(No Model.) 3 Sheets—Sheet 1.

D. S. WAUGH.

HOISTING MACHINE.

No. 359,910. Patented Mar. 22, 1887.

Fig. 1.

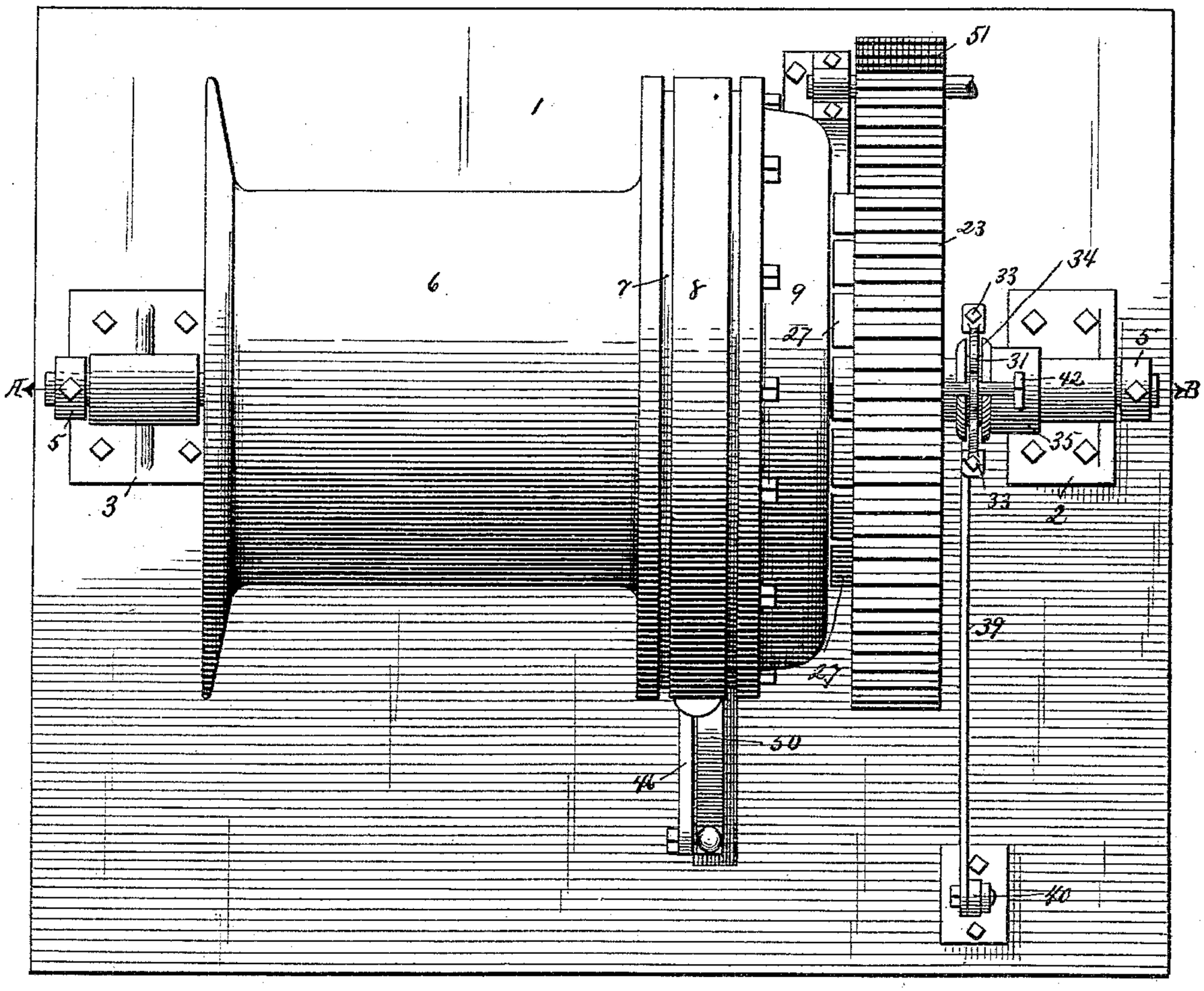


Fig. 8.

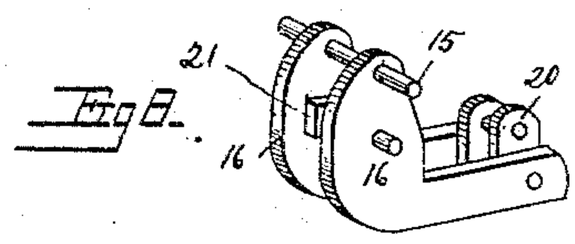


Fig. 6.

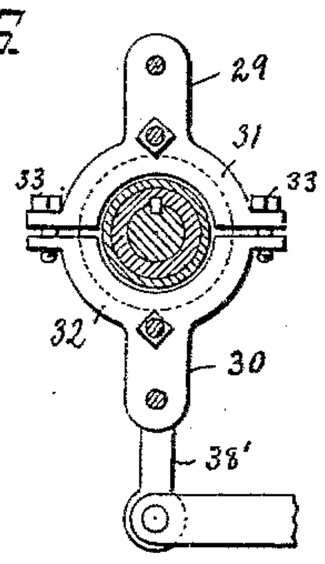
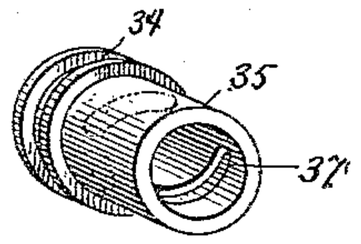


Fig. 7.



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(No Model.) 3 Sheets—Sheet 2.

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HOISTING MACHINE.

No. 359,910. Patented Mar. 22, 1887.

Fig. 2.

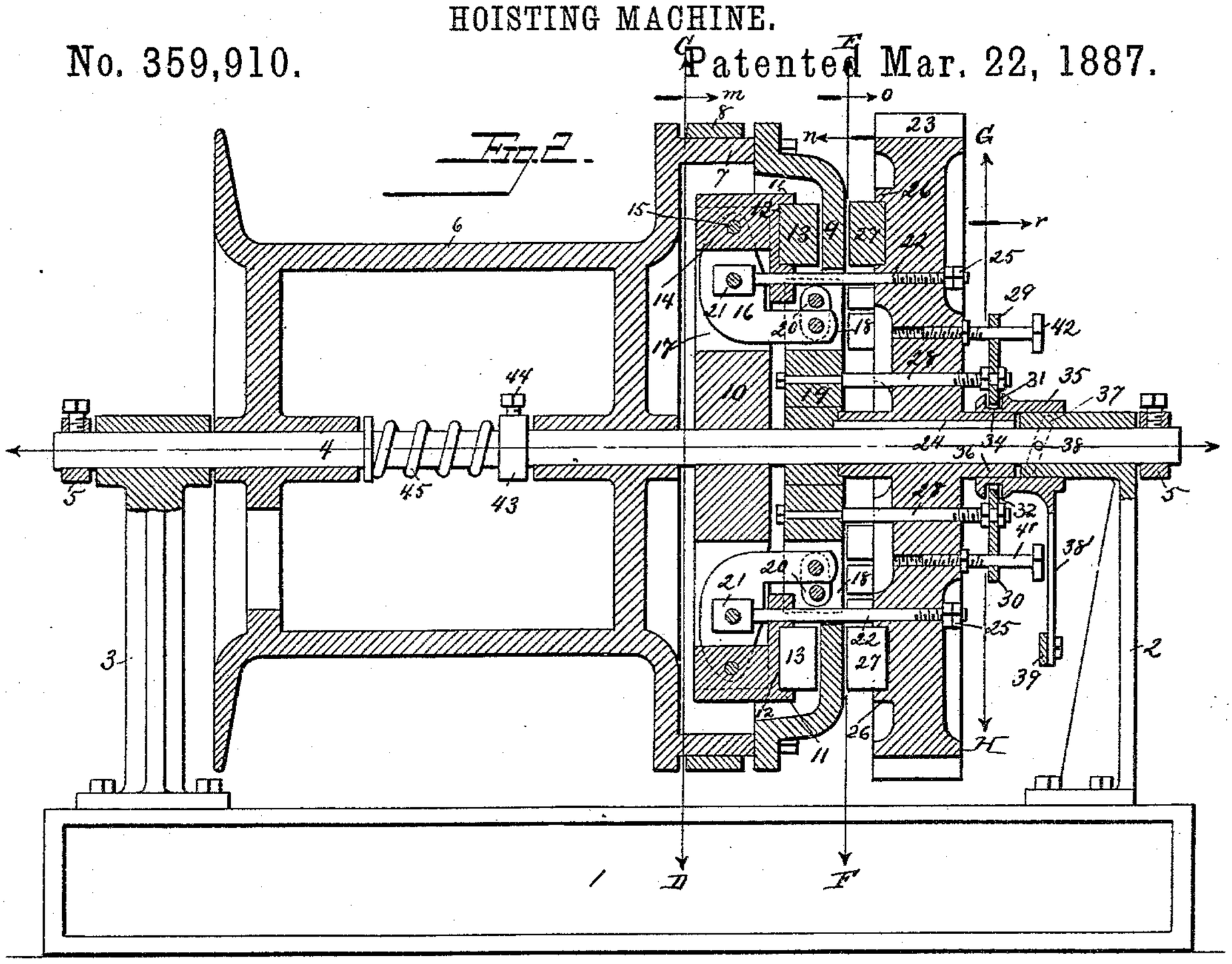
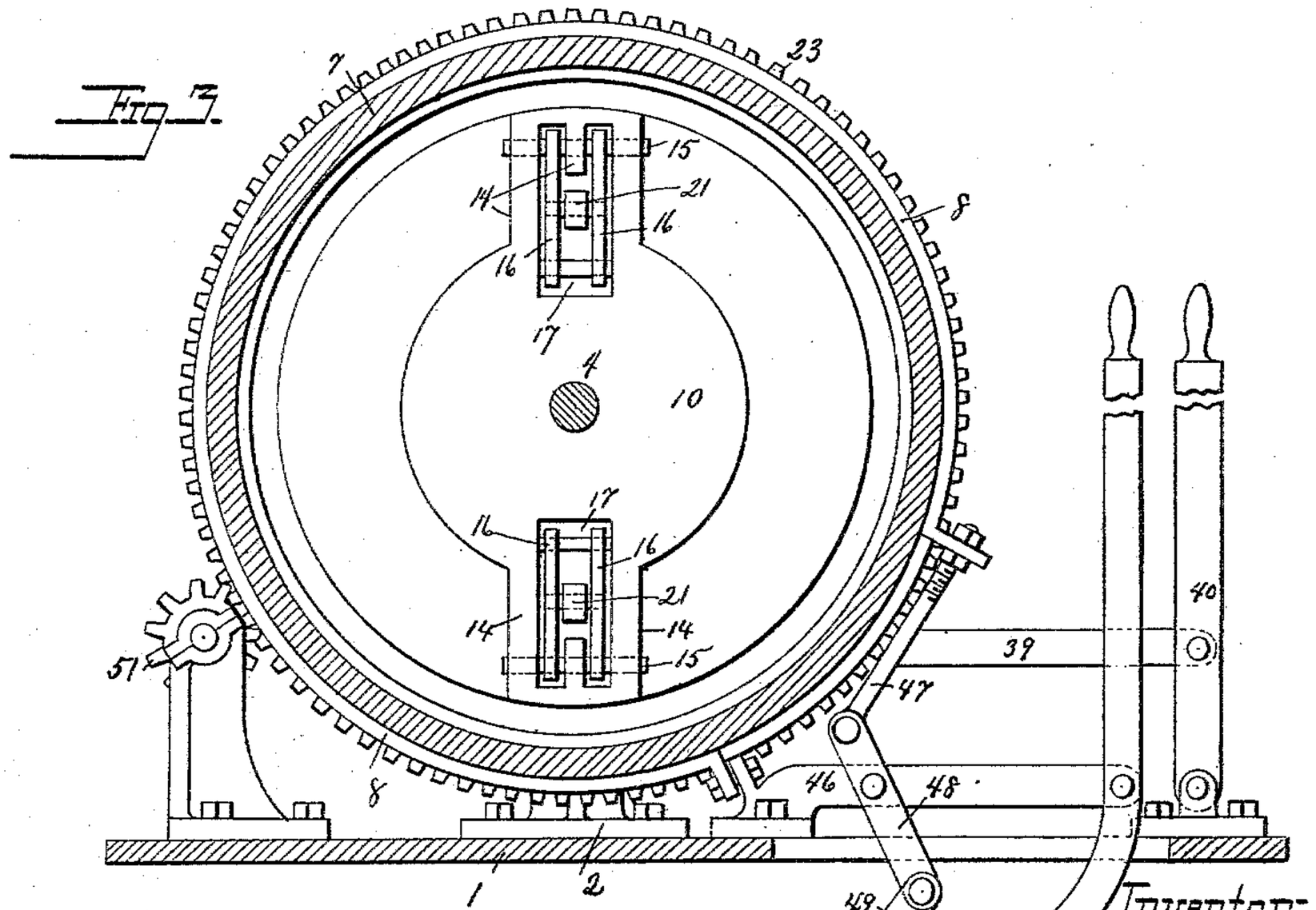


Fig. 3.



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3 Sheets—Sheet 3.

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HOISTING MACHINE.

No. 359,910. Patented Mar. 22, 1887.

Fig. 5.

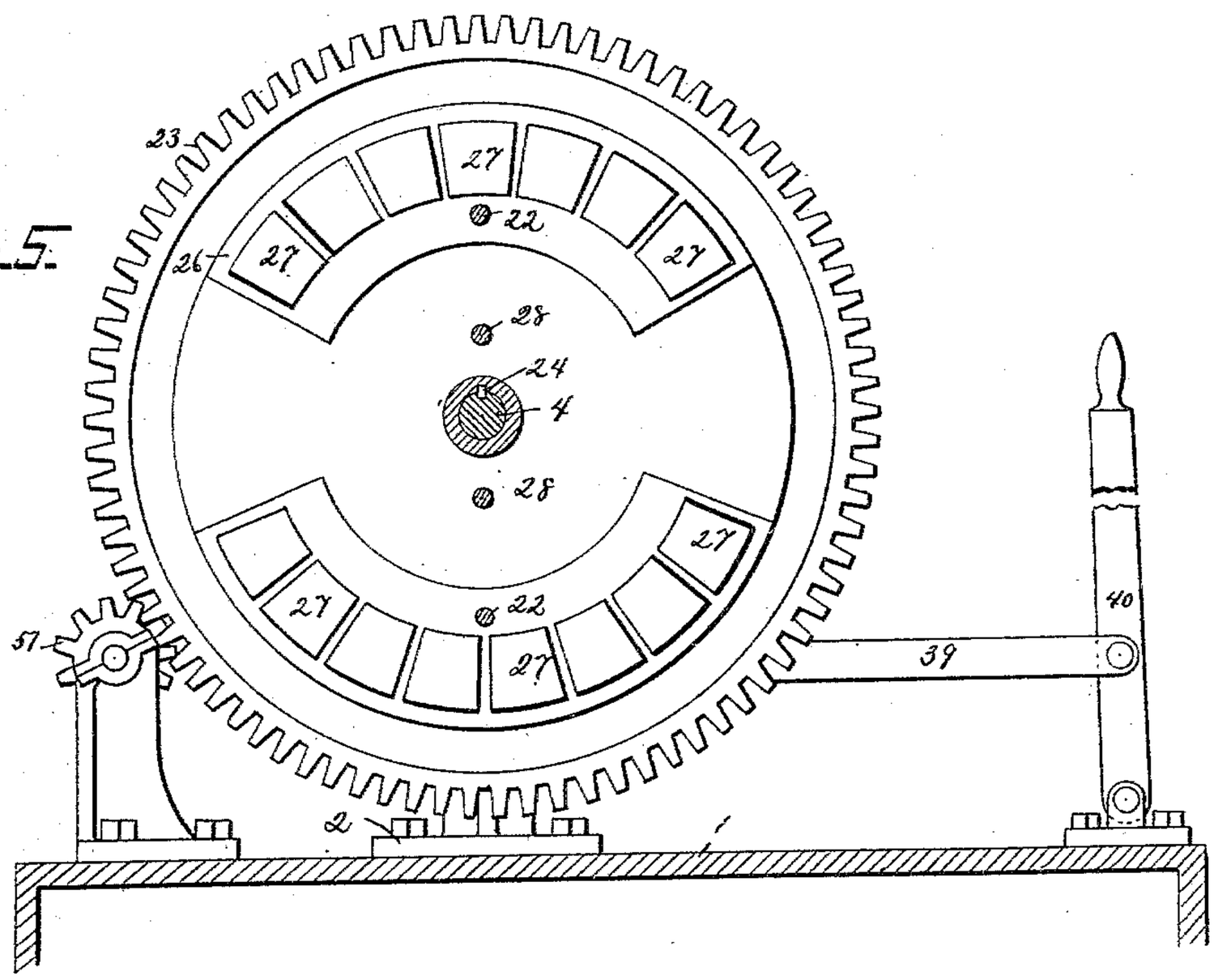
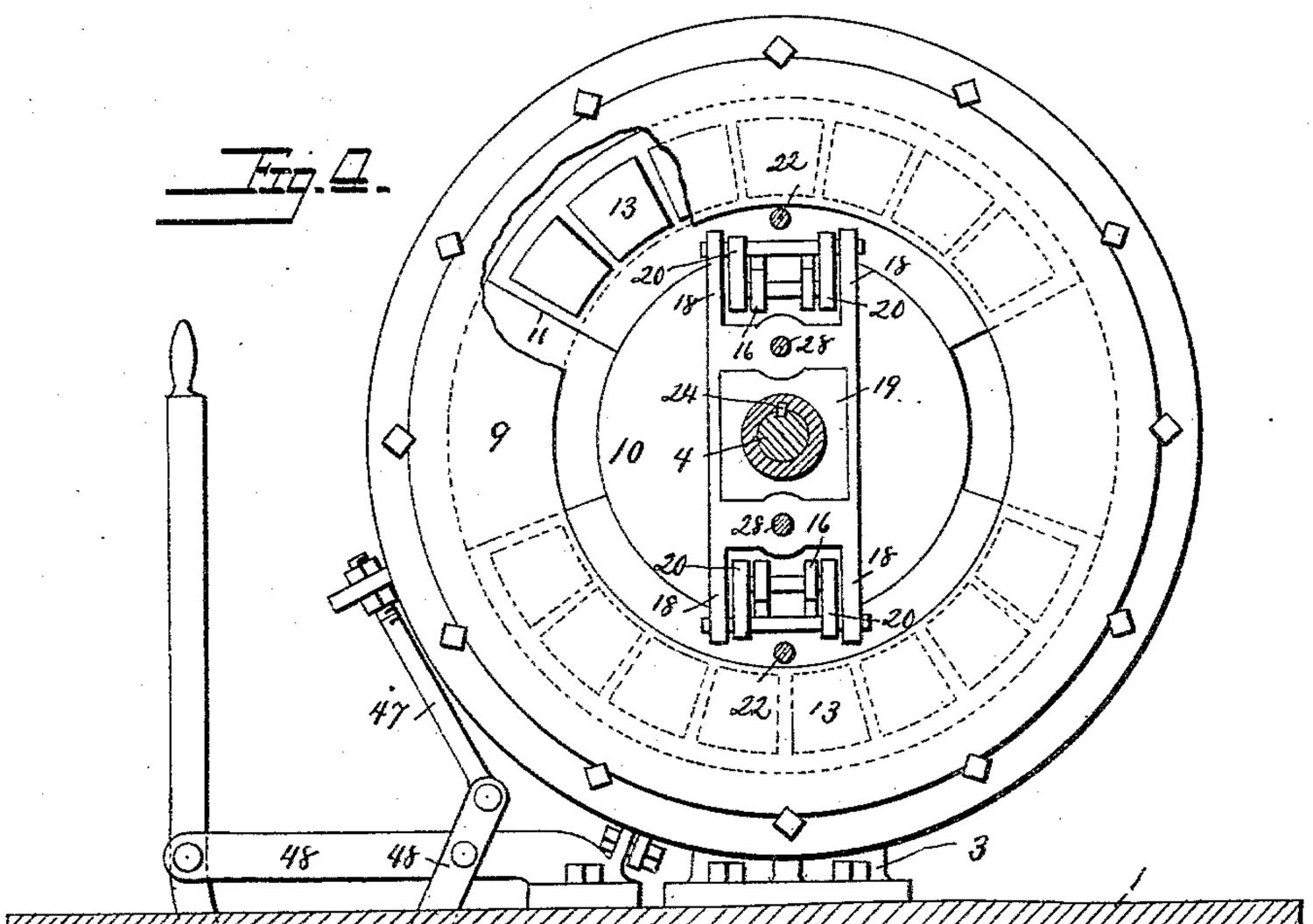


Fig. 4.



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UNITED STATES PATENT OFFICE.

DANIEL S. WAUGH, OF DENVER, COLORADO.

HOISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 359,910, dated March 22, 1887.

Application filed October 9, 1886. Serial No. 215,799. (No model.)

To all whom it may concern:

Be it known that I, DANIEL S. WAUGH, a citizen of the United States, and a resident of Denver, Arapahoe county, Colorado, have invented certain new and useful Improvements in Hoisting-Machines, of which the following is a specification.

My invention relates to improvements in hoisting-machines of that class wherein rotary motion is imparted to a rope carrying or hoisting drum from a steam-engine or other motor through the medium of friction-clutches, and has for its objects the provision in a device of the class named, and in connection with the hoisting-drum thereof, of peculiarly-constructed driving mechanism, means for throwing said mechanism into or out of operative connection with said drum without exerting undue end or side pressure or thrust upon the main or drum supporting shaft and its bearings, means for imparting an increased area of frictional surface to the drum-driving clutches, and means for imparting the proper adjustment to the several elements comprised in the device, all substantially as hereinafter set forth, and illustrated in the accompanying drawings, wherein similar figures of reference denote similar parts.

In said drawings, Figure 1 is a a top plan view of a hoisting-machine constructed in accordance with my invention. Fig. 2 represents a longitudinal section therethrough, taken on the line A B of Fig. 1. Fig. 3 is a transverse section thereof, taken on the line C D of Fig. 2, looking in the direction of the arrow *m*. Fig. 4 represents a transverse sectional view taken on the line E F of Fig. 2, looking in the direction of the arrow *n*. Fig. 5 is a similar sectional view taken on said line E F, looking in the direction of the arrow *o*. Fig. 6 represents a transverse sectional view taken on the line G H of Fig. 2, looking in direction of the arrow *r*; and Figs. 7 and 8 represent detached detail views of parts of the operating mechanism.

It will be understood that motion may be imparted to my improved hoisting-machine by any desired form of motor, operated by any desired power—as steam, water, wind, gas, &c.—and I have not, therefore, herein shown, nor shall I hereinafter describe, any particular form or description of motor or machine for accomplishing this purpose, but will confine my description solely to the construction and combination of the several elements comprised in the present embodiment of my invention, and to the manner in which said elements co-operate when the machine is in operation.

In the present embodiment of my invention I provide the base or bed 1, which may be common both to the hoisting-machine and to the motor which operates said machine, with pillow blocks or standards 2 and 3, that form bearings for the opposite ends of the main or drum carrying shaft 4, as shown. I provide the opposite ends of the shaft 4 with collars 5, which bear against the outer surfaces of the pillow-blocks and prevent longitudinal movement of the shaft.

Upon the shaft 4, adjacent to the pillow-block 3, I mount a drum, 6, one end of which is provided with a flange, 7, about which a brake-strap, 8, extends. (See Fig. 3.) To the flange 7 I secure an annular flanged casting, 9, the opposite surfaces of which are engaged by friction-blocks, presently to be described.

Upon the shaft 4, within the flange 7 of the drum, I loosely mount a disk, 10, and provide one surface of said disk—that toward the flange 9 and upon opposite sides of the middle of said disk—with projecting portions 11, and provide said portions with apertures 12, which receive friction-blocks 13, preferably of wood, and which at times, hereinafter stated, bear against the flange 9. I provide the opposite surface of the disk 10, opposite the middles of the projections 11, with lugs or ears 14, between which is pivoted in pairs, at 15, angular dogs 16, which extend thence through apertures 17, formed in the disk 10 outwardly and between projecting ears or lugs 18, formed upon the opposite ends and sides of a casting, 19, which is loosely mounted upon the shaft 4, adjacent to the disk 10. The ends of the dogs 16 are connected by pivoted links 20 with said casting 19, as shown. Between and to each pair of dogs 16 I pivot a block, 21, from which extends a rod, 22, to and through a spur-wheel, 23, which is mounted upon the shaft 4 outside

of the flange 9 of the drum 6, and is held from rotation upon said shaft by a key, 24, as shown.

The free ends of the rods 22 are screw-threaded, and adapted to receive adjusting nuts or burrs 25, which bear against the outer surface of the spur-wheel.

I provide one surface of the spur-wheel 23—that adjacent to the flange 9 of the drum 6—with projecting portions 26, having apertures to receive friction-blocks 27, which in practice are placed opposite the blocks 13 of the disk 10, and co-operate with said latter blocks to clamp the flange 9, as will be hereinafter explained.

Rods 28 extend from the casting 19 at opposite sides of the shaft 4 outwardly through the spur-wheel 23, and are connected at their outer ends with arms 29 and 30, which project from semicircular disks 31 and 32, that extend about the shaft 4 outside of the spur-wheel 23, and are connected together by bolts 33, which extend through laterally-projecting ears formed on said disks 31 and 32, as shown.

The inner edges of the disk-sections 31 and 32 are placed and operate in a peripheral groove, 34, formed in a short sleeve, 35, which is placed partly upon a boss or hub, 36, formed upon the spur-wheel 23 and partly upon a boss which projects from the pillow-block 2. The latter-named boss is provided upon its opposite sides, within the sleeve 35, with inclined peripheral slots 37, into which pins 38 project from the sleeve 35, (see Figs. 2 and 7,) for a purpose hereinafter to be explained. An arm, 38′, extends downwardly from the sleeve 35, and is connected by a bar or rod, 39, with a lever, 40, pivotally connected to the base 1, as shown.

The outer ends of each of the arms 29 and 30 of the semicircular castings 31 and 32 are apertured to permit the passage of screw-threaded adjusting-bolts 41 and 42, which project from the spur-wheel 23.

As the drum 6 in operation is moved slightly in longitudinal direction upon the shaft 4, its flange 9 might, when said drum is heavily laden, remain for a time in contact with the friction-blocks of the wheel 23, when it is desirable to instantly remove said flange from said blocks. To obviate this objection I provide the shaft 4 within the drum with a collar, 43, secured in place by a set-screw, 44, and surround said shaft with a coiled spring, 45, the opposite ends of which bear, respectively, against said collar 43 and the inner surface of the drum-head, or against a boss formed thereon, as shown in Fig. 2.

I connect the opposite ends of the brake 8 of the flange 7, respectively, with a foot, 46, formed upon the base 1, and an adjustable screw-threaded rod or bar, 47, which connects to a lever, 48, pivoted to said foot 46. The opposite end of said lever 48 is connected by links 49 with the lower curved end of a lever, 50, also pivoted in said foot 46, as shown. The teeth of the spur-wheel 23 are engaged by gear-teeth formed upon a spur-pinion, 51, which is mounted upon the main shaft of the motor.

The operation of my device is as follows: It being understood that the friction-blocks 13 and 27 of the casting 10 and spur-wheel 23, respectively, are normally maintained at a distance from the flange 9 of the drum, said casting 10 and spur-wheel rotate in unison with the shaft 4, inasmuch as said shaft and spur-wheel are keyed together, while the drum 6 is maintained in stationary position. It will also be understood that the castings 19, 31, and 32, move in unison with the spur gear-wheel and casting 10. When it is desired to cause the drum to rotate, the lever 40 is drawn outward, which action, through the connecting bar or rod 39 and arm 38, causes the sleeve 35 to rotate upon its bearing, and by said rotation to be moved, through the medium of the inclined slots 37 and pin 38, toward the spur wheel 23. The connected castings 31 and 32, from their described connection with said sleeve 35, will also be moved toward said spur-wheel; and, inasmuch as said castings are, through the rods 28, connected with the casting 19, it also will move in unison with the parts named, thereby, through the dogs 16, moving the disk 10 in the opposite direction—*i. e.*, toward the flange 9. The movement of parts thus described will bring the friction-blocks 13 and 27 of the disk 10 and spur-wheel 27, respectively, into engagement with the opposite sides of the flange 9. The continued movement of the parts named will cause the links 20 to swing into alignment with the longer arms of the dogs 16, and so not only operate to force the friction-blocks tightly against the flange 9, but will also operate as a lock to hold them securely in such position. Movement of the lever 40 and its connected parts, above described, in direction contrary to that named will release the flange 9 from engagement with the friction-blocks, as will be understood. This latter action of the parts described is aided in great measure by the spring 45 of the drum 6, the said spring operating in manner hereinbefore described. The adjustable bolts 42 and castings 31 and 32 serve to draw the spur-wheel backward should such wheel from any cause not be moved by the action of the parts above described.

In applying the brake 8 to the drum the lever 50 is drawn backward, which will at first rapidly move the lower arm of the lever 48 through the medium of the links 49. As, however, said links will be swung upward by the above-described movement, the upward speed of the point at which said links are connected to the lever 48 will be gradually decreased until said links are nearly in alignment with said lever, and so operate as a lock to hold the brake-band 8 in close contact with the flange until said brake is released therefrom by the opposite movement of the lever 50. The proper adjustment as to length is imparted to the brake-band 8 through the rod 47.

It will be observed from the foregoing description that the main or drum bearing-shaft is practically free from the longitudinal and lateral strains consequent in machines of this class upon the direct connection to such shafts of the clutch-controlling mechanism.

If desired, material other than wood may be employed as friction-blocks.

Modifications in detail of construction may be made in the within-described invention without departing from the spirit or sacrificing the advantages thereof—as, for instance, the friction-blocks may extend entirely around the casting 10 and wheel 23, respectively, or said blocks may be attached to the opposite surfaces of the flange 9.

Having thus described my invention, I claim—

1. In a hoisting-machine and in combination, a shaft, a drum upon said shaft, a clamping-flange secured to said drum, oppositely-moving friction-blocks to engage the opposite sides of said flange, and mechanism independent of the shaft to simultaneously move said blocks toward said flange and into engagement therewith, substantially as described.

2. The combination of a base, a shaft supported therefrom, a drum upon said shaft, and a clamping-flange secured to said drum, with a gear-wheel, a circular disk, friction-blocks secured to said wheel and disk, respectively, and mechanism independent of the shaft to simultaneously move said wheel and disk into contact with the opposite sides of said clamping-flange, substantially as described.

3. The combination of a shaft, a drum thereon, and a clamping-flange secured to said drum, with a gear-wheel and a circular disk having friction-blocks secured thereto, dogs connected to said disk, and means, substantially as described, to operate said dogs to move the friction-blocks into engagement with the opposite sides of said clamping-flange, as and for the purpose specified.

4. In a hoisting-machine, the combination of a shaft, a drum loosely mounted thereon, a clamping-flange secured to said drum, a spur gear-wheel, and a circular disk arranged upon opposite sides of said clamping-flange, said wheel and disk being provided with friction-blocks to engage said flange, with a casting arranged between said gear-wheel and disk, connections between said casting and disk, and means, substantially as described, to move said casting to simultaneously bring said gear-wheel into engagement with said flange, as and for the purpose set forth.

5. The combination of a shaft, a drum loosely mounted thereon, a clamping-flange secured to said drum, a gear-wheel, and a circular disk arranged upon opposite sides of said flange, with an oscillating sleeve and connections, substantially as described, between said sleeve, spur-wheel, and disk to move said wheel and disk simultaneously toward each other and into contact with said clamping-flange, as and for the purpose specified.

6. In a hoisting-machine, a rotating shaft, a drum loosely mounted thereon and provided with a flange to receive a brake and with a clamping-flange, in combination with a gear-wheel, a circular disk, friction-blocks secured to said wheel and disk, an oscillating sleeve, a rotating casting operated by said sleeve, and connections, substantially as described, between said casting-wheel and disk to simultaneously move said wheel and disk toward said clamping-flange, as and for the purpose specified.

7. In a hoisting-machine, a rotating shaft, a spur gear-wheel mounted thereon and provided with projecting hubs, a bearing for said shaft projecting from the pillow-block, angular slots formed in said bearing, and an oscillating sleeve mounted upon said bearing and hub and provided with a stud projecting into said slots, in combination with a drum loosely mounted upon said shaft, having a clamping-flange secured thereto, a spur-wheel and a circular flange arranged upon opposite sides of said clamping-flange, and connections between said sleeve, spur gear-wheel, and disk to simultaneously move said wheel and disk toward said clamping-flange, as and for the purpose specified.

8. The combination, with the shaft, drum, and clamping-flange of a hoisting-machine, of a circular disk mounted upon said shaft upon one side of said clamping-flange, dogs pivoted to said disk, spur gear-wheel mounted upon the shaft upon the opposite side of said clamping-flange, connections between said pivoted dogs and spur gear-wheel, and means, substantially as described, independent of the shaft to simultaneously move said spur gear-wheel and disk toward said clamping-flange, as and for the purpose specified.

9. In a hoisting-machine, a rotatable shaft, a circular disk loosely mounted thereon and provided with projecting friction-blocks and pivoted dogs, connections between said dogs, and a spur gear-wheel mounted upon the shaft, said spur gear-wheel and friction-blocks secured thereto, in combination with a casting hinged to said dogs, connections between said casting, and a casting operated by an oscillating sleeve, said sleeve, and means, substantially as described, to operate said sleeve and to cause said spur gear-wheel and disk to be simultaneously moved toward each other, as and for the purpose specified.

10. In a hoisting-machine, the combination of the oscillating sleeve 35, having a peripheral groove, and an inwardly-projecting stud-bearing, 37, having inclined slots, connecting-rod 39, and lever 40, to operate said sleeve, with a casting adapted to engage said peripheral groove, and connections, substantially as described, between said casting, and a circular disk and a spur-wheel to simultaneously move said disk and wheel toward each other, as and for the purpose set forth.

11. The combination of a spur gear-wheel having friction-blocks secured thereto and adjustable stops 41 and 42 projecting therefrom, a shaft upon which said gear-wheel is mounted, a circular disk mounted upon said shaft and provided with friction-blocks, dogs pivoted to said disk, and connections between said dogs and spur-wheel, and means, substantially as described, to move said disk and wheel toward each other and into engagement with a clamping-flange secured to the drum of the machine, substantially as described.

12. The combination, with a rotating shaft, a drum provided with a clamping-flange loosely mounted upon said shaft, and frictional clamping-blocks to engage the opposite sides of said flange, of a spring arranged upon the shaft within the drum, substantially as described.

13. In a hoisting-machine, a shaft, a drum loosely mounted thereon, a brake-flange upon said drum, and means, substantially as described, to operate said drum, in combination with a brake-band upon said brake-flange, a lever, 48, connected to said band, and links 49, connecting said lever 48 and the operating-lever 50, as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DANIEL S. WAUGH.

Witnesses:

HOWARD S. BAILEY,

ROBT. I. SKILIS.