Feb. 13, 1923. 1,445,022.

W. D. KIMBALL.

TENSION DEVICE FOR STRIP SERVING MACHINES.

FILED JULY 15, 1920.

Fig. 1

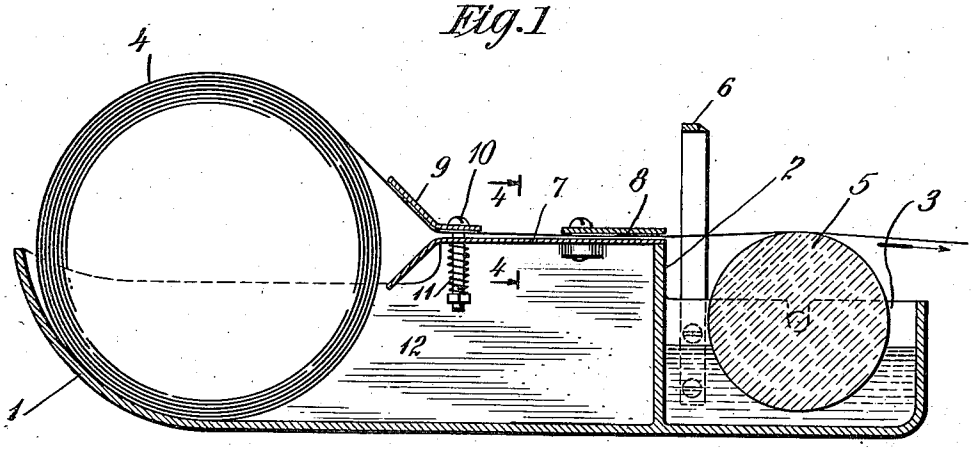


Fig. 2

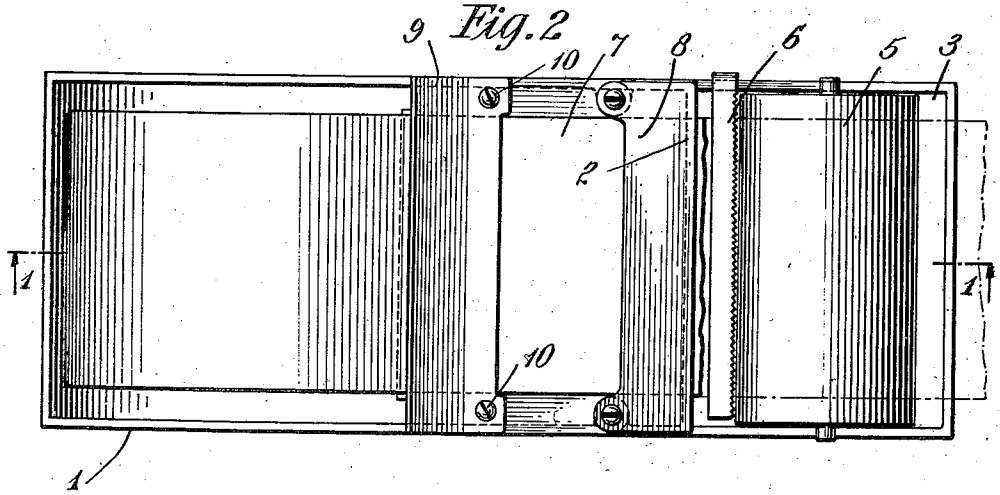


Fig. 3

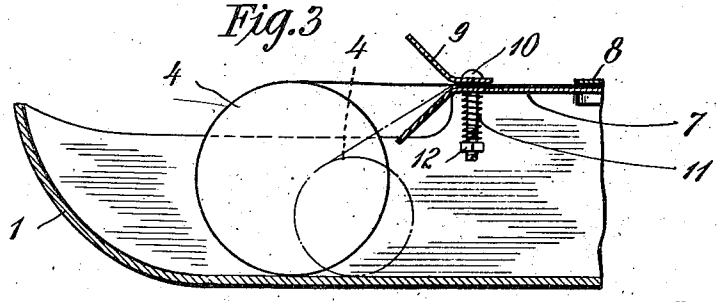
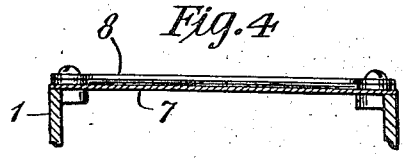


Fig. 4



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By his Attorney

W. Brown Morton

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UNITED STATES PATENT OFFICE.

WALLACE D. KIMBALL, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO NASHUA GUMMED & COATED PAPER COMPANY, OF NASHUA, NEW HAMPSHIRE.

TENSION DEVICE FOR STRIP-SERVING MACHINES.

Application filed July 15, 1920. Serial No. 396,363.

To all whom it may concern:

Be it known that I, WALLACE D. KIMBALL, a citizen of the United States, and a resident of the city, county, and State of New York, have invented new and useful Improvements in Tension Devices for Strip-Serving Machines, of which the following is a specification.

This invention relates to tension devices for paper webs, particularly for use in gummed tape-serving machines where the gummed tape is supplied in the form of a roll and drawn through the moistening apparatus and cut off in the desired lengths for use.

In such machines the weight of the roll is depended upon to provide the necessary resistance to the feeding movement of the tape for the pull on it to press the tape against the moistening roll with the necessary pressure to effect the absorption of the moisture by the gummed surface. When the rolls are of full size, or substantially so, the weight is sufficient to secure a proper moistening of the tape, but as the roll decreases in size its weight does not afford sufficient resistance to cause the necessary pressure between the gummed surface and the moistening roll to secure a satisfactory moistening of the gum.

In machines as generally built to-day some means are provided to put an additional pressure on the reel of tape to add to the resistance to the feed, but these devices are not altogether satisfactory for if the pressure is fixed and sufficient to cause a proper gumming and moistening of the tape when the roll is small, the additional pressure of the weight of the full roll will make the machine difficult of operation, while if adjustment of the device must be effected from time to time as the roll is completed, it will be neglected by the average operator until his attention is called to the need of adjustment by defective operation of the machine.

The object of the present invention is to provide a tension device for the paper which adds but little to the resistance of the paper feed when the roll is large, but becomes effective as the roll grows smaller, and hence without adjustment will at all times maintain the necessary tension of the web to insure its proper moistening.

In the accompanying drawings I have shown my improved tension device applied to a strip-serving machine of very simple design, but it will of course be obvious that it is equally applicable to strip-serving machines of all kinds and to web feeds generally where a more or less uniform tension on the web is desired.

In the said drawings,

Figure 1 is a vertical section on line 1—1 of Fig. 2 of a strip-serving machine provided with my improved tension device.

Fig. 2 is a plan view of the machine shown in Fig. 1;

Fig. 3 is a partial longitudinal section of a machine showing the effect of different size reels on the tension device; and

Fig. 4 is a transverse section on line 4—4 of Fig. 1.

Referring to the drawings, particularly to Fig. 1, 1 indicates the frame or body of the strip-serving machine which, as shown, comprises a trough-shaped receptacle hav- a partition 2 near one end to divide off the water-containing compartment 3 from the rear portion in which the roll 4 of gummed tape is placed.

A moistening roll 5 of unglazed porcelain, metal or other suitable material is freely supported in the water compartment 3 in bearing notches in the edges of the tank and to the rear of the moistening roll is a knife 6 consisting of a bar having a vertical part screwed or riveted to the side of the water tank and a horizontal part with a serrated edge extending across the machine and of sufficient height above the plane of the paper to leave a projecting end of the strip when the desired length is cut off by pulling the strip up against the knife.

The rear end of the paper compartment of the body is curved to form a support for the roll 4 which is wound with its gummed surface on the inside, the roll being placed in the machine so that the tape is drawn off the top of the roll in the manner shown.

Between the roll-holding part of the body and the water tank the machine is provided with a paper guiding top plate 7 across which the paper is guided in its path to the moistening roll by a fixed guide plate 8 overlying the plate 7 and spaced from it in the manner shown in Fig. 4 to allow the free passage of the paper. The mechanism as above described constitutes a simple form

of strip-serving apparatus now on the market. My improved tension device as applied to this type of apparatus comprises a plate 9 of sheet metal supported at its ends on the side walls of the paper compartment to the rear of the guide plate 8, and spaced from the end of the paper compartment a sufficient distance to receive a roll of full size between the plate 9 and the end of the compartment. The plate 9 overlies the rear end of the fixed guide plate 7 and is connected to it by bolts 10 passing through both plats adjacent their side edges and also near the front edge of the plate 9. Springs 11 are fitted on the bolts 10 between the under side of the plate 7 and the nuts 12 on the ends of the bolts whereby the plate 9 is held with a light yielding pressure against the plate 7. The rear edges of the plates 9 and 7 are bent upwardly and downwardly, respectively, in the manner shown, to allow the tape to enter freely between the plates at different angles from different size rolls, as apparent from the drawing.

The operation of my improved tension device will now be described. In Fig. 1 a roll of full size is shown in position in the machine. As the free end of the strip is drawn off from the upper side of the roll it is threaded across the plate 7 under the plates 9 and 8 and thence across the moistening roll 5. When the operator desires to use a piece of tape he draws upon the free end of the roll until the desired length is drawn off, the pull on the top being in a slight downward direction to press its moistening surface against the roll 5. Unless there is a certain amount of tension on the web the pull on the tape will not press its gummed surface against the moistening roller hard enough to insure the penetration of the moisture into the gum on its surface. When the roll is large, the weight of the roll and its friction on the bottom of the trough is sufficient. Hence it is desirable that the tension device apply little pressure to the paper when the fresh roll is put in the machine. The tension applied by my improved tension device is due chiefly to the friction of the gummed face of the tape against the plate 7 which, even though the springs 11 be light, is quite appreciable when the plate 9 is not lifted from the plate 7. When the roll is large, however, the paper comes off the roll at quite an angle to the plane of the paper across the plate 7, that is, the bent edge of the plate 9 lies in what may be termed a loop of the paper web so as to be raised by the first pull on the paper as resisted by the inertia of the roll to movement. As springs 11 are very light, a light pull when the angle of the paper leaving the roll to the plane of the guide plate is large will lift the plate 9 out of contact with the plate 7, allowing the paper to be drawn freely forward save for the light friction of the smooth face of the paper against the plate 9.

As the roll diminishes in size the angle of the length of paper leaving the roll to the plane of the plate 7 becomes less and less, so that its lifting effect for the same pull on the tape is lessened, thus compensating for the diminishing weight of the roll. When the roll is reduced to the size shown in Fig. 3 where its weight is insignificant, the paper will have no lifting effect on the plate 9, consequently the full force of the springs 11 will press the gummed face of the tape against the plate 7, applying sufficient tension to the web to insure its proper gumming, which friction will be maintained until the roll is completely exhausted.

My improved tension device adds little to the cost of the machine. In fact, it materially lessens the cost where substituted for any one of the various tension devices for adding pressure to the face of the tape reel. I have shown my tension device applied to the simplest form of tape-serving apparatus, but it will be understood that it may be applied with equal advantage to other forms of apparatus, for instance motor-operated machines and measuring machines and also to labeling machines, box-covering machines and various other types of machines where similar advantages are desired.

I claim:

1. In a strip serving machine, the combination of means for supporting the roll, and resilient means adjacent thereto for applying frictional resistance to the movement of the web during the serving of a strip, said means being so arranged with relation to the roll of material that the frictional resistance applied thereby is greater when the size of the roll is small.

2. In a tension device for paper webs, the combination of means for supporting the roll, and movable means adjacent thereto for applying frictional resistance to the movement of the web, said means being controlled by the angle of the paper leaving the web in such manner that the frictional resistance applied thereby is greater when the size of the roll is small.

3. In a tension device for paper webs, means for supporting a paper roll, a guide for the paper to direct the same radially away from the roll in a plane substantially in line with the center of the roll, and a tension member engaging said paper to press it against said guide, the said member being arranged to be lifted by the stretch of paper between the roll and the guide to lessen the resistance of the tension device when the roll is large.

4. In a tension device for strip-serving apparatus, the combination of a roll holder,

moistening means for the gummed paper strip, a guide extending from the roll to said moistening means, and having a surface against which the gummed surface of the paper strip is drawn, and a member for pressing the gummed surface of the strip against the guide surface, said member overlying the paper strip adjacent the roll whereby it will be lifted more or less to relieve the pressure on the paper by the length of paper leading from the roll to said guide.

5. In a strip serving machine the combination of means for freely supporting a roll of strip material and means adjacent thereto for applying frictional resistance to the movement of the strip during the serving thereof comprising a guiding plate having a surface across which one surface of the strip is drawn and a tension member engaging the opposite surface of said strip to press the strip against said plate, said member being adapted to be lifted by the run of the strip thereby to lessen the frictional resistance applied thereto when the roll is large.

6. In a strip serving machine the combination of means for freely supporting a roll of strip material and means adjacent thereto for applying frictional resistance to the movement of the strip during the serving thereof comprising a plurality of friction surfaces of different lengths past which the strip is drawn, and arranged to be brought successively into functioning relation therewith as the size of the roll diminishes whereby the frictional resistance to the movement of the strip is increased when the roll is small.

7. In a strip serving machine the combination of means for freely supporting a roll of strip material and means adjacent thereto for applying frictional resistance to the movement of the strip during the serving thereof comprising a plurality of friction surfaces of different lengths past which the strip is drawn, the shorter only of said surfaces having contact with the strip when the roll is large and both of said surfaces contacting the strip when the roll is relatively small thereby to increase the frictional resistance to the movement of the strip at such time.

Signed at New York, in the county of New York and State of New York, this 29th day of May, 1919.

WALLACE D. KIMBALL.