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PATENTED MAR. 21, 1905.

J. WILHELMI.
ELECTRICALLY DRIVEN HOIST OR COAL WHIP.

APPLICATION FILED JUNE 16, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

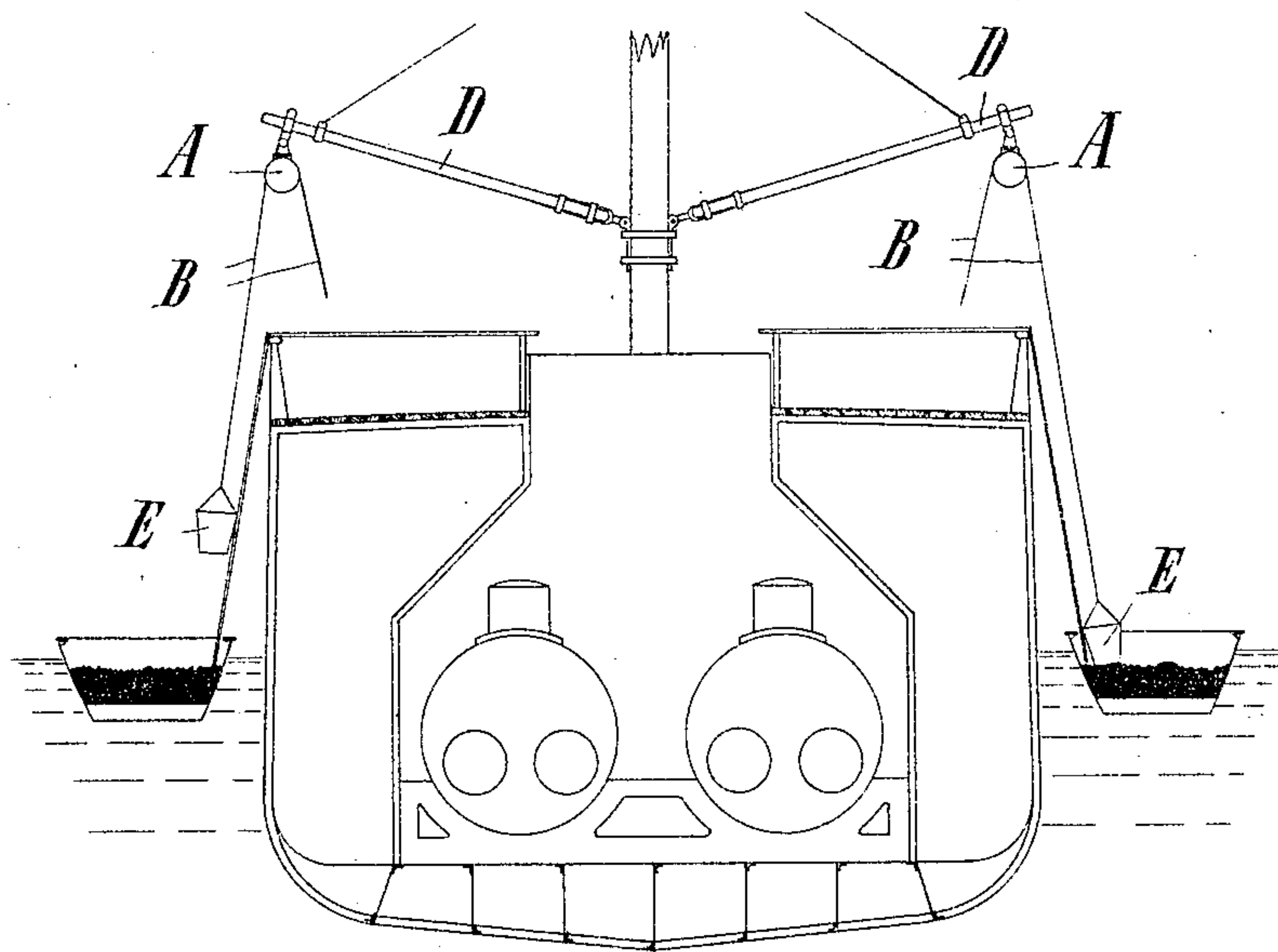


Fig. 2.

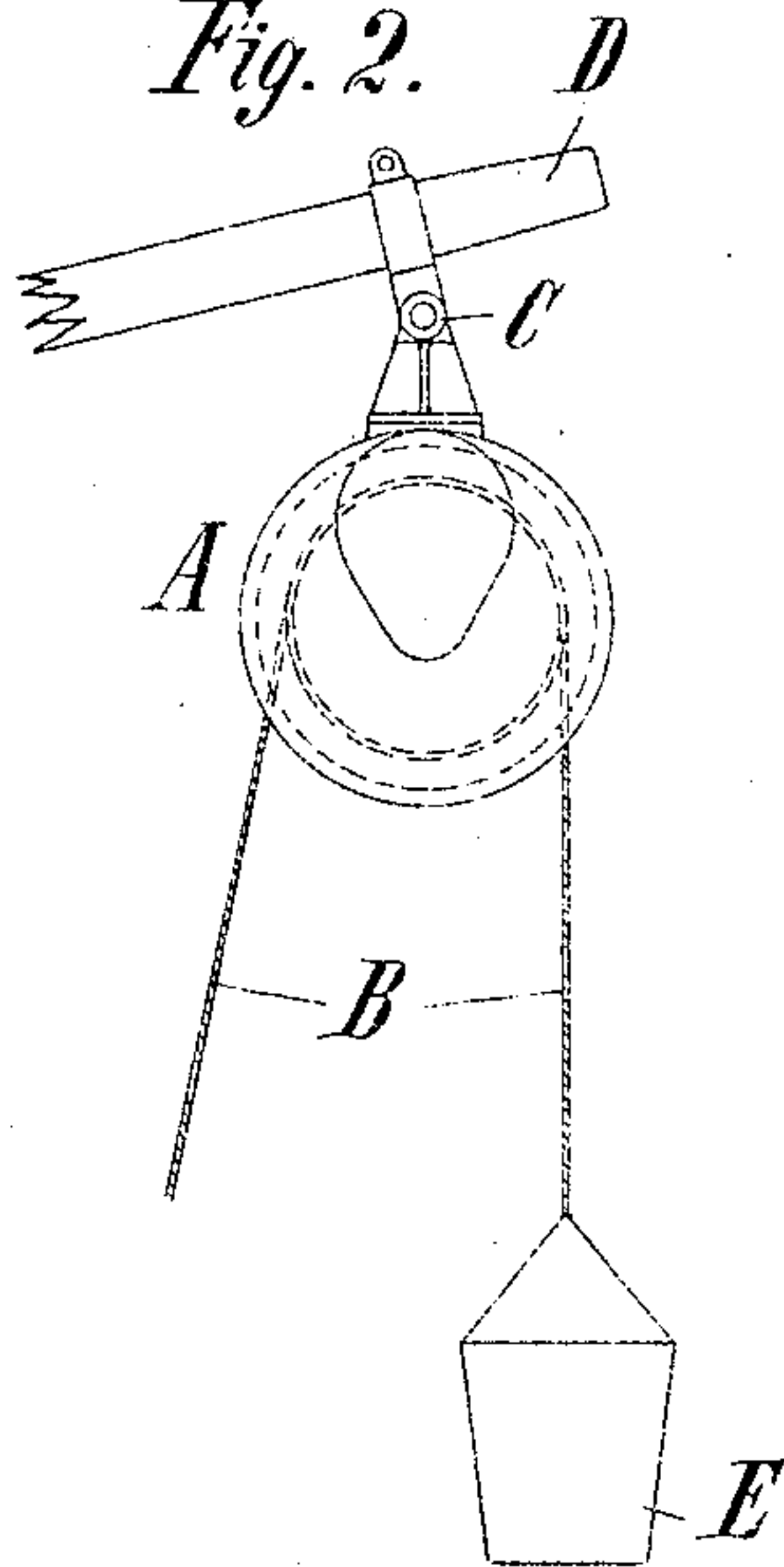
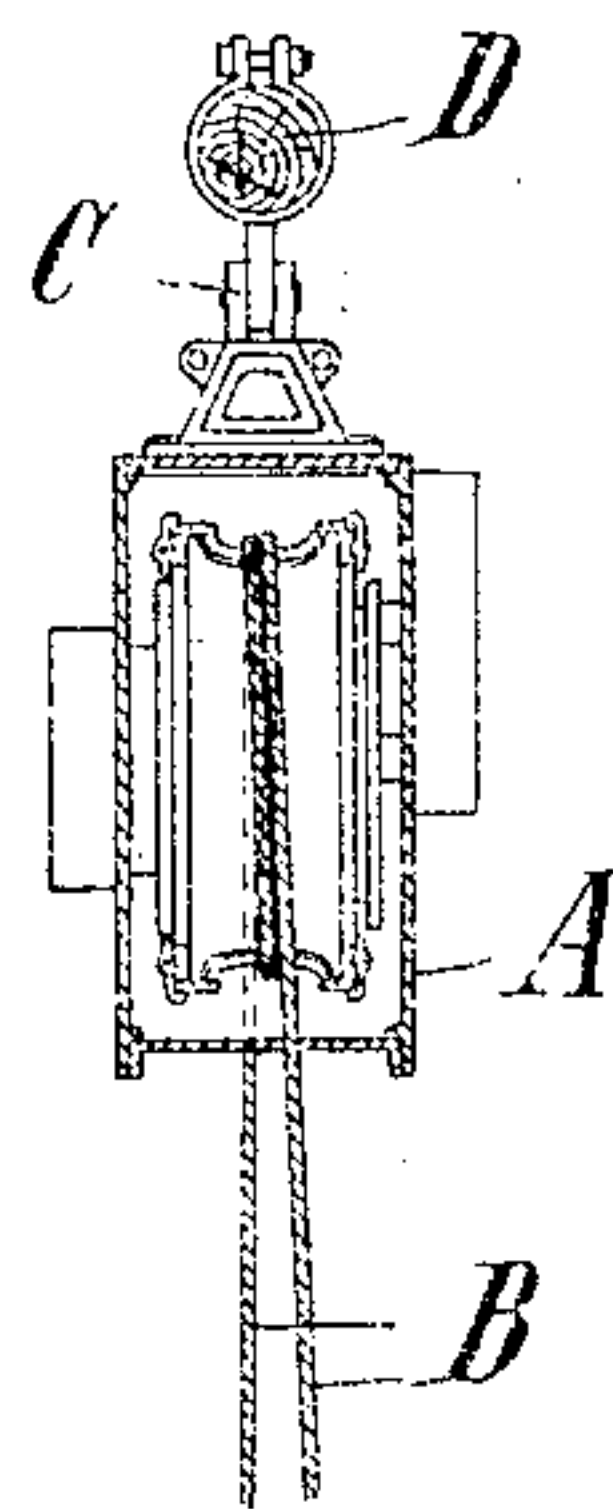


Fig. 3.



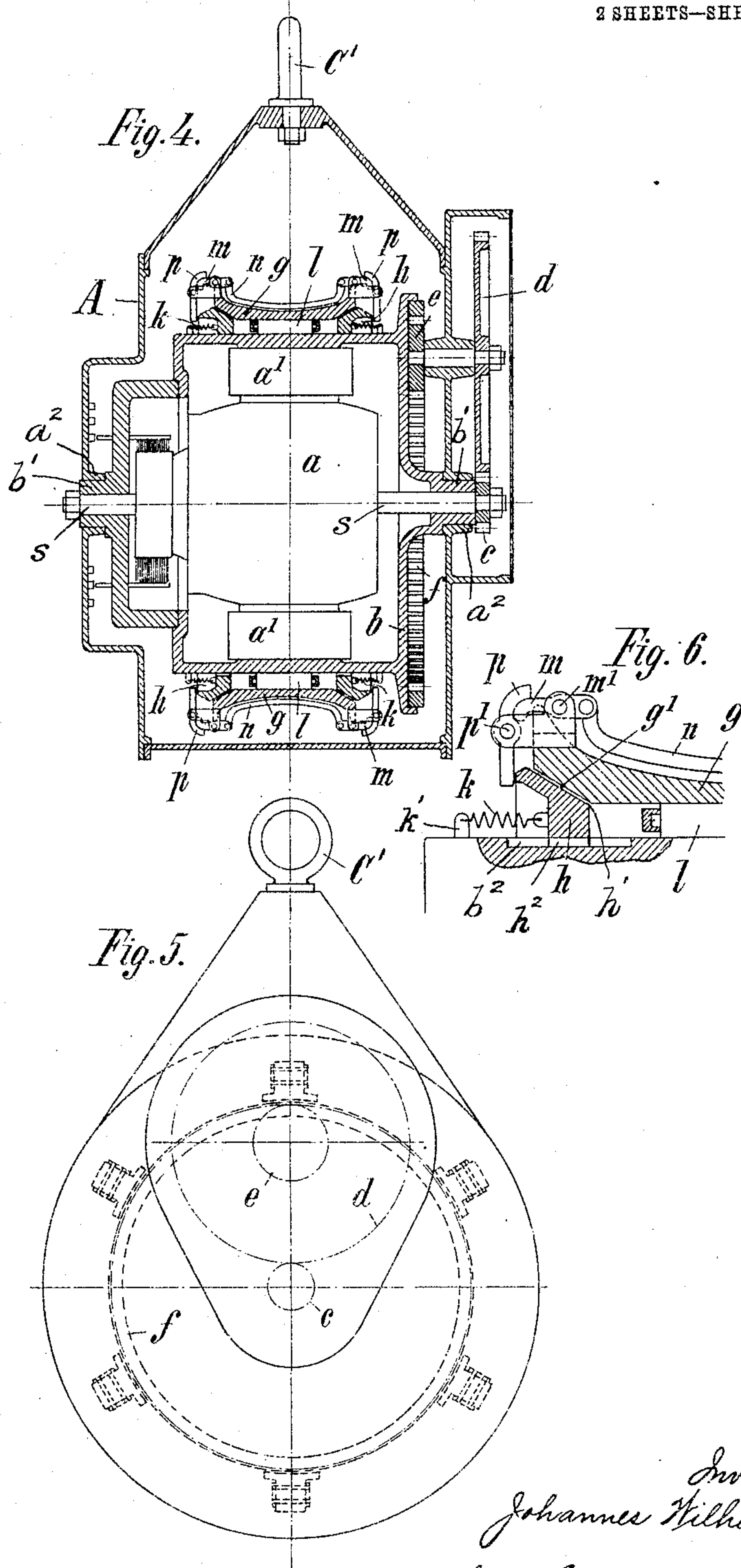
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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ELECTRICALLY-DRIVEN HOIST OR COAL-WHIP.

SPECIFICATION forming part of Letters Patent No. 785,139, dated March 21, 1905.

Application filed June 16, 1904. Serial No. 212,862.

To all whom it may concern:

Be it known that I, JOHANNES WILHELMI, a subject of the German Emperor, and a resident of Hamburg, in the German Empire, have
5 invented certain new and useful Improvements in Electrically-Driven Hoists or Coal-Whips, of which the following is a specification.

This invention has relation to hoisting appliances, and more particularly to hoisting-blocks; and it has for its essential object the saving of labor and the simplification of the hoisting appliances, and consequently their cost of construction and maintenance.

15 In its broad sense my invention lies in a block comprising a sheave or pulley, hereinafter referred to as the "pulley," and an electric motor to rotate the pulley contained in a common housing or shell, hereinafter referred to as the "shell," the latter provided with
20 means for suspending it from or otherwise connecting it to an overhead support.

A characteristic feature of my invention lies in the combination with the pulley of an
25 electric motor, the revoluble element of which is geared to said pulley to rotate it in one direction only, and of means to permit the pulley to revolve independently of and about said revoluble element of the motor, whereby the
30 use of reversing mechanism to reverse the direction of rotation of the revoluble element of the motor is dispensed with.

A further characteristic feature of my invention lies in means controlled by the frictional contact between the hoisting rope or
35 cable, hereinafter referred to as the "cable," and the pulley to couple the latter or to uncouple it from the revoluble element of the motor, the variation of such frictional contact
40 being controlled by variations of the tension or strain on the cable, which tension variations or differences are under the control of the attendant.

A further characteristic feature of my invention lies in the construction of the pulley
45 in two parts—namely, a cylindrical chambered body portion, constituting also a part of the electric motor, and a separate grooved ring or rim portion, hereinafter referred to
50 as the "pulley-rim," and combining therewith

clutch mechanism controlled by the tension or strain of the cable on the pulley-rim, or, in other words, by the frictional resistance exerted by the cable and antagonizing the rotation of said pulley-rim, and in gearing the
55 body portion of the pulley to the rotor of the motor, so that the pulley-rim may be coupled to or uncoupled from its body portion by varying the tension or strain of the cable on said pulley-rim.

In the accompanying drawings I have illustrated my invention in its application to the coaling of ships as an example of the many
60 uses to which said invention may be applied.

Figure 1 is a sectional view illustrating the
65 application of my improved block to the coaling of vessels. Fig. 2 is an end elevation of the block; and Fig. 3 a sectional side elevation thereof, showing the block connected to the swinging arm of a derrick as in Fig.
70 1. Fig. 4 is a vertical sectional view; Fig. 5, a view similar to Fig. 2 on an enlarged scale, and Fig. 6 is an enlarged sectional fragmentary detail view.

My improved block comprises a shell A of
75 suitable construction to accommodate the pulley and the driving mechanism, having suitable apertures for the free passage of the cable B, Figs. 2 and 3, said shell being provided with means, as a bolt C, Fig. 3, or an eye C',
80 Figs. 4 and 5, for connection to an overhead support—as, for instance, to the swinging arms D of a derrick, as shown in Fig. 1. The shell A is furthermore provided with bearings
85 a' for the tubular journals b' of the body portion b of the pulley, which body portion is cylindrical and chambered or hollow and carries on its inner periphery the field-magnets a' of the electric motor, and said tubular journals b' of the pulley-body b constitute the
90 bearings for the shaft s , which carries the armature of said motor, which armature rotates in the field of said magnets.

The pulley-body b is provided at one end with an internally-toothed ring or flange f' ,
95 and the armature-shaft s carries a pinion c , meshing with a wheel d , the shaft of which carries a pinion e in gear with the aforesaid toothed ring f' , whereby the body b of the pulley is rotated in one direction only, the
100

gearing being of course so arranged as to cause the pulley-body *b* and the armature-shaft to rotate in opposite directions and at different rates of speed. The pulley is made

5 in two parts—namely, the described body portion *b* and a grooved rim portion *g*, mounted on rollers *l* on the periphery of said body portion and adapted to revolve about the same in any direction.

10 On the periphery of the pulley-body *b*, between it and the rim *g*, are mounted two friction clutch-rings *h*, connected by tongue and groove *h²b²* to said body, so as to rotate therewith and slide axially thereon, said rings being under the stress of springs *k*, connected thereto and to lugs *h'* on the body portion *b* at various points thereof, the said springs tending to move the rings *h* from each other, and said rings have upper diverging clutch-

15 faces *h'* coacting with correspondingly-converging under faces *g'* at the opposite edges of the pulley-rim *g*.

At suitable points on the perimeter of the edges of the pulley-rim *g* I provide horizontally-disposed levers *m*, arranged in pairs, a lever on one edge being connected by a link *n* to a lever on the opposite edge of the pulley-rim, said levers being fulcrumed at *m'*. The outer preferably downwardly-bent arms

25 of levers *m* project beyond the edges of the pulley-rim *g* and engage the upper correspondingly-bent arms of vertical levers *p*, fulcrumed at *p'* to lugs projecting from the sides of said pulley-rim, the lower arms of levers *p*

30 being in contact with the clutch-rings *h*. The links *n*, which connect two levers *m* of a pair of such, are so shaped as to conform to the groove in the pulley-rim and lie normally a short distance from the bottom of said groove

35 to afford them the necessary play.

In the use of the described block the cable B is passed several times around the pulley-rim, and it is obvious that when said cable is placed under sufficient tension by an attendant

40 to exert the required pressure on the links *n* the latter will tilt the levers *m*. Their outer arm acting on the upper arm of levers *p* will tilt the same and move their lower arms toward each other, thereby moving the clutch-

45 rings *h* in a like manner into engagement with the pulley-rim, thus coupling the latter to its body *b* and causing the two to revolve together, thus hoisting the load—as, for instance, a bucket E—the cable B being kept under

50 proper tension by the attendant and hauled in as fast as it winds on the pulley until the bucket is to be lowered again either with or without the load. In this case the attendant reduces the tension or strain on the cable sufficiently

55 to relieve the links *n* of the pressure to permit the springs *k* to move the clutch-rings *h* out of contact with the pulley-rim *g*, thus uncoupling the latter from its body *b*, the rim being free to revolve in a direction the reverse of the revolution of the body *b*. On the

other hand, by suitably controlling the strain on the cable the attendant may hold a load at any desired elevation, as will be readily understood.

The advantages derived from my improved 70 block will be readily understood by those conversant with hoisting appliances.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is— 75

1. A block comprising a shell provided with means to connect it to an overhead support, a pulley, and an electric motor to drive said pulley, both contained in said shell.

2. A block, comprising a shell provided with 80 means to connect it to an overhead support and containing a pulley, an electric motor and transmitting mechanism to transmit the angular motion of the rotor of said motor to the pulley. 85

3. A block, comprising a shell provided with means to connect it to an overhead support, and containing a chambered pulley, field-magnets therein, an armature revoluble in the field of said magnets, the armature-shaft and transmitting mechanism to transmit the angular 90 motion of the shaft to the pulley and cause the two to rotate in opposite directions.

4. A block, comprising a shell provided with means to connect it to an overhead support, 95 and containing a chambered pulley, field-magnets therein, an armature revoluble in the field of said magnets, the armature-shaft and transmitting mechanism to transmit the angular motion of the shaft to the pulley and cause the two to rotate in opposite directions and at different rates of speed. 100

5. A block, comprising a shell provided with means to connect it to an overhead support and containing a two-part pulley composed of 105 a cylindrical body and a grooved pulley-rim loosely mounted thereon, an electric motor, its armature-shaft and transmitting mechanism to transmit the angular motion of the shaft to the pulley-body; in combination with coupling devices and mechanism to couple the pulley-rim to and uncouple it from its body. 110

6. A block, comprising a shell provided with means to connect it to an overhead support and containing a two-part pulley composed of a 115 cylindrical body and a grooved pulley-rim loosely mounted thereon, an electric motor, its armature-shaft and transmitting mechanism to transmit the angular motion of the shaft to the pulley-body; in combination with coupling devices and mechanism to couple the pulley-rim to and uncouple it from its body, said mechanism organized to be operated by variations of the tension on the hoisting-cable. 120

7. A block, comprising a shell provided with means to connect it to an overhead support and containing a two-part pulley composed of a 125 cylindrical body and of a grooved rim loosely mounted on said body, an electric motor, its armature-shaft and transmitting mechanism 130

to transmit the angular movement of the shaft to the pulley-body; in combination with a clutch-ring on each side of the pulley-rim, said rings revoluble with and slidable axially on the pulley-body and having clutch-faces adapted to act on corresponding faces on opposite sides of the pulley-rim, and means to move said rings toward and from the pulley-rim to couple the latter to and uncouple it from its body portion.

8. A block, comprising a shell provided with means to connect it to an overhead support and containing a two-part pulley composed of a cylindrical body and of a grooved rim loosely mounted on said body, an electric motor, its armature-shaft and transmitting mechanism to transmit the angular movement of the shaft to the pulley-body; in combination with a clutch-ring on each side of the pulley-rim, said rings revoluble with and slidable axially on the pulley-body and having clutch-faces adapted to act on corresponding faces on opposite sides of the pulley-rim, mechanism to move said rings toward and from the pulley-rim to couple the same to or uncouple it from its body portion, said mechanism organized to be operated by variations of the tension on the hoisting-cable.

9. A block, comprising a shell provided with means to connect it to an overhead support and containing a chambered pulley provided with tubular journals revoluble in bearings in the shell, and an electric motor comprising field-magnets arranged in the chamber of the pulley, an armature revoluble in the field of said magnets, and an armature-shaft revolubly mounted in the tubular journals of the pulley, and transmitting mechanism to transmit the angular motion of the shaft to the pulley and cause the two to rotate in opposite directions.

10. A block, comprising a shell provided with means to connect it to an overhead support and containing a two-part pulley composed of a

hollow cylindrical body provided with tubular journals revoluble in bearings in the shell and of a grooved pulley-rim loosely mounted on said body, an electric motor comprising field-magnets on the inner periphery of the pulley-body and an armature revoluble in the field of said magnets, and an armature-shaft revoluble in the tubular journals of said pulley-body, and transmitting mechanism to transmit the angular motion of said shaft to the pulley-body; in combination with friction-clutch devices acting on the pulley-rim to couple the same to its body, means to automatically move said devices out of contact with the pulley-rim, and mechanism organized to be operated by variations of the tension on the hoisting-cable to move the clutch devices into contact with said pulley-rim.

11. The combination with a cylindrical, revoluble pulley-body, two friction clutch-rings revoluble with and slidable axially thereon, and springs acting on said rings to move the same from each other; of a grooved pulley-rim loosely mounted on roller-bearings on said body and having a circular friction clutch-face on either side acted upon by corresponding faces of the clutch-rings, and means to move the clutch-rings toward each other into contact with the clutch-faces of the rim, consisting of horizontal levers, *m*, on either side of the pulley-rim at different points of its perimeter, links, *n*, connecting two oppositely-arranged levers, *m*, and vertical levers *p*, one arm of which is in contact with the clutch-rings, said levers *p* also fulcrumed to the pulley-rim and operated by the levers *m* to move the clutch-rings against the stress of their springs when pressure is applied to the links *n* by the hoisting-cable.

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Witnesses:

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