No. 644,828.

Patented Mar. 6, 1900.

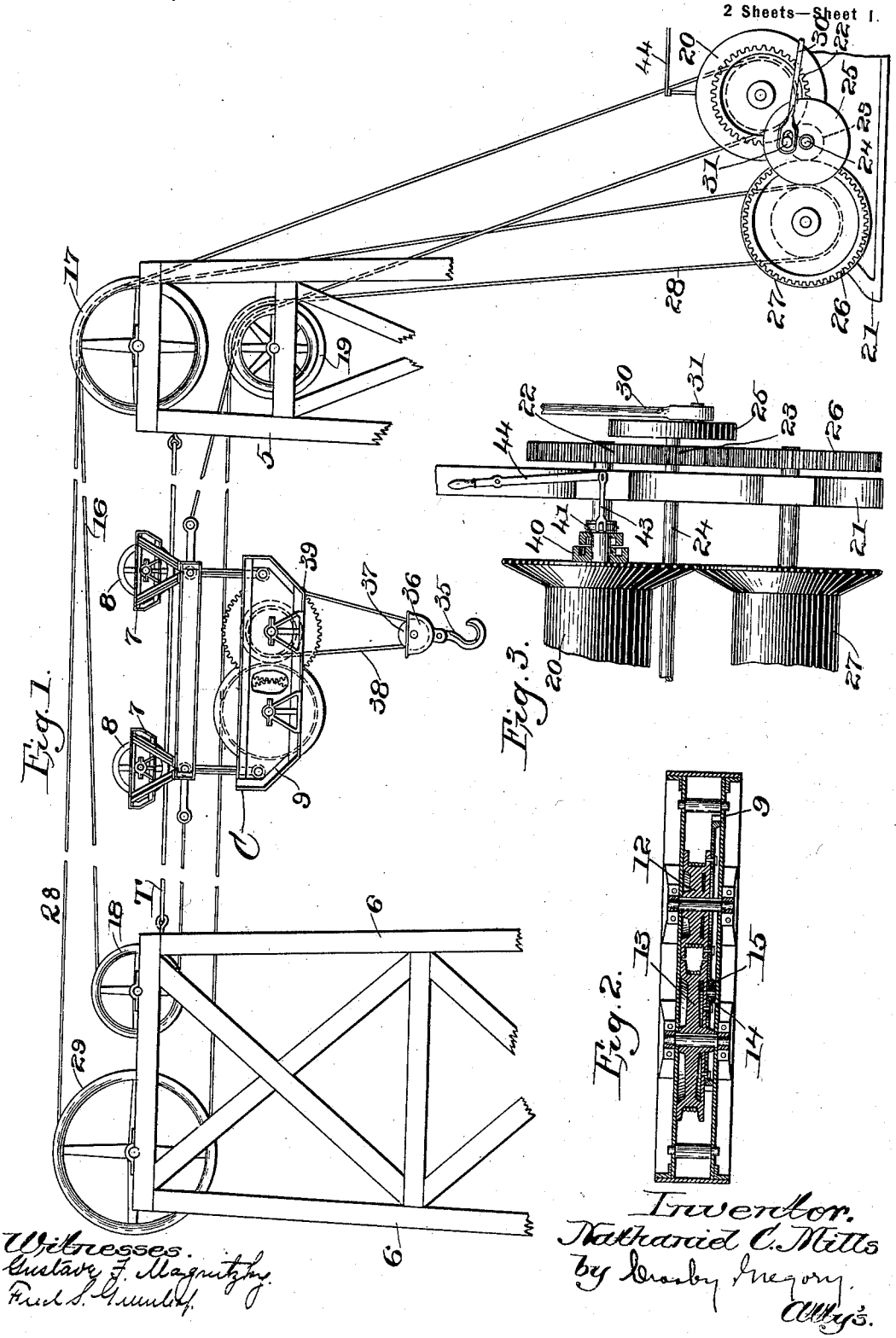
N. C. MILLS.

HOISTING APPARATUS.

(Application filed June 26, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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(No Model.) 2 Sheets—Sheet 2.

Fig. 4.

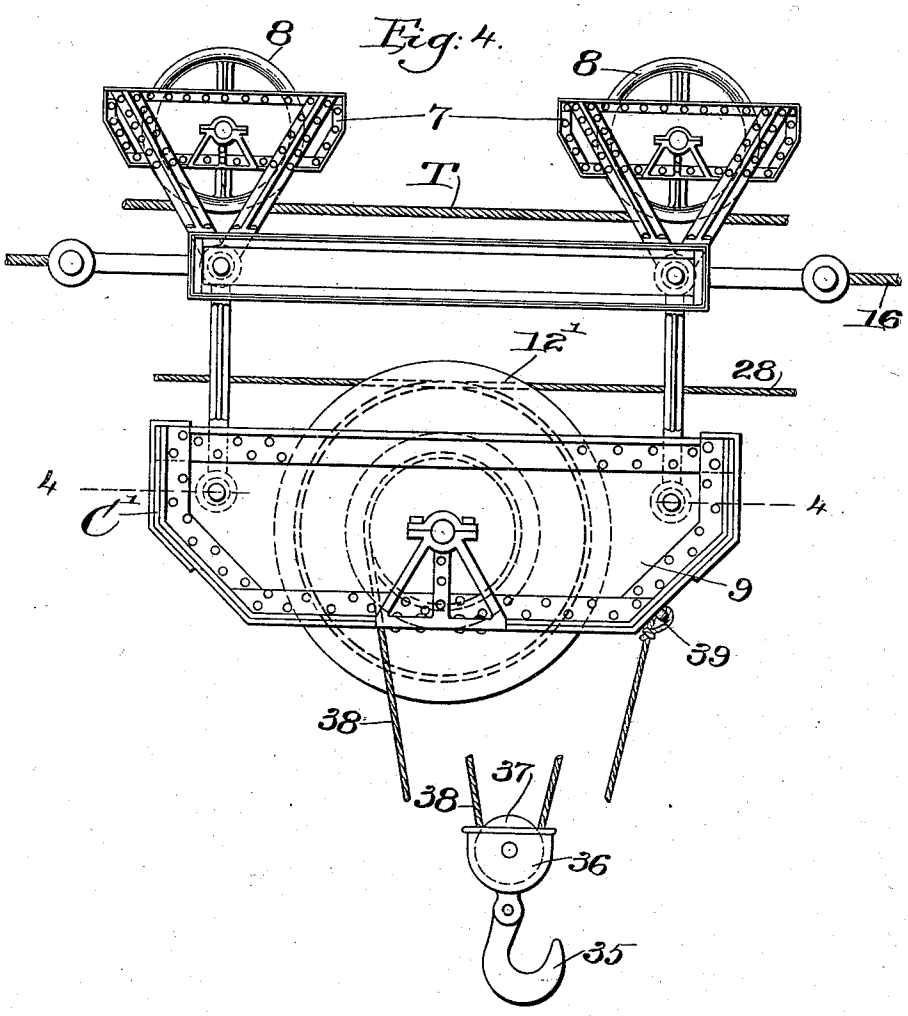
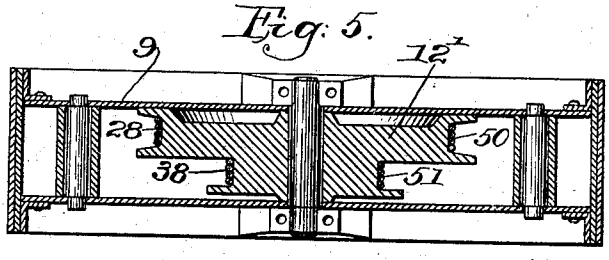


Fig. 5.



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UNITED STATES PATENT OFFICE.

NATHANIEL C. MILLS, OF MALDEN, MASSACHUSETTS.

HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 644,828, dated March 6, 1900.

Application filed June 26, 1899. Serial No. 721,813. (No model.)

To all whom it may concern:

Be it known that I, NATHANIEL C. MILLS, of Malden, county of Middlesex, and State of Massachusetts, have invented an Improvement in Hoisting Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to a hoisting apparatus; and the object of the invention is to provide a simple and convenient mechanism of the type specified involving in the embodiment of the invention herein illustrated means for moving a carriage or traveler carrying hoisting mechanism backward and forward on a track and means for operating the hoisting mechanism at a predetermined time without effecting the operation of the carriage or traveler, and the means which operate the hoisting mechanism includes, preferably, a band, and the organization of elements is such that this band is maintained tight in whatever position the carriage may be between two terminals, and this advantage is obtained without the necessity of employing carriers or suspenders for the hoisting-mechanism-operating cable or rope.

In the drawings, Figure 1 is a side elevation of a hoisting apparatus constructed in accordance with my invention. Fig. 2 is a longitudinal central sectional plan view of the carriage. Fig. 3 is a plan view of a convenient type of mechanism for effecting the simultaneous and independent operation of the operating bands and cables. Fig. 4 is a side elevation of a carrier, showing a modified form of the apparatus; and Fig. 5 is a section on line 4 4 of Fig. 4.

The apparatus in the improvement thereof herein illustrated includes in its organization a carriage or traveler, as C, which moves backward and forward upon the track T, said track being ordinarily formed of heavy cable or steel rope and being connected at its ends with the uprights or trestles 5 and 6, respectively, located generally at remote points. The carriage includes in its construction a pair of hangers, as 7, equipped with wheels 8, adapted to roll upon the track and connected with the side plates 9 of the carriage, between which plates the hoisting mechanism and certain of the controlling devices therefor, hereinafter more fully described, are disposed.

The apparatus in the present case involves in its construction a carriage such as that previously briefly described, a pair of rolls or analogous devices supported by the carriage, one of which constitutes a winding-roll and the other of which constitutes a power-roll, a hoisting device operable by said connections between said rolls, and two bands connected, respectively, with the carriage and with the power-roll, and preferably I employ two devices operated either in unison or independently for moving the two bands, it being remembered that one of said bands is connected with the carriage, with the other is connected with the power-roll to which I have just referred.

By operating the carriage back and forth upon its track through the agency of what may be termed the "haulage-band" and simultaneously operating what may be termed the "hoisting-band," or that connected with the power-roll, said roll which is on the carriage will not be rotated; but if said power-roll be rotated on the stoppage of the carriage or otherwise it will serve, through the intermediate connections, to turn the hoisting-roll, and thereby operate the hoisting device.

The rolls or drums 12 and 13 are supported between the side plates 9 of the carriage, and the roll 12, which is of less diameter than its companion 13, constitutes the hoisting member of the two, while the roll 13 is the power member, and to the outer face of the roll or pulley 13 the pinion 14 is secured and meshes with a gear 15, fastened to the outer face of the roll or pulley 12.

The haulage cable or rope 16 passes around the sheaves or pulleys 17, 18, and 19, carried by the framing made up of the trestles 5 and 6, and also around the main drum 20, supported by the standard or bed 21 and the shaft of which carries a gear 22, meshing with a pinion 23 upon the shaft 24 of the crank-disk 25, said pinion in turn meshing with the gear 26 upon the shaft of the main drum 27, around which the hoisting cable or rope 28 passes, said hoisting-cable also passing over the sheaves or pulleys 17 and 19, both sustained by the trestle 5, and over the large

sheave or pulley 29, mounted upon the trestle 6.

Both the bands or cables 16 and 28 are of the endless type, although the band 16 is divided; but its ends are connected with the ends of the traveler or carriage C.

The disposition of the parts and of the driving mechanism is such that the bands 16 and 28 will be driven in unison from a single operating device, such as the pitman or connecting-rod 30, one end of which is connected to a suitable motor (not shown) and the other end of which is jointed to the crank-pin 31 upon the disk 25.

The hoisting-band 28 passes around the pulley or roll 13 a number of times upon the carriage, which it will be remembered is in the nature of a power device for effecting at stated times the rotation of the adjacent hoisting-roll 12.

As hereinbefore stated, when the two bands 16 and 28 are operated in unison the carriage will be moved back and forth; but the pulley or roll 13 will not be rotated, as the effect will be substantially the same as clamping the band 28 to said roll or pulley 13, this being due to the fact that the two bands are operated in unison. When, however, the carriage is stopped and the band 16 is thrown out of action or stopped and the band 28 is driven, the drum 13 will be rotated and will serve, through the intermediate gears 14 and 15, to rotate the roll or pulley 12, thereby to operate a part connected with said last-mentioned roll or pulley.

In the present case a hoisting device, such as the hook 35, is connected with the pulley or drum 12 for operation, it being also connected with the body portion or carrier 36, provided with the guide-roll 37, under which the band 38 is passed, said band being also turned around the drum or pulley 12 a number of times and having one end fixedly connected, as at 39, with the carriage C. From this it will be evident that when the power-drum 13 is actuated in the manner before described the hook 35, through the intermediate connections, will be raised or lowered, in accordance with the direction of rotation of the power-roll, which of course is governed by the movement of the motor driving the connecting-rod or pitman 30.

For the purpose of rendering the haulage rope or band 28 ineffective I usually throw the main roll out of action, this being conveniently secured by braking and then uncoupling said roll from its supporting-shaft.

The shaft of the drum 20 has a clutch 40 of some familiar type, the movable clutch-section of which has a peripheral groove to receive the ring 41, to which the branches of the bifurcated link 43 are connected, said link being jointed at its opposite end to the operating-lever 44, which is manually controlled and by shifting which the movable clutch-section can be thrown into or out of engagement with its companion to either start or stop the main haulage-drum of the apparatus.

From the preceding description, taken in connection with the drawings, it will be evident that the embodiment of the invention shown in said drawings is exceedingly simple and effective, and it will be apparent that the carriage can be moved backward and forward at any point along the track between the trestles 5 and 6 without operating the hoisting mechanism; but said hoisting mechanism can be rendered instantly effective the moment the carriage stops by simply throwing what I have termed the "main" or "haulage" drum out of action, and this, as has been before stated, can be readily accomplished by simply uncoupling said drum from its shaft.

By the mechanism hereinbefore set forth the carriage can be moved long distances between the uprights 5 and 6 without producing any looseness in the hoisting cable or rope 28, that operates the hoisting-cable, it being well known that in ordinary apparatus of this character the use of a large number of carriers is necessary to sustain that rope or cable which operates the hoisting mechanism.

While I have represented the traveler or carriage C as provided with two rollers 12 and 13, it is obvious, of course, that this is not essential, for one roll may be employed, as represented in Figs. 4 and 5, where the carrier C′ sustains a single drum 12′. Said single drum 12′ has two portions, as 50 and 51, the cable 28 being wound around the portion 50, while the hoisting-device elevating-rope 38 is wound upon the portion 51 of said drum 12′. With this exception the construction illustrated in the modified type of the apparatus is the same as that shown in Figs. 1, 2, and 3, and it is highly advantageous, as the second drum and the gearing or other power-transmitting mechanisms are dispensed with.

In employing the modified type the carriage is driven backward and forward by the operating engine or motor, and when it stops the drum 27 will be operated when the carriage is at rest, so as to rotate the drum 12′ through the agency of the intermediate endless band 28, whereby the hook 35′ will be raised or lowered in accordance with the direction of rotation of the drum 27.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus of the class specified, a carriage provided with a roll, two endless bands connected respectively with the roll and with the carriage, means for operating said bands in unison and for operating that one of said bands connected with the roll, independently of the other band when the carriage is at rest, and hoisting mechanism controlled by said roll.

2. In an apparatus of the class specified, a carriage provided with a roll, two bands connected respectively with the roll and with the carriage, the band which is connected with

the roll being endless, means for operating said bands in unison, a second roll supported by the carriage and operated by said first-mentioned roll, and hoisting mechanism controlled by said second roll.

3. In an apparatus of the class specified, a carriage provided with a roll, two bands connected respectively with the roll and with the carriage, and that band which is connected with the roll being endless, and means for operating said bands in unison.

4. In an apparatus of the class specified, a carriage provided with a roll, two bands connected respectively with the roll and with the carriage, and that band which is connected with the roll being endless, and means for operating said bands in unison, and for actuating the endless band independently of the other band and when the carriage is at rest.

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

NATHANIEL C. MILLS.

Witnesses:

HEATH SUTHERLAND,

GUSTAVE F. MAGNITZKY.