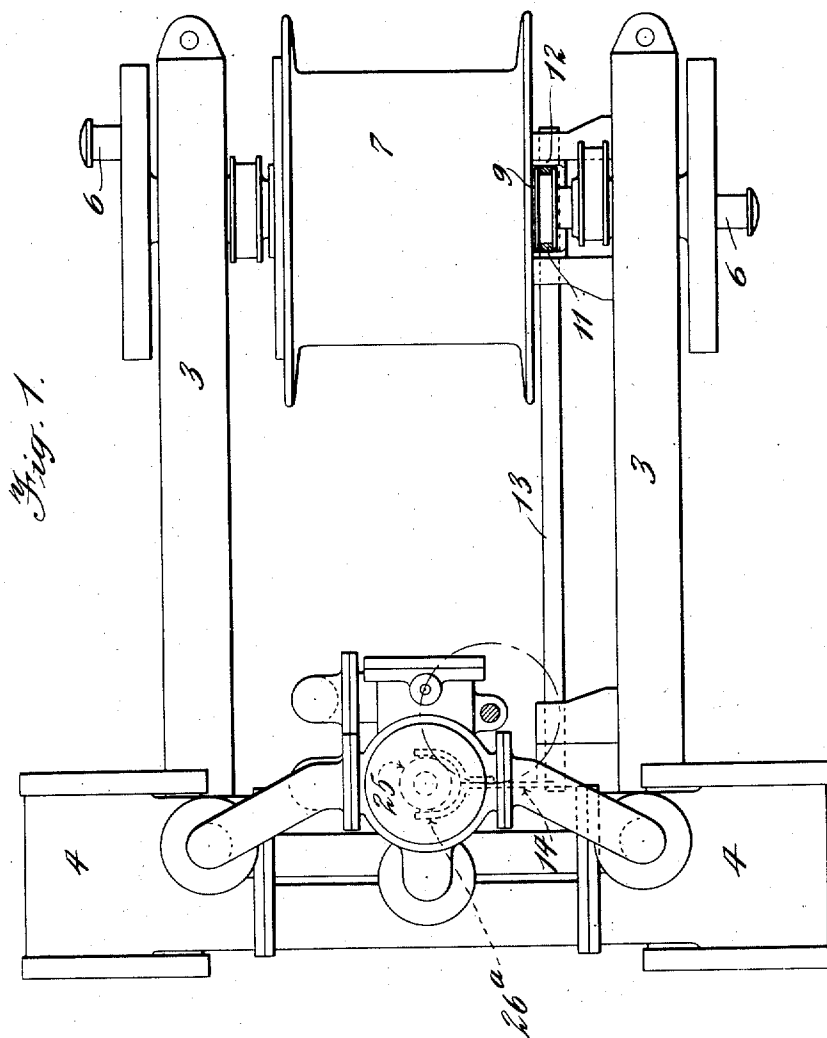


T. S. MILLER.
 ROPE DRUM.
 APPLICATION FILED JULY 30, 1910.

1,062,723.

Patented May 27, 1913.

3 SHEETS—SHEET 1.



Witnesses:
Geo. C. Cheney
C. Meylman

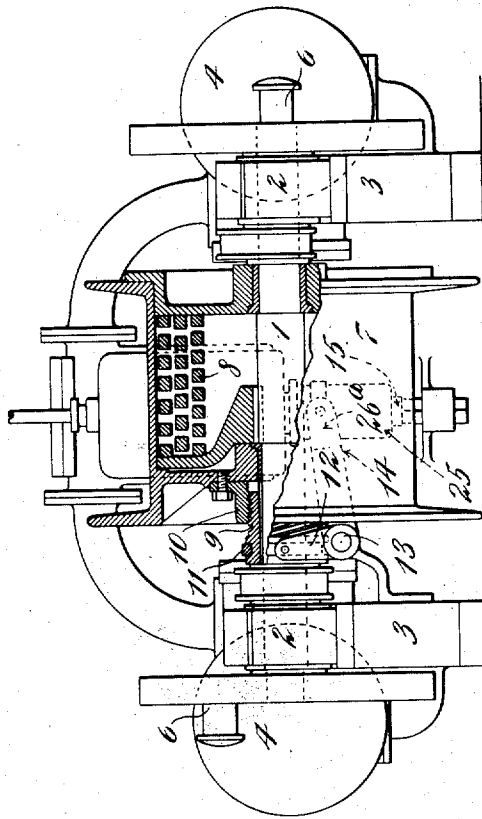
Thomas Spencer Miller Inventor
 By his Attorney *Clifford & Bull*

ROPE DRUM.

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3 SHEETS—SHEET 2.

Fig. 2.



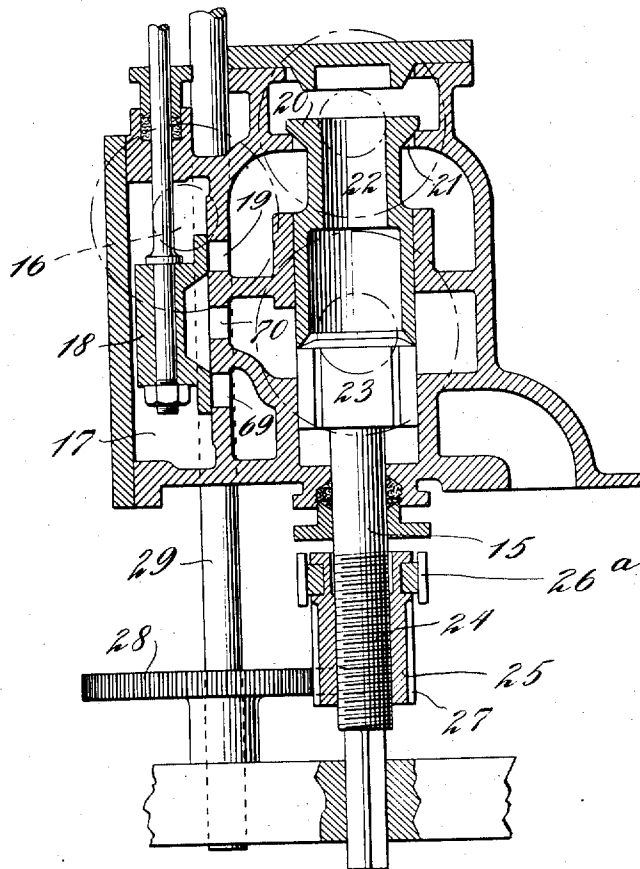
Thomas Spencer Miller
By his Attorney *Lifford Bull*

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 3 SHEETS—SHEET 3.

1,062,723.

Fig. 3.



Witnesses:
John A. Lohmeyer
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Thomas Spencer Miller Inventor
 By *His Attorney* *Lifford & Bull*

UNITED STATES PATENT OFFICE.

THOMAS SPENCER MILLER, OF SOUTH ORANGE, NEW JERSEY.

ROPE-DRUM.

1,062,723.

Specification of Letters Patent.

Patented May 27, 1913.

Original application filed January 22, 1910, Serial No. 539,513. Divided and this application filed July 30, 1910. Serial No. 574,703.

To all whom it may concern:

Be it known that I, THOMAS SPENCER MILLER, a citizen of the United States, residing at South Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Rope-Drums, of which the following is a specification.

My invention relates to new and useful improvements in rope drums, and the object is to provide a rope drum with an automatic governor for governing the power of its prime mover, said governor being controlled by the load on the drum.

This application is a division of my prior application Serial No. 539,513, filed January 22, 1910.

The invention consists in the novel construction and arrangement of parts in operative combination to be fully described hereinafter and the novelty of which will be particularly pointed out and distinctly claimed.

I have fully and clearly illustrated my invention in the drawings to be taken as a part of this specification and wherein:

Figure 1 is a top plan view of an embodiment of the invention. Fig. 2 is a view in front elevation partly in section of the same. Fig. 3 is a sectional view through the valve used in connection with the drum shown in Figs. 1 and 2.

Referring to the drawings by characters of reference, 1 designates the prime mover which, in this instance, consists of a horizontally disposed shaft mounted in suitable bearings 2, 2 formed in the side members 3, 3 of the frame for the rope drum. This shaft may be driven by any source of power, but in the embodiments shown and hereinafter described, I have employed a double cylinder steam engine, but I wish it understood that I do not desire to be limited to any particular form of motor, as I may use any source of power which will accomplish the results desired. The cylinders of the engine are shown at 4, 4, the pistons (not shown) operating in said cylinders being connected to the driving shaft or prime mover by pitmen not shown by cranks 6, 6 on said shaft. These engine cylinders are of an ordinary type having the usual valve

chest 4^a, 4^a, containing side valves operated from eccentrics 4^b, 4^b, on the shaft 1, by rod connections (not shown).

Mounted on a shaft 1 is a drum 7, said drum being arranged so as to be capable of revolution independently of the shaft, but held against movement longitudinally of the same. In other words, the drum may turn independently of the shaft but revolves in a fixed path on or with said shaft. The drum is connected to the shaft by means of helical coil springs 8, arranged within the drum, and having their ends connected to the drum and shaft respectively, the arrangement being such that the springs will permit an increase of load on the drum above normal, due to the pull of the rope thereon, to cause the drum to revolve on the shaft independently thereon; and these springs will operate to turn the drum on the shaft, if, for any reason, the load thereon should decrease below normal. In other words, the connection between the drum and the shaft permitting the relative movement between the drum and shaft, acts in the nature of what I may term a detector, for the purpose of ascertaining any variations of load to which the drum may be subjected by the pull of the cable wound thereon.

I will now proceed to describe what I may term governing means acting in accordance with the variations of load as ascertained by said detector, which governor in turn controls the valve mechanism of the engine cylinders or the control of such other power as may be employed in such a manner that the steam or other motive fluid admitted thereto is automatically increased when the load upon the drum decreases, and is automatically reduced when the load on the drum is increased, the result being that the drum automatically responds promptly to all variations of load thereon incident to the pull of the cable. I will now proceed to describe this governing mechanism: On the crank shaft or prime mover to one side of the drum, is mounted an element formed with a cam incline, said element preferably being in the form of an exteriorly threaded sleeve 9, said sleeve being longitudinally movable of the shaft but feathered thereto so as not to revolve independently thereof. Coöperat-

ing with this threaded sleeve is an interiorly threaded nut 10 carried by one end of the drum and revolving with the drum. By this arrangement, when the drum revolves with respect to the shaft under changes of load, the screw-threaded connection between the drum and sleeve 9 will serve to move the latter in one direction or the other on the shaft according to the direction of rotation of the drum. This screw-threaded sleeve carries a grooved collar 11 which engages the forked end of a lever 12 rigidly connected to one end of a connecting rod 13 which extends longitudinally of the frame in a plane beneath the prime mover or crank shaft, the opposite end of said rod from that carrying the lever 12 terminating adjacent the engine cylinders. On the end of the connecting rod adjacent the cylinders is a lever 14 which coöperates with a vertically disposed valve rod 15 for operating the regulating valve for controlling the flow of steam to and from the valve chests of the engine cylinders in accordance with the variations of load on the drum.

I will now proceed to describe the construction of the said regulating valve for controlling flow of fluid to the motor in case a fluid pressure engine is employed: The regulating valve comprises a vertical casing into which steam from a suitable source enters by way of an inlet 16 into a steam chest 17, and in which steam chest a manually-operated D valve operates, said valve slidably coöperating with a port wall 18^a separating the valve chest from the main body of the valve casing, said port wall having ports 19, 70 and 69 establishing communication between chambers in the main body of the casing. The port 19 is arranged to connect the valve chest 17, by way of the body of the valve casing, with the slide valve chambers of the piston cylinders to admit steam thereto, the port 70 connects the chest 17, through the main body of the casing, with the exhaust ducts leading from the cylinders, and the port 69 connects said chest 17 with the main exhaust from the regulating valve casing. When the valve 18 is moved down from the position shown in Fig. 3, to uncover the port 19, steam is admitted from the chest 17 to the ports 17^a in the regulating valve casing leading to the valve chests of the engine cylinders, it being understood that the vertically reciprocating valve 20 in the main body of the casing is first raised from its seat 21 in a partition 21^a in the main casing separating said ports from the port 19. The ports 17^a are connected to the valve chests of the cylinders by conduits 17^b, see Fig. 1. The exhaust from the cylinders passes therefrom by way of pipes 22^a and enters the main casing through the openings 22 in opposite sides of the main

casing wall below a horizontal partition 22^b which separates the casing into upper and lower chambers 22^c, 22^d, respectively, the openings 22 opening into the chamber 22^d, and the exhaust flowing from said openings through the chamber 22^d and ports 70 and 69 to the main exhaust 71 of the valve casing. This is the operation taking place when the engine is running forward to wind the rope on the drum.

In Fig. 3 the D valve is shown in neutral position so as to cut off all communication between the engine cylinders and both the inlet 16 and exhaust 71 of the regulating valve casing.

The main valve 20 is slidably disposed in a guide sleeve 20^a surrounding an opening in the partition 22^b, and said valve rests by gravity on a secondary or piston valve 23 which is connected to a vertically movable rod 15. When the rod 15 is lowered, the valve 23 is moved down away from the bottom of the valve 20, the latter being supported on the partition 21^a, so that a space is provided between the lower edge of said valve 20 and the top of the valve 23 whereby communication is established between the main exhaust of the valve casing and the ducts 22^a leading to the engine cylinders through a passage 20^b extending through the main valve. With the parts in this position it will be seen that the supply of steam to the engine cylinders is cut off and said cylinders are connected with the exhaust of the valve so that the drum may pay off the rope without resistance of steam cushioned in the engine cylinders. The valve 23 is guided in a guide 23^a cast in the main valve casing and around which the exhaust port 71 passes.

While in Fig. 3 only one of the ports 17^a, and 22, is shown, yet it will be understood that there are two of each of said ports, arranged respectively on opposite sides of the casing as is evident from Fig. 1.

The lower end of the valve stem or rod which carries the secondary valve is provided with a screw-thread 24, and on this operates a threaded sleeve or nut 25, the upper end of which is provided with a groove engaged by the forked lever 26^a on the end of the connecting rod 13 operated by the traveling nut on the prime mover or crank shaft, the arrangement being such that the movements of said forked lever will operate to raise and lower the secondary valve. The lower end of this threaded sleeve 25 on the valve stem 15 is provided with gear teeth 27, which mesh with a gear 28 on a vertical shaft 29 journaled in the frame and upon the upper end of which is a hand-wheel (not shown) for manual operation of the valve. When this shaft 29 is turned the nut is rotated on the valve stem and moves the stem 15 up or down, thus seating or un-

seating the main regulating valve 20, said hand operation being independent of the automatic operation which is as follows: If the engine is stationary and the drum 5 subjected to a normal load the valve 20 is seated or may be open just enough to admit steam to compensate for condensation losses and if an increase should occur in the load the drum will revolve on its shaft and there- 10 by move the threaded sleeve on the shaft to move the valve stem down, which will permit the valve 20 to seat and the valve 23 to move away from the valve 20 to uncover the passage through the latter and 15 establish communication between the cylinders and the main exhaust which will reduce the pressure in the engine cylinders, thus permitting the drum to rotate to let out the rope wound thereon and thereby 20 reduce the load on the drum. As soon as the load becomes normal the drum through the springs will react and the valve 23 will be raised into contact with the valve 4, thus closing communication between cylinders 25 and the main exhaust.

If a decrease in load should occur on the drum the springs 8 will operate to revolve the drum to take up the rope and the valve stem 15 will be raised and the valve 20 unseated admitting more steam into the cylinders so that the engine will run forward to take up the rope until the load on the drum becomes normal when the valve seats to hold the steam in the cylinders to cushion the 30 pistons and thereby hold the drum.

What I claim and desire to secure by Letters Patent of the United States is:

1. In combination, a driving shaft, controlling means therefor, a drum on the shaft, 40 an element movable longitudinally of the shaft, an element rotatable on the shaft, said elements being in threaded engagement with each other, and one being rotatable by the drum to cause said elements to move relative 45 to each other, and means acting in accordance with such relative movement for operating the controlling means for the shaft.

2. In combination, a driving shaft, controlling means therefor, a drum on the shaft, 50 means connecting the drum and shaft permitting relative movement between the same due to changes of load on the drum, an element movable longitudinally of the shaft, an element rotatable on the shaft, said elements being in threaded engagement with 55 each other, and one being rotatable by the drum to cause said elements to move relative to each other, and means acting in accordance with such relative movement for 60 operating the controlling means for the shaft.

3. In combination, a driving shaft, controlling means therefor, a drum on the shaft, spring connecting the drum and shaft per-

mitting a relative movement between said 65 elements due to changes of load on the drum, an element movable longitudinally of the shaft, an element rotatable on the shaft, said elements being in threaded engagement with each other, and one being rotatable by the 70 drum to cause said elements to move relative to each other, and means acting in accordance with such relative movement for operating the controlling means for the shaft.

4. In combination, a driving shaft, controlling means therefor, a drum on the shaft, 75 an element movable longitudinally of the shaft and threaded to the drum, and means acting in accordance with the movement of said element for operating the controlling 80 means for the shaft.

5. In combination, a driving shaft, controlling means therefor, a drum on the shaft, a spring connecting the drum and shaft, permitting relative movement between the same, 85 due to changes of load on the drum, an element movable longitudinally of the shaft and having a cam incline engagement with the drum whereby it is moved by the drum, and means acting in accordance with the 90 movement of said element for operating the controlling means for the shaft.

6. In combination, a driving shaft, controlling means therefor, a drum on the shaft, a spring connecting the drum and shaft, permitting relative movement between the same, 95 due to changes of load on the drum, an element movable longitudinally of the shaft, a connection between the drum and element to move the latter longitudinally of the shaft, 100 and means acting in accordance with said movement for operating the controlling means for the shaft.

7. In combination, a driving shaft, controlling means therefor, a drum driven by 105 the shaft, an element movable longitudinally of the shaft, an element turned by the drum and threaded to said longitudinally movable element, and means acting in accordance with said last-named element for operating 110 the controlling means for the shaft.

8. In combination, a driving member, controlling means therefor, a drum driven by the driving member, an element movable longitudinally of said driving member, an 115 element rotatable on said driving member, a cam engagement between said elements, said rotatable element being rotatable by the drum to cause said elements through the cam engagement to move relative to each other, 120 and means acting in accordance with such relative movement for operating the controlling means for the driving member.

9. In combination, a driving shaft, a controller therefor, a drum driven by the shaft, 125 a yielding connection forming the driving connection between the drum and shaft, an element movable longitudinally of the shaft,

a rotatable element rotated by the drum, means whereby the rotation of the rotatable element moves the other element longitudinally of the shaft, and a connection between the longitudinally movable element and the controller.

In testimony whereof I have hereunto

signed my name in the presence of two subscribing witnesses.

THOMAS SPENCER MILLER.

Witnesses:

ERNST PULSFORD,
LOUIS G. RUGGLES.

Correction in Letters Patent No. 1,062,723.

It is hereby certified that in Letters Patent No. 1,062,723, granted May 27, 1913, upon the application of Thomas Spencer Miller, of South Orange, New Jersey, for an improvement in "Rope-Drums," an error appears in the printed specification requiring correction as follows: Page 1, line 53, for the word "side" read *slide*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 24th day of June, A. D., 1913.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.

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