

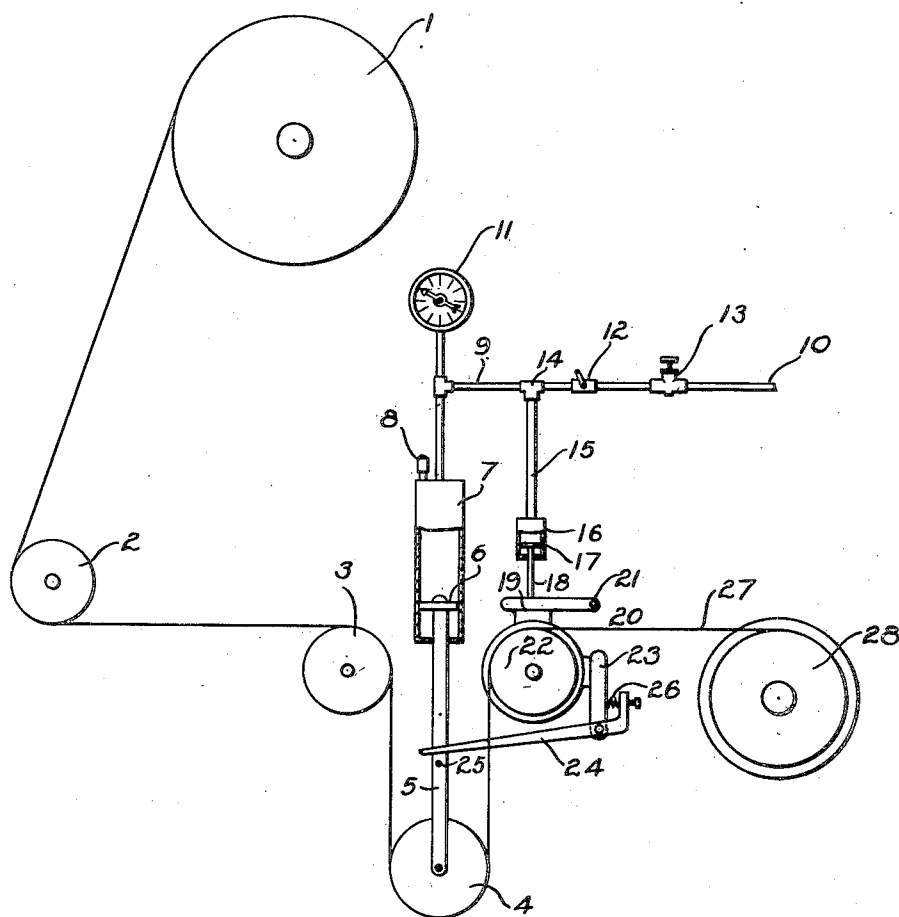
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TENSION DEVICE FOR ARMATURE BANDING

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WITNESSES:

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TENSION DEVICE FOR ARMATURE BANDING.

Application filed May 24, 1921. Serial No. 472,193.

To all whom it may concern:

Be it known that I, HENRY D. MURDOCK, a citizen of the United States, and a resident of Wilkesburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Tension Devices for Armature Banding, of which the following is a specification.

My invention relates to improvements in armature banding more especially to an apparatus for winding banding wire at a uniform tension on armatures of dynamo-electric machines.

Heretofore, it was customary to form banding wire on armatures to secure the ends of coils by unreeling the wire from a supply reel and applying tension thereto by various methods such as hanging weighted pulleys on the wire or applying tension with a lever. Such methods are injurious to the wire and do not indicate the amount of tension applied.

With the ever increasing horsepower capacity of motors and generating machines it has become necessary to provide means for securing uniform tension on the banding wire, as the band is formed, to insure uniform stressing of the individual strands in accordance with given specifications.

My invention provides means for winding banding wire on armatures of dynamo-electric machines which automatically controls the tension on the wire, it being among the objects thereof to provide an apparatus that shall be inexpensive to manufacture and easy to operate and that shall be capable of reducing changes in wire tension, during application, to a very small value.

It is a further object of this invention to provide an indicating device for gaging the tension of the band wire while being applied.

In practicing my invention, I mount an armature in the usual manner to permit free rotation thereof in either direction. A reel of armature band wire is placed in alignment with the armature-end to be banded and the wire is fed through a plurality of guide wheels, some of which function as tension-maintaining and slack-adjusting members. One of the guide wheels is mounted on the

end of a piston rod extending from an air cylinder and actuated by means of fluid pressure in the cylinder, controlled by a reducing valve. The tension on the wire is further controlled by a series of brakes engaging a brake or tension drum.

The required tension on the wire may be obtained by adjusting the air pressure in the main cylinder through the reducing valve. No adjustments are required for different sizes of armatures, sizes of banding wire or speeds of banding. A pressure gauge is provided for indicating tension in pounds on the banding wire.

A more detailed description of the various parts and the operation of my device will be given below with the aid of the accompanying drawing, the single figure of which is a side elevational, partially diagrammatic, view of a tension maintaining device, showing the arrangement of the various parts.

The armature 1 is rotatively mounted parallel to guide wheels 2 and 3 and a tension-maintaining and slack-adjusting wheel 4 which is mounted on the outer end of the piston rod 5 extending from the piston 6 in an air cylinder 7. The air cylinder 7 is provided with a safety valve 8 and is connected to a supply pipe line 9, the end 10 of which leads to a source of fluid pressure (not shown). A pressure gauge 11 is connected in the pipe line 9 to indicate the pressure acting on the piston 6 and is calibrated to indicate tension on the wire in pounds. An air-reducing valve 12 and a two-way air cock 13 are connected between the cylinder 7 and the source of fluid pressure.

A T 14 is provided in the line 9 to form a connection with a pipe 15 leading to a main brake cylinder 16, having a piston 17, the rod 18 of which is secured to a brake shoe 19. The brake shoe 19 is carried by arm 20 that is pivoted at 21 to engage the tension drum 22.

An auxiliary brake shoe 23 has a pivotally mounted operating arm 24 that extends to the piston rod 5 to be engaged by a pin or projection 25. The brake shoe 23 engages the drum 22 and is held in contact therewith by a calibrated spring 26. A sup-

ply of wire 27, on the reel 28, is mounted parallel to the tension drum 22.

The operation of my device is briefly as follows: A sufficient length of wire 27 to reach around the tension drum 22, tension-maintaining wheel 4 and guide wheels 3 and 2 to the armature 1 is unreeled from the supply wheel 28 and secured to the armature at the end to be banded. The air gage 11 is set to indicate pounds pressure of tension desired on the wire 27 by adjusting the reducing valve 12. The safety valve 8 is adjusted to blow off a little above the indicated pressure.

The main brake 19 is designed to give most of the braking effect needed on the tension drum 22. The balance of the braking power required is supplied by the auxiliary brake 23. The percentage of the braking effected by the main brake 19 is maintained for all values of wire tension, as the pressure on the brake varies with the air pressure in the main cylinder.

The armature 1 is rotated and as the tension drum is prevented from turning by the brakes 19 and 23, the tension wheel 4 moves gradually upward to release the brake 23 sufficiently to allow the tension drum 22 to supply wire to the armature 1 as rapidly as is needed. When the armature is stopped for adjustment or at the completion of the operation the tension drum 22 will continue to feed wire until the slack-adjustment wheel 4 travels far enough to apply the auxiliary brake 23. If slack wire is needed, the two-way cock 13 is opened to exhaust air from the main cylinder.

It will be noted that all wire tensions required in banding armatures may be obtained by simply adjusting the air pressure in the main cylinder through the reducing valve. It will also be noted that the inertia of the moving parts of the slack-adjusting and tension-maintaining devices is so slight as to be practically negligible. This, combined with the pneumatic cushion of the main cylinder, reduces the stress set up in the wire during the starting and stopping to a very small part of the band-wire tension.

From the above description of my invention, it will be apparent that my device provides an automatically controlled mechanical means for applying banding wire at a uniform tension, according to any given specification and that, by the use of such apparatus, the securing of the armature-coil ends so that they will be of the requisite mechanical strength is assured.

Although I have described a specific embodiment of my invention, it will be obvious to those skilled in the art that various changes may be made in the structure and arrangement of the various parts without departing from the principles herein set

forth. For instance, the guide-wheel members may be entirely eliminated or any number of them may be used. The armature and supply reels may be placed in any suitable position relative to the tension device.

I claim as my invention:—

1. In a tension device for banding the ends of armature coils, a tension-maintaining and slack-adjusting means comprising a wheel and a fluid-pressure actuated piston member therefor.

2. In a tension device for banding the ends of armature coils, a tension-maintaining and slack-adjusting means comprising a wheel and an air-pressure-actuated piston member therefor.

3. In a tension device for banding the ends of armature coils, a tension-maintaining and slack-adjusting means comprising a wheel, a supporting piston rod therefor, a piston, a cylinder and means for providing air pressure in said cylinder.

4. In a tension device for banding the ends of armature coils, a tension-maintaining and slack-adjusting means comprising a wheel, a supporting piston rod therefor, a piston, a cylinder, means for providing air pressure in said cylinder and means for automatically regulating said pressure.

5. In a tension device for banding the ends of armature coils, a tension-maintaining and slack-adjusting means comprising a wheel, a supporting piston rod therefor, a piston, a cylinder, means for providing air pressure in said cylinder and means for indicating and automatically regulating said pressure.

6. In a tension device for banding the ends of armature coils, a tension-maintaining and slack-adjusting means comprising a rotatable member and a fluid-pressure-actuated brake member engaging the outer periphery thereof.

7. In a tension device for banding the ends of armature coils, a tension-maintaining and slack-adjusting means comprising a rotatable member and an air-pressure-actuated brake member engaging the outer periphery thereof.

8. In a tension device for banding the ends of armature coils, a tension-maintaining and slack-adjusting means comprising a rotatable drum, a fluid-pressure-actuated main brake member and an auxiliary brake member engaging the outer periphery thereof.

9. In a tension device for banding the ends of armature coils, a tension-maintaining and slack-adjusting means comprising a slack-adjusting wheel, a supporting fluid-pressure-actuated piston and a tension drum having multiple brake control means.

10. In a tension device for banding the ends of armature coils, a tension-maintaining and slack-adjusting means comprising a

slack-adjusting wheel, a supporting fluid-pressure-actuated piston, a tension drum having a fluid-pressure-actuated main brake and an auxiliary brake.

5 11. In a device for banding the ends of armature coils, a tension-maintaining and slack-adjusting means comprising a plurality of guide wheels, a slack-adjusting wheel, a supporting piston rod, a piston, an
10 air cylinder, a safety valve mounted on said cylinder, a tension drum having a plurality of co-operating brake shoes, a second air cylinder having a piston connected to one of the brake shoes and means for supplying
15 fluid pressure to said air cylinders.

12. In a device for banding the ends of armature coils, a tension-maintaining and slack-adjusting means comprising a plurality of guide wheels, a slack-adjusting
20 wheel, a supporting piston rod, a piston, an air cylinder, a safety valve for said cylinder, a tension drum having a plurality of co-operating brake shoes, a second air cylinder having a piston connected to one of the brake
25 shoes, a mechanical trip lever therefor, means for supplying fluid pressure to said cylinders, an indicating device connected within the fluid supply circuit, a reducing valve and a two-way cock for regulating and
30 reversing the flow of pressure fluid.

13. A banding machine comprising means for rotating the object to be banded; means for holding a supply of the banding material; a cylinder; a piston operating therein;
35 means associated with the piston for regulating the tension of said banding material; and controllable means for admitting fluid

under pressure to the cylinder to operate the piston.

14. A banding machine comprising means 40 for rotating the object to be banded; means for holding a supply of banding material; a cylinder; a piston operating therein; means associated with the piston for regulating the tension of said banding material; means for 45 controlling the feed of said banding material from the holding means; means associated with the piston for operating said feed controlling means; and controllable means for admitting fluid under pressure to 50 the cylinder to operate the piston.

15. A banding machine comprising means for rotating the object to be banded; a cylinder; a piston operable within said cylinder; a pulley associated with said piston 55 and adapted to be linearly moved thereby; a second pulley mounted upon a fixed axis, said pulleys being adapted to receive a bight of the banding material; and means for feeding the banding material to said pulleys. 60

16. A banding machine comprising means for rotating the object to be banded; a cylinder; a piston operable within said cylinder; a pulley associated with said piston and adapted to be linearly moved thereby; a second 65 pulley mounted upon a fixed axis, said pulleys being adapted to receive a bight of the banding material; and means controlled by the movement of said piston for feeding the banding material to said pulleys. 70

In testimony whereof, I have hereunto subscribed my name this 29th day of April, 1921.

HENRY D. MURDOCK.