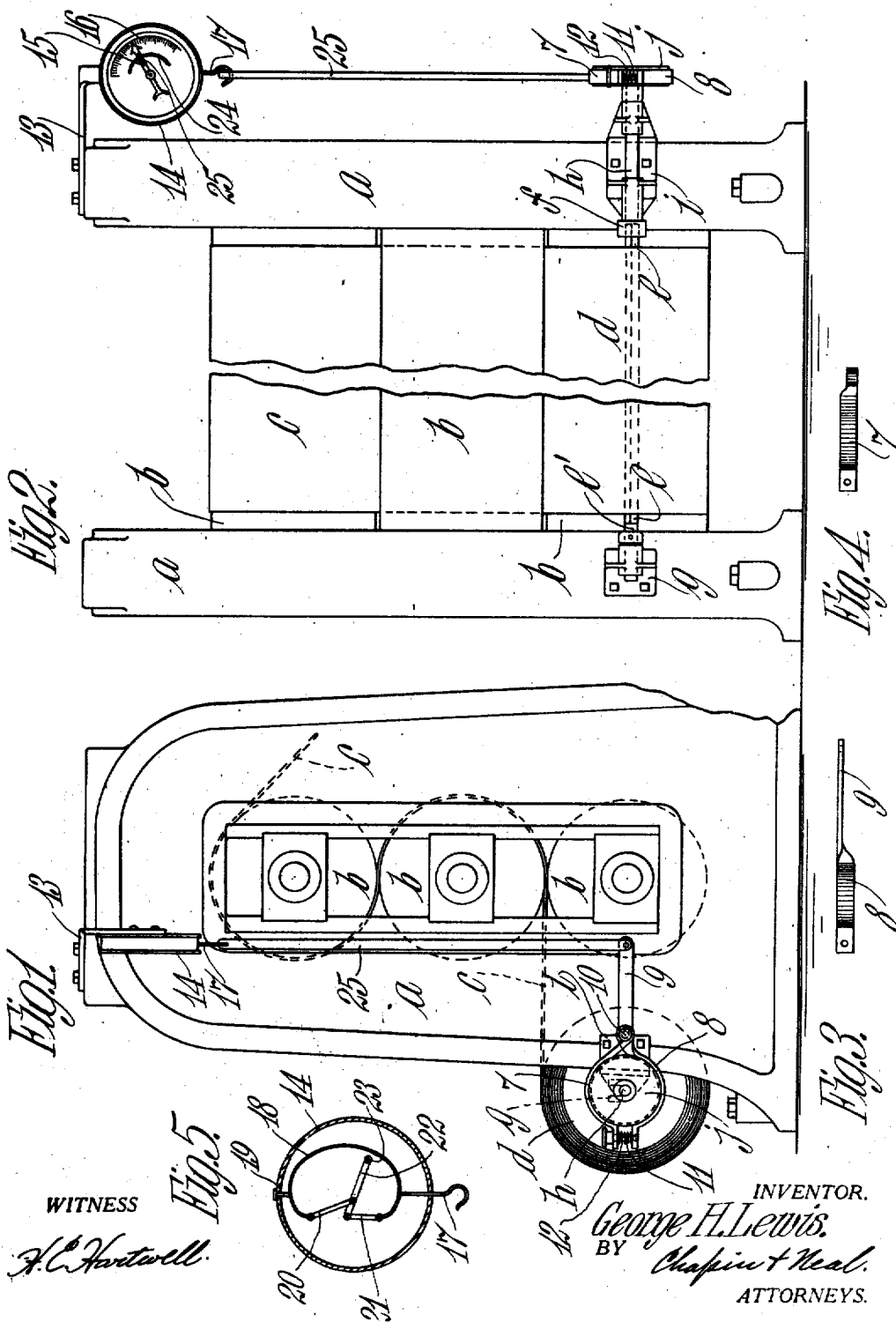


G. H. LEWIS.  
WEB TENSIONING DEVICE.  
APPLICATION FILED FEB. 27, 1917.

1,256,503.

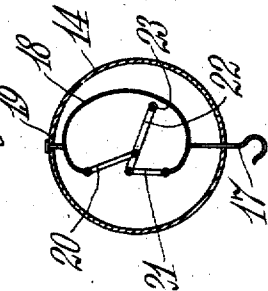
Patented Feb. 12, 1918.



WITNESS

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Fig. 5.



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## WEB-TENSIONING DEVICE.

1,256,503.

Specification of Letters Patent.

Patented Feb. 12, 1918.

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*To all whom it may concern:*

Be it known that I, GEORGE H. LEWIS, a citizen of the United States of America, residing at Chicopee Falls, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Web-Tensioning Devices, of which the following is a specification.

This invention relates to improvements in web tensioning devices for calenders.

Devices of this character are desirable when the web is unwound from a roll and drawn through the machine by the pull of the calender rolls themselves. It is usual to provide a braking mechanism to retard the rotation of the unwinding roll, but obviously, since the diameter of the latter continually diminishes, the tension of the web will increase unless the braking pressure be diminished. Various mechanisms have been provided heretofore to automatically vary the braking pressure to keep the tension of the web constant as it is unwound from the supply roll. Such mechanisms, however, are necessarily elaborate and expensive, and there are many instances in which the cost of installing and using these automatic devices is not justified. For example, such devices are generally not applicable to existing machines without an extensive reconstruction and, indeed, it may even be necessary to buy an entirely new machine to obtain the automatic mechanism for the latter is seldom sold as a separate article. Moreover, in the operation of calenders, there is always an operator whose function it is to supply rolls to the machine. These rolls are brought to this operator, and, after one has been inserted in the machine, he has nothing as a rule to do until a new roll is required. Therefore, it is usual to have the operator stand by to adjust the braking pressure on the unwinding roll. The variations in braking pressure by this method are left entirely to the judgment of the operator so that it is essential to have skilled operators in order to obtain satisfactory results. The difficulty arises, however, that experienced operators are seldom obtained for this class of work, and it is necessary to provide a tensioning device which may be satisfactorily operated by unskilled labor. This invention seeks to supply a simple means for indicating the tension to the operator, so that personal judgment on his part is not required,

and the braking pressure may be accurately varied to maintain the web under constant tension.

The object of the invention is to provide a device for indicating automatically the tension of a web as it passes through the calender, the device being characterized in that it involves a simple yet efficient arrangement of mechanical structure which may be readily applied as an attachment to any existing calender new or old.

The invention, in an embodiment at present preferred, is shown for illustrative purposes in the accompanying drawings, in which—

Figure 1 is a side elevational view of a calender showing the invention as applied thereto;

Fig. 2 is a rear elevational view of Fig. 1;

Figs. 3 and 4 are top plan views of the lower and upper braking members, respectively; and Fig 5 is a sectional elevation of the tension indicator.

Referring to these drawings, reference *a* indicates the frame of a calender and *b* the rolls thereof which are mounted in vertically stacked relation in the usual way and may be driven in any suitable manner. A web *c* of the material to be calendered is unwound from a roll *d* and passed through the rolls *b* in the manner shown in Fig. 1. Passing through roll *d* is a rod *e* which is square in cross sectional shape, and is adapted to turn with the roll. One end of roll *e* is adapted to fit in a square socket in a head *f* (Fig. 2) and at the other end is a cylindrical portion *e'* which rests in a U-shaped bracket *g* fixed to frame *a*. Head *f* is an integral part of a shaft *h* rotatably mounted in a bracket *i* fixed to frame *a*, as best shown in Fig. 2, and on the end of shaft *h* is fixed a flanged drum *j* upon which the braking pressure is applied to retard the rotation of roll *d*. The devices so far described are of the usual character and illustrate the customary way of removably mounting a stock roll in a calender.

The usual way to apply pressure to drum *f* is by a weighted brake band or the like, but, instead of employing the customary mechanism, other devices, now to be described, are used. Two brake straps 7 and 8 are arranged to engage the upper and lower peripheral portions of drum *j*. Strap 8, as shown in Figs. 1 and 3, has an extended portion

tion 9 which is formed by a quarter turn bend in the strap. Strap 7 is pivotally connected at 10 to the portion 9, and, as shown in Fig. 5, the looped end to receive pivot 10 is of less width than the remainder of the strap to permit the extended portion 9 of strap 8 to pass thereby. A hand screw 11, threaded into the flanged end of strap 8, passes loosely through the correspondingly flanged end of strap 7, and coiled around screw 11 is a spring 12 which tends to separate the flanged ends. By turning screw 11, the straps 7 and 8 may be forced against the periphery of drum *j* in an obvious manner.

Fixed to a hanger 13, extending outwardly and downwardly from the top of frame *a*, is an indicator 14 which may consist simply of a spring balance or scales. The indicator has a pointer 15 which is movable over a suitably graduated scale 16 when a force is applied to a hook 17. Any of the well-known mechanisms may be employed to actuate pointer 15 from hook 17. The mechanism shown in Fig. 5 may be employed, for example, and this mechanism will be described merely as an illustrative example of one operable means of accomplishing the desired function. A C-shaped spring 18 is suspended at 19 from the top of and within the indicator casing and hook 17, passing loosely through the latter, is attached to the lower end of the spring. Links 20 and 21 pivotally connected to the upper and lower ends, respectively, of spring 18 are pivotally connected at different points to an arm 22, and on the end of the latter is a pin 23 which is movable in a slot 24 (Fig. 2) in the face of indicator 14 and has its end resting in a slot 25 in the pointer 15. The mechanism just described is well known in the art as a spring balance or dynamometer. As weight is placed upon the hook 17, the ends of the C-shaped spring 18 are drawn apart, and the separation of these ends is arranged to swing arm 23 and thus the pointer 15. The hook 17 is connected by a link 25 to the end of the member 9.

The operation of the invention will now be described. The square rod *e* is slipped into the roll *d* of material to be calendered. One end of the rod is then fitted into the socket in head *f*, and the other end lowered into the open top of the U-shaped bearing *g*. The end of the web *c* from roll *d* is then threaded through the calender in the usual manner after which the normal calendering operation ensues. With the machine in motion, the operator turns the screw 12 until the pointer 15 comes to the desired position on scale 16. The force acting to turn roll *d*, which is equal to the tension in the web *c*, is opposed by the spring 23, acting through the levers and brake band, and the spring is deflected until the forces are balanced when pointer 15 becomes stationary. It is

the operator's function to keep the latter stationary at a designated graduation on scale 16. However, as the roll *d* unwinds and diminishes in diameter, it must rotate more rapidly, since the surface speed of the web is constant, or the tension in the web will increase. Accordingly, the operator loosens the screw 11 to diminish the pressure on drum *j* and makes adjustments of the screw from time to time as often as is necessary to keep the pointer 15 at the desired scale graduation.

If desired, a brake band and indicating mechanism as described may be put on on each side of the calender. In this case, a simple clutch device would be added to connect the bar *e* and the second shaft *h* to be placed at the left hand side of the calender, as seen in Fig. 2. In all other respects, the attachment at the left side of the machine would be the same as that already described. The duplicate description and illustration is thought to be unnecessary and has, therefore, been omitted.

It is to be noted particularly that the device described can be readily and conveniently applied to an existing calender without much expense. No modification of the calender is required except the substitution of the brake straps. It is only necessary to provide means to attach the bracket 13 to the machine and thereafter the few remaining parts may be applied quickly and without difficulty. Any standard spring scales may be used, and the other parts are simple. The expense of manufacturing the device is, therefore, small as is also the cost of installation for the reason that no change in the existing structure is required.

The device described is, however, particularly useful in the operation of calenders for it is most desirable that the tension of the web be kept substantially constant. Variations above or below the required tension will work injury to the web. By using the structure described, the operator, even though he be unskilled, can tell when adjustments are needed by watching the indicator and can, therefore, get the desired tension in the web as well as to thereafter maintain the tension substantially constant during the calendering of the entire web.

The invention has been described in a preferred form for illustrative purposes, but the scope of the invention is defined by the appended claims rather than by the foregoing description.

What I claim is—

1. A web-tensioning device for calenders and the like, comprising in combination an arbor to support the web in roll form, a friction drum rotatable by the arbor as the web is unwound from the roll, brake band members hinged together at one end and adapted to encircle the drum, adjustable

means to draw the other ends of said members together to apply pressure to the drum, an arm extending from one of the brake bands, and means connected to said arm to  
5 balance the tension in the web and indicate variations in web tension as a guide for adjusting the first-named means.

2. A web tensioning device for calenders, comprising in combination with the calender  
10 frame, a shaft rotatably mounted on the latter, an arbor having a removable driving engagement with the shaft and having a removable rotatable engagement with a part of said frame, a brake drum on said shaft,

brake band members hinged together at one 15 end and adapted to encircle the drum, adjustable means to draw the other ends of said members together to apply pressure to the drum, an arm extending from one of the brake bands, an indicating spring balance 20 fixed to the frame and a link connecting the balance to said arm, all constructed and arranged so that the tension of the web is measured by the spring balance and so that the indications of the latter may be used as 25 a guide to the adjustment of said means.

GEORGE H. LEWIS.