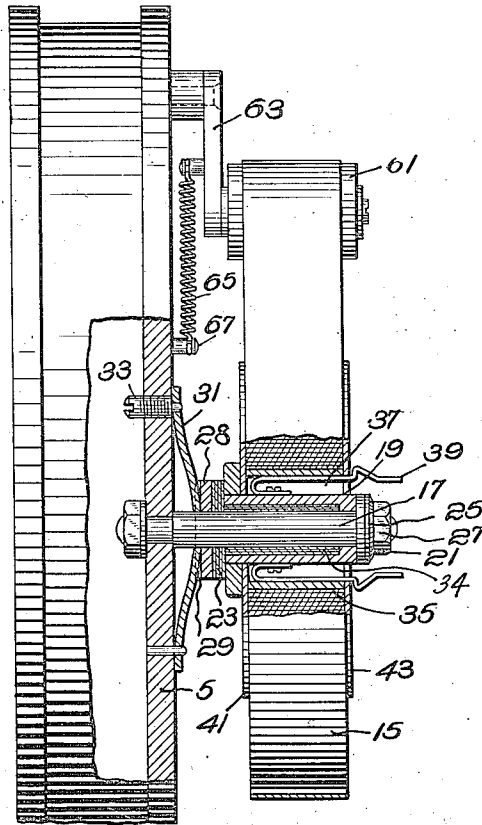
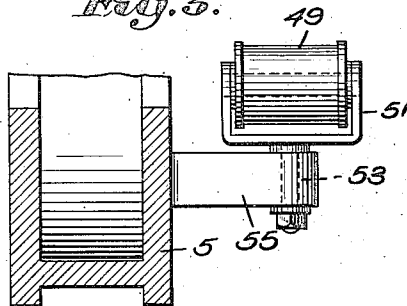


Fig. 3.



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WRAPPING MACHINE.

1,409,504.

Specification of Letters Patent. Patented Mar. 14, 1922.

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To all whom it may concern:

Be it known that I, WILLIAM M. WHEILDON, a citizen of the United States, and a resident of Ashland, county of Middlesex, State of Massachusetts, have invented an Improvement in Wrapping Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to wrapping machines of the type wherein a strip is wound by the motion of a suitable shuttle round the article wrapped. Machines of this general type are in common use for wrapping pneumatic vehicle tires, and for convenience I shall refer specifically to a tire wrapping machine, using the word in an exemplary sense. The purpose of the invention is to provide various improvements in the construction of such a machine which will render it more efficient in action.

My invention will best be understood by reference to the following description of an illustrative embodiment of my invention as shown in the accompanying drawings wherein:

Figure 1 is a view, partly in end elevation and partly in section, showing as much of a wrapping machine as is necessary to an understanding of my invention; and

Figs. 2 and 3 are sections on the lines 2—2 and 3—3, respectively, of Fig. 1 and are on an enlarged scale.

Referring to Fig. 1 of the drawings, the machine shown is of a type not novel to this application and embodies in its construction a partially annular shuttle 5 which may be supported on rollers 7 and rotated in any desired manner, as by means of the driving belt 9, engaging the shuttle throughout an extended arc, and the driving wheel 11. The article to be wrapped, herein a tire, is supported on rolls 13, one of which is shown in the drawing, which may be revolved in any desired manner. The shuttle, on which is mounted a suitable supply of wrapping strip, rotates about the article to be wrapped, in this instance through the central opening of the tire, and thus carries the strip around the cross section thereof while the revolution of the tire provides for the application of the strip as a helical wrapping.

The wrapping material may be carried on

the shuttle in the form of a roll 15. Herein I show a post or spindle 17 (see Fig. 2), mounted on the face of the shuttle, on which is journaled a sleeve 19 adapted to turn on the spindle 17 between the friction washers 21 and 23, conveniently of oil-impregnated wood, the former being clamped against the right hand end of the sleeve by washer 25 held by nut 27, and the latter by washer 28 which is provided with a recess 29 in which the flat spring 31 fits, the spring 31 being interposed between the washer 28 and the face of the shuttle 5. An adjusting screw 33 acting on one end of the spring permits a regulated friction to be applied to the end of the sleeve 19 to control its revolution about the spindle 17. The interior bearing surface of the sleeve 19 on spindle 17 is also preferably of oil-impregnated wood, this being provided for herein by the use of a bushing 34 of such material.

On the spindle 17 is mounted the core or spool 35 on which is carried the roll of strip 15. The core 35 is interlocked with the sleeve 19 and prevented from rotating thereon, and for this purpose the exterior surface of the sleeve 19 and the inner bore of the core may be made of corresponding form, non-circular in cross-section. As indicated in Fig. 1, the exterior of the spindle and the interior of the core may be formed with one or more flattened sides and herein they are shown substantially hexagonal.

The wrapping strip 15 is also mounted on the exterior of the core or spool 35 in such a way that it can not rotate relatively thereto, and for this purpose the exterior of the core may also be made non-circular and conveniently of the same form as the interior bore, as indicated by the dotted line in Fig. 1.

To secure the spool 35 on the sleeve 19, the latter may have grooves 37 milled therein in which are mounted spring latches 39 having shoulders adapted to latch over the exterior face of the spool. These latches may be provided with extended ends, as shown, to permit them to be pressed toward one another.

To place the roll on the shuttle, it is only necessary to squeeze together the latches 39 and thrust the spool over the sleeve 19, which it fits, and permit the latches to spring out to the position shown in Fig. 2. A plate 41 at the back of the sleeve may provide support for the roll on that side and a similar

plate 43 may be sprung over the latches together with the spool on the other side.

By the construction just described, the only rotation which is permitted when the wrapping strip is drawn from the roll 15 is that between the spindle 17 and the sleeve 19, as neither the sleeve and spool nor the spool and the strip which is wound thereon can rotate one relatively to the other, but all must move as a unit. The rotational movement of the parts is thus concentrated on the bearing provided between the bushing 34 and the spindle. The use of such a bearing of oil-impregnated wood on metal has been found most advantageous since it permits the machine to be run at high speed without undue heating and is cleanly. It will be understood that the ordinary oiled bearing could not advantageously be used in a machine of this type since it would tend to spatter oil which would injure the work. Furthermore, the bearing would soon become dry. The use of oil-impregnated wood provides an easy running and durable bearing. The entire control of the rotation of the roll of strip is concentrated at the spindle. Heretofore it has been customary to apply a braking force to the strip itself, but beside certain other disadvantages the construction was mechanically complicated and rendered it comparatively difficult to place the rolls in position. In the present instance the rolls are simply pushed on over the sleeve 19 and then all parts move as a unit about the spindle 17 without the necessity of any adjustment.

The use of washers 21 and 23 of a dense anti-heating material like oil-impregnated wood between the bearing surfaces on the ends of the hub and the bearing surfaces provided by the washers 21 and 23 gives a double braking surface. In practice, for example, the rotation may take place between the inner washer 23 and the washer 28 until the bearing becomes heated. It will then stick and rotation will then take place between the washer 21 and the washer 25 and so on in alternation.

The wrapping strip leads from the main supply thereof provided by the roll 15, preferably in the manner hereinafter to be described, to the article wrapped, such as the tire T. In the present drawing I have shown it passing over an arc-shaped supporting surface 45, mounted on the shuttle, which positions the strip so that it wipes over a moistening roller 47 which may be utilized to supply suitable adhesive to the strip to provide a sealed package. This construction, however, forms no part of the invention which is the subject of the present application. The strip leaves the shuttle, to be applied to the tire, over a suitable guide which herein takes the form of a roller 49. Since the tire T is irregular in form and the

path of the roller is a true circle, the distance between this roller and the point of application of the strip to the tire varies greatly during each revolution, and in particular the angle between the plane of the guide roller and the pitch of the helix undergoes considerable change. To compensate for this, I mount the guide roller so that the axis thereof may swing angularly in a plane transverse to the plane of the shuttle and adapt itself to this variation. In the present instance this angular swinging is in the general direction of travel of the paper strip which passes over it.

To effect adjustment of the roll 49, as referred to, it may, as best shown in Fig. 3, be journaled in the arms 51 of a fork having a depending stem 53 which is swivelled substantially parallel to the face of the shuttle 5 in a post 55 projecting therefrom. It will be clearly understood from Fig. 3 that as the stem 53 turns in the post 55, the angular position of the axis of the roll 49 may vary.

As has been pointed out, in the rotation of the shuttle around the tire the distance between the guide roll 49 and the point of application of the strip to the tire varies markedly. Since the strip is drawn from the roll by the wrapping action of the same about the tire, the speed at which it travels varies. By way of illustration I may state that I have found that in wrapping a 33" by 4" tire on such a machine as is illustrated, the average linear speed on each quarter of a revolution varied from $3\frac{1}{2}$ " to 3" to $3\frac{1}{4}$ " to $2\frac{3}{4}$ " and again to $3\frac{1}{8}$ ". It will be clear that if the shuttle is run at a fair rate of speed, say 300 revolutions per minute, the tension on the paper is constantly varying, and furthermore, the paper itself tends to lose tension through the action of centrifugal force thereon. I have found it impracticable to attempt to control the paper by friction or spring tension, as the paper is most likely either to snap at high rates of speed or to become so loose that the wrapping is not smoothly applied.

I have herein shown a tensioning element in the form of a roll 61 adapted to engage the inner side of the strip on its course from the roll 15 to the guide roller 49, which roller 61 during the operation of the machine is under the control of centrifugal force and which has been found admirably to adapt itself to keeping proper tension upon the wrapping strip. Referring to Fig. 2, the roller 61 is herein shown mounted on the end of an arm 63 pivoted on the face of the shuttle 5 and free to swing thereon. In the drawing I have illustrated a spring 65 extending substantially lengthwise of the arm 63 and secured to it and to a post 67 on the shuttle. This spring, however, may be a light one and its function is merely to

position the arm when no wrapping strip is on the shuttle or when the shuttle is stationary, so that it will be more conveniently reached when it is desired to put on the strip. The spring 65 offers no substantial resistance to the free movement of the arm 63 and its roller 61 and it may therefore be said that the roller 51 is normally untensioned and that it is positioned by the strip without substantial tension thereon when the shuttle is at rest.

While the tension roller 61 may be utilized in various positions, I prefer to place it as shown in Fig. 1 in such manner that the strip may be drawn about it to form a loop which returns against the side of the roll 15 and engages the same throughout an extended arc, the whole presenting an appearance similar to a belt trained about a large and a small pulley, the roll 15 corresponding to the large pulley and the roller 61 to the small. The strip 15 may be then led to the guide roller 49 and to the tire at the opposite side of the roll 15 from that occupied by the roller 61. This arrangement of strip provides for an automatic control of the roll of strip 13, since if under the action of centrifugal force the outer turns of the roll tend to belly or the roll to turn at a greater speed than is required by the draft thereon, the run of the strip which forms one side of the loop referred to will act on the roll in the manner of a band brake. Furthermore, if the roll tends to move too slowly, the strip will act upon the same somewhat in the manner of a driving belt, so that the roll has a rotating force applied to it at the right hand side in Fig. 1, as well as to the left hand side by the draft of the paper.

As the shuttle rotates the roller 61 is normally positioned by the strip, as shown in Fig. 1, but tends to swing outwardly under the action of centrifugal force. As the tension on the strip varies and as it tends to slacken or suddenly tighten under the varying demands of draft thereon, the rollers 61 swings outwardly or inwardly, as the case may be, and while the operation of the machine continues it keeps the strip tensioned so that it is drawn smoothly and tightly about the article to be wrapped and at the same time is not subjected to a breaking strain which might snap the same.

I have described in detail the illustrative embodiment of my invention shown by way of example in the accompanying drawings. The principles illustrated thereby which I claim as new and desire to secure by Letters Patent, I shall express in the following claims:—

1. In a machine of the class described and applicable to the wrapping of articles of irregular section, in combination with a rotating shuttle, a strip supply and tension-maintaining means comprising an element moving, during the rotation of the shuttle, through a path of constantly changing direction, said element being arranged to engage the inner side of the strip between the supply thereof and its point of application to the article wrapped and adapted normally to be positioned by the strip without substantial tension, said element being mounted to permit free movement thereof controlled conjointly by centrifugal force and the tension of the strip during continued operation of the machine.
2. In a machine of the class described and applicable to the wrapping of articles of irregular section, in combination with a rotary shuttle, a support for a roll of wrapping material, a guide over which the material is led to the article wrapped, and tension-maintaining means comprising a normally untensioned member, moving, during the rotation of the shuttle, through a path of constantly changing direction, said element being arranged to engage and be positioned by the material on its course from the roll on the support to the guide, said member being mounted to permit free movement thereof controlled conjointly by centrifugal force and the tension of the strip during continued operation of the machine.
3. In a machine of the class described, in combination with a rotary shuttle, a support for a roll of wrapping material, a guide over which the material is led to the article wrapped, and an arm freely swingable in the plane of the shuttle during operation of the machine having a terminal portion for engaging the material on its course from the roll on the support to the guide and carried, during the rotation of the shuttle, through a path of constantly changing direction.
4. In a machine of the class described, in combination, a revolvable shuttle, a roll of strip material rotatably mounted on the shuttle, a swinging arm having a roll thereon, and a guide over which the strip is led from the shuttle to the article wrapped, said parts being so located relatively as to provide a loop around the roll on the arm, a run of which extends back in contact with the side of the roll of strip.
5. In a machine of the class described, in combination with a rotary shuttle, a spindle projecting therefrom, a sleeve rotatable on the spindle having an exterior surface formed for interlocking engagement with a core, end bearings for the sleeve and adjustable braking means interposed between the shuttle and one of said bearings to exert an endwise braking pressure on the latter.
6. In a machine of the class described, in combination with a rotary shuttle, a spindle projecting therefrom, a sleeve rotatable on the spindle having an exterior surface formed for interlocking engagement with a

core, end bearings for the sleeve and a spring interposed between one of said bearings and the shuttle.

7. In a machine of the class described a spindle, a roll-carrying hub rotatably mounted thereon having provision for holding the roll to rotate therewith and having end bearing surfaces, rotary members of smooth

dense anti-heating material engaging said surfaces, washers engaging said members 10 and means to apply a braking pressure to one such washer.

In testimony whereof, I have signed my name to this specification.

WILLIAM M. WHEILDON.