No. 785,641. PATENTED MAR. 21, 1905.

J. C. SLOCUM.

HOISTING APPARATUS.

APPLICATION FILED NOV. 22, 1902.

4 SHEETS—SHEET 1.

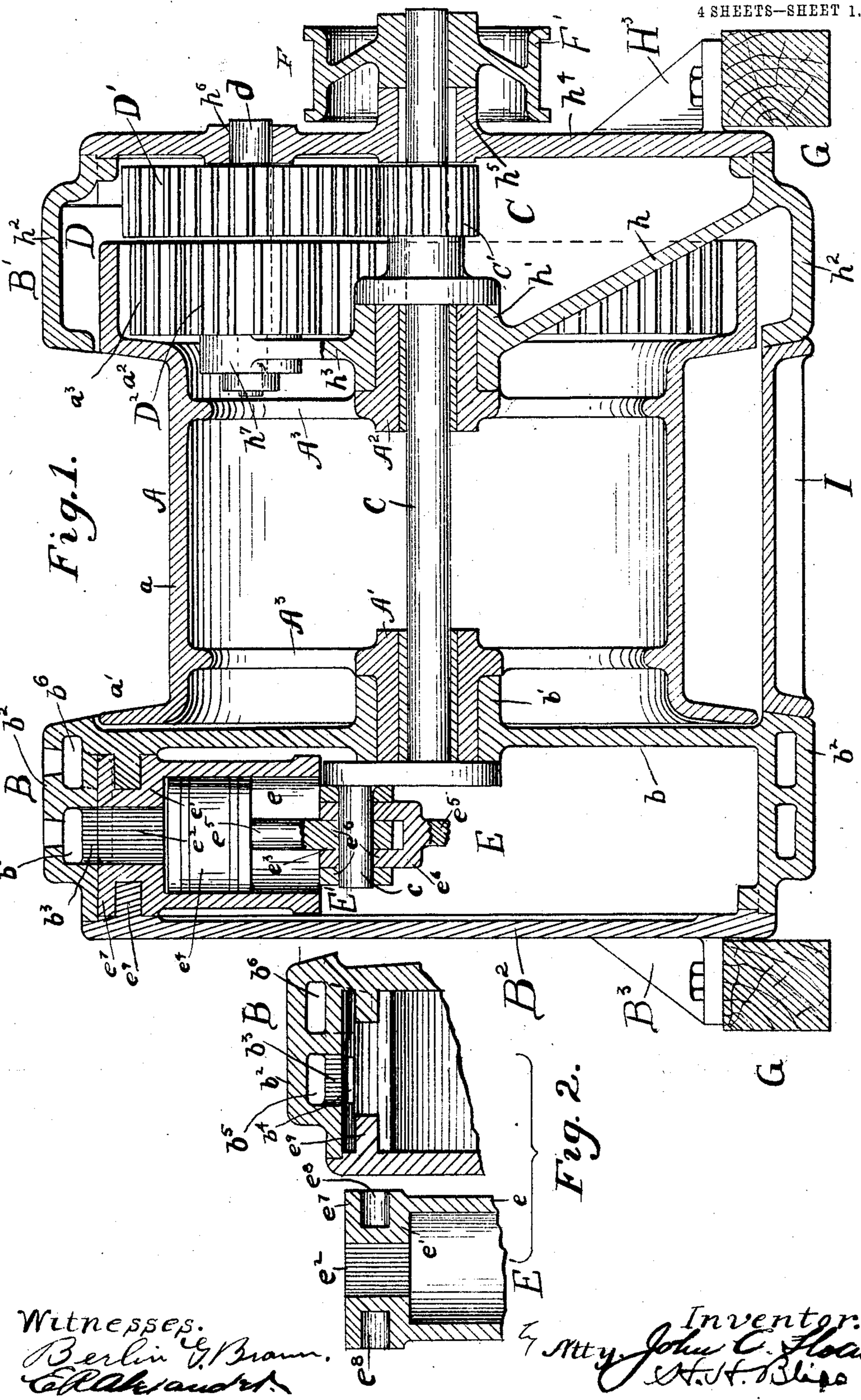



Fig. 1.

Fig. 2.

Witnesses.
Berlin G. Brann.
E. R. Alexander.

Inventor.
John C. Slocum
by H. H. Bliss
Atty.

PHOTO-LITHOGRAPHED BY SACHETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 785,641. PATENTED MAR. 21, 1905.

J. C. SLOCUM.

HOISTING APPARATUS.

APPLICATION FILED NOV. 22, 1902.

4 SHEETS—SHEET 2.

Fig. 4.

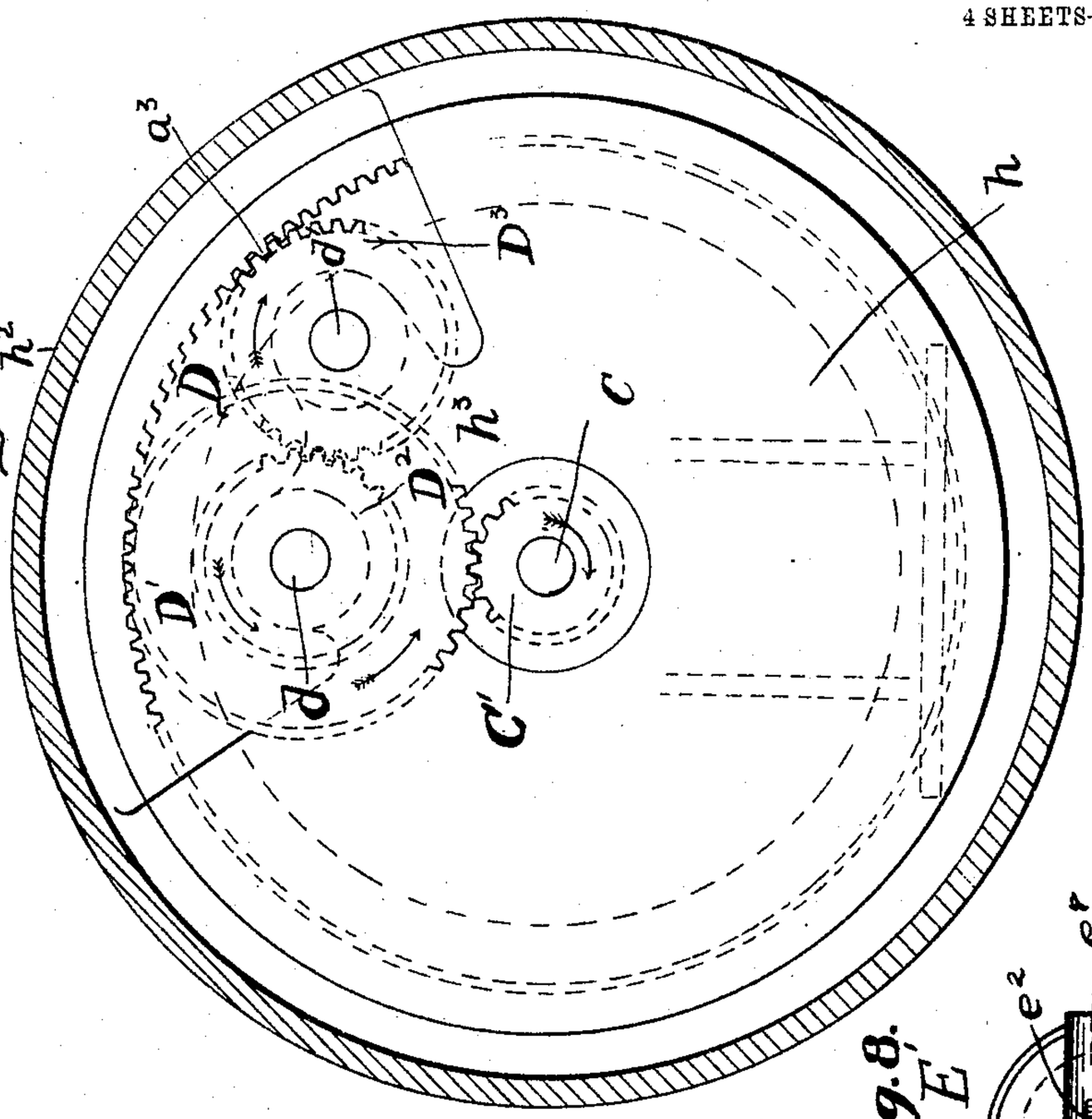



Fig. 8.

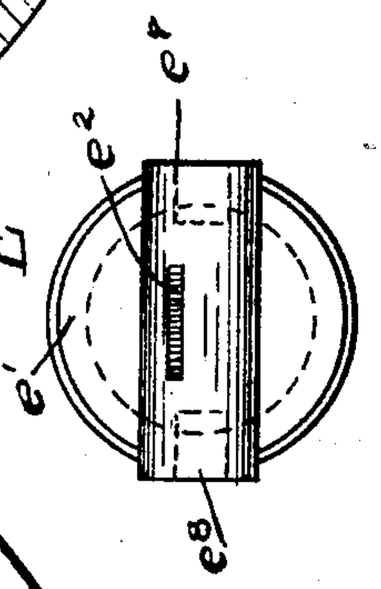
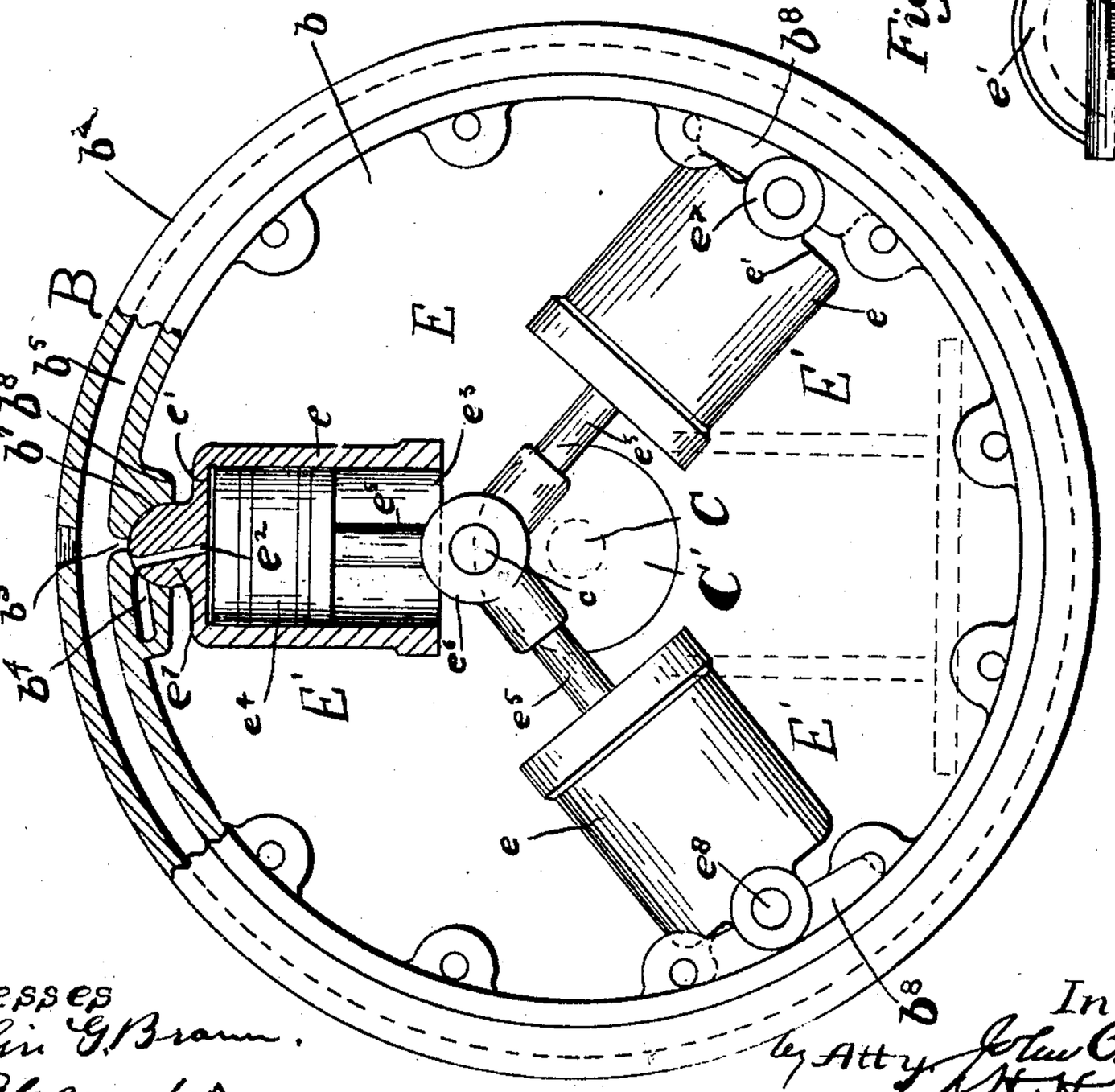



Fig. 3.




Witnesses
Berlin G. Brown.
E. P. Alexander

Inventor
John C. Slocum
by Atty H. H. Bliss

No. 785,641. PATENTED MAR. 21, 1905.

J. C. SLOCUM.

HOISTING APPARATUS.

APPLICATION FILED NOV. 22, 1902.

4 SHEETS—SHEET 3.

Fig. 7.

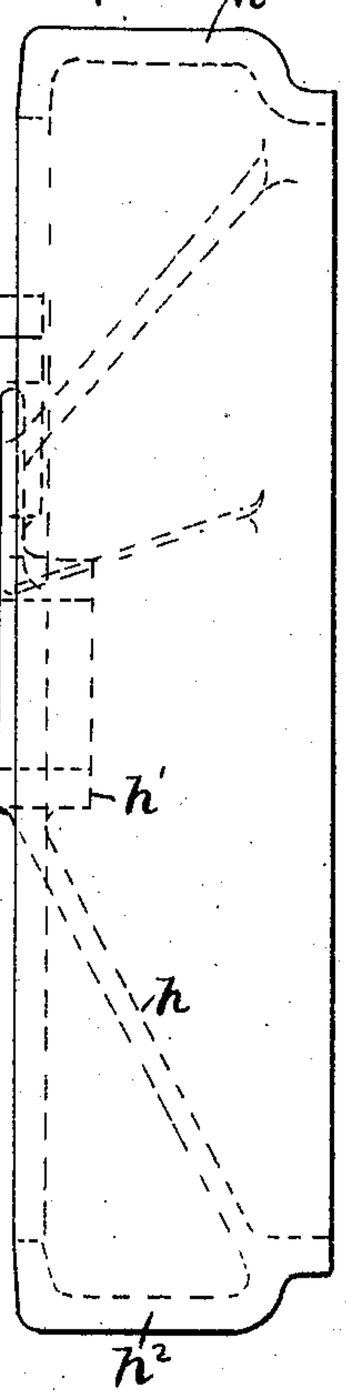



Fig. 6.

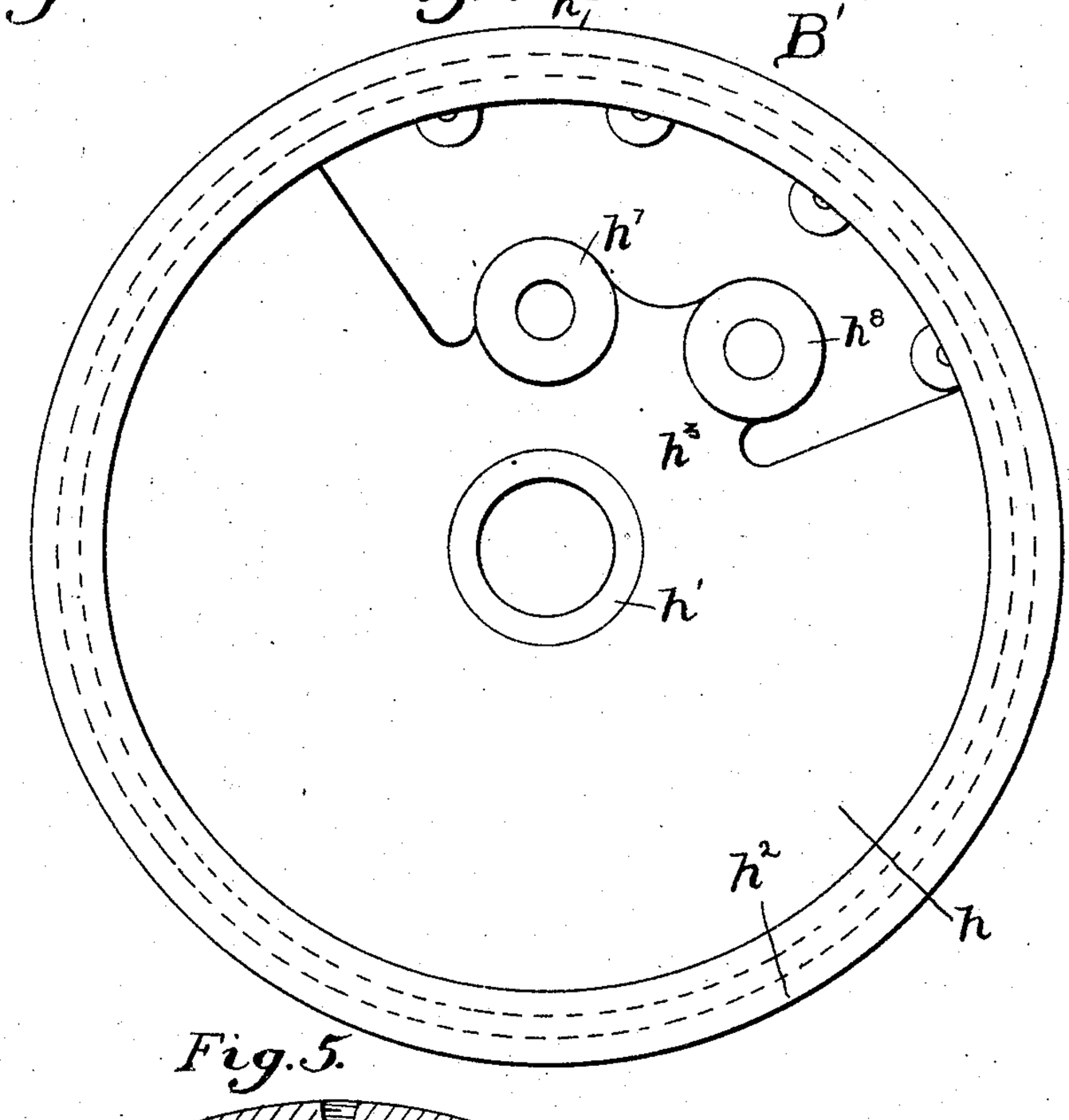
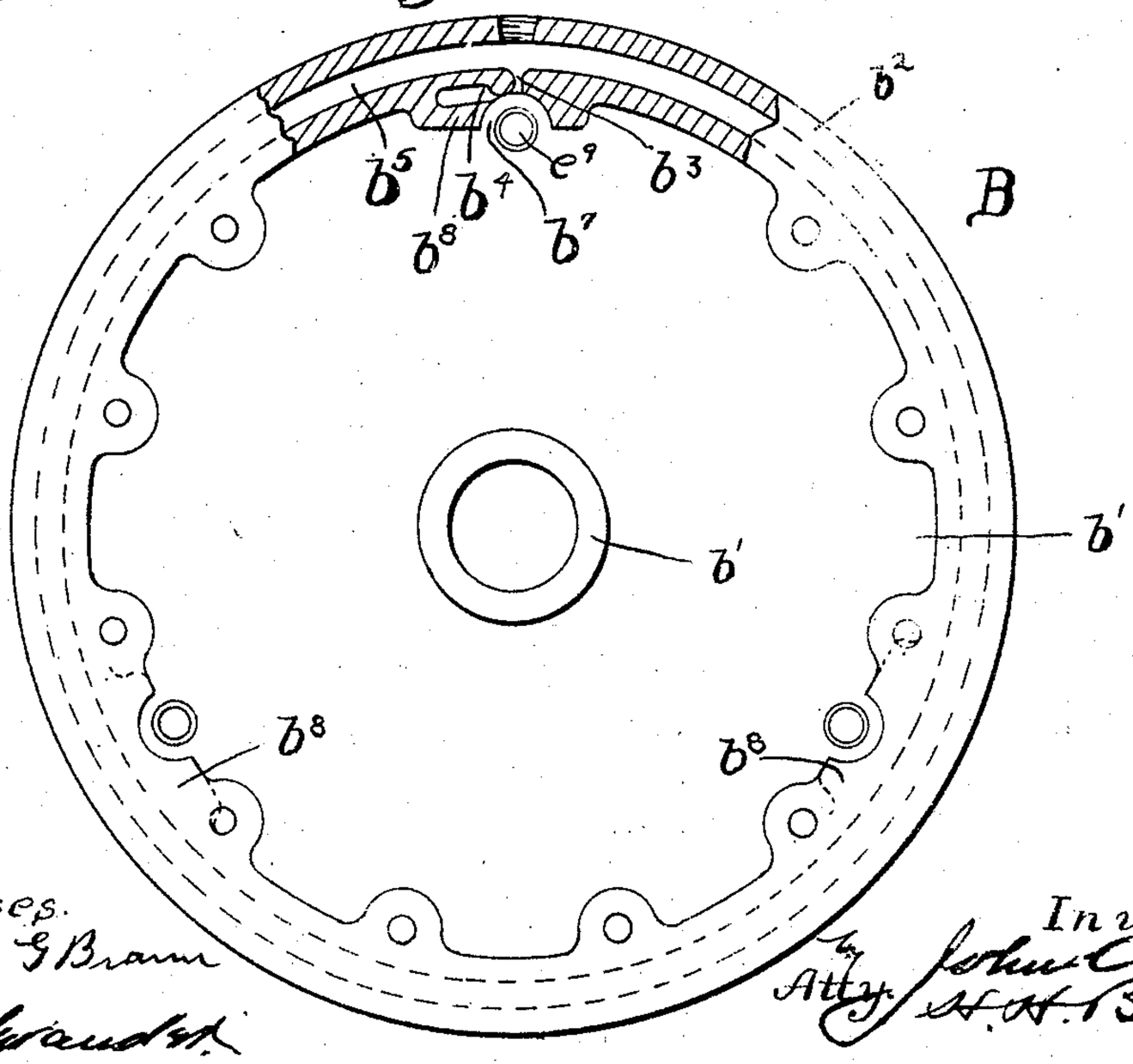



Fig. 5.




Witnesses.
Berlin G Brann
E. C. Allen 2d

Inventor.
John C. Slocum
by Atty. H. A. Bliss

No. 785,641. PATENTED MAR. 21, 1905.

J. C. SLOCUM.

HOISTING APPARATUS.

APPLICATION FILED NOV. 22, 1902.

4 SHEETS—SHEET 4.

Fig. 9.

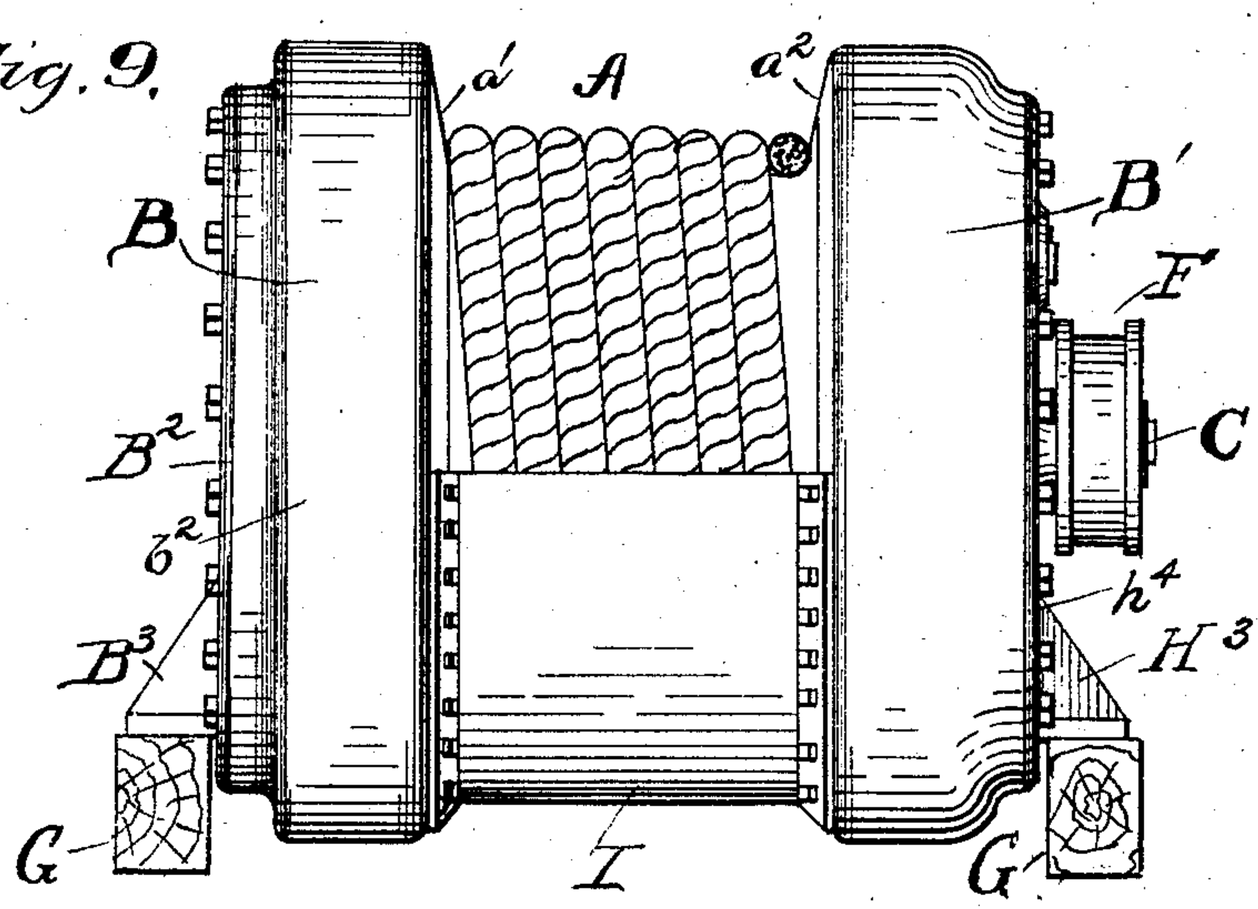



Fig 10.

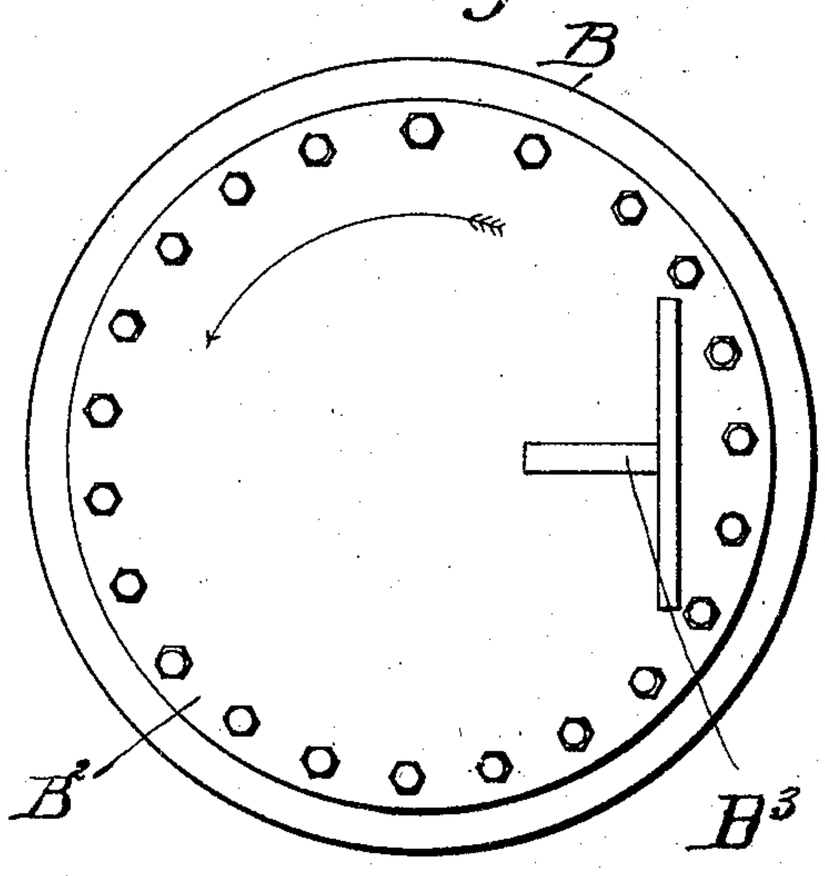
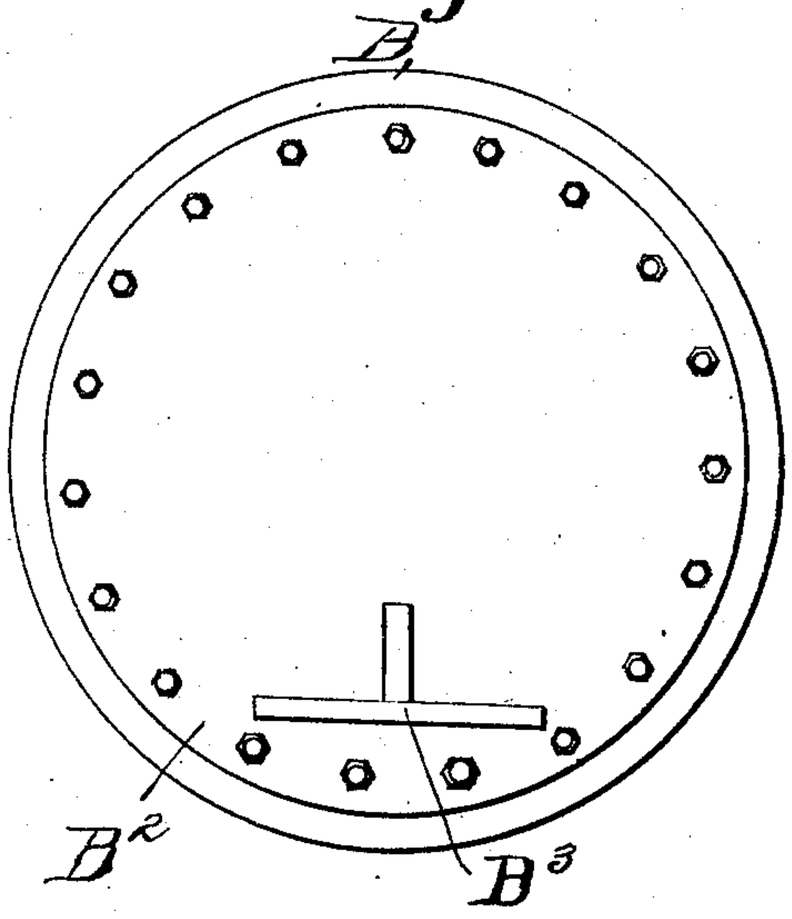



Fig. 11.




WITNESSES:

Berlin J Brown

E. M. Hopkins

INVENTOR

John C. Slocum

BY H. H. Bliss

Attorney

No. 785,641. Patented March 21, 1905.

# UNITED STATES PATENT OFFICE.

JOHN C. SLOCUM, OF COLUMBUS, OHIO, ASSIGNOR TO JOSEPH A. JEFFREY, OF COLUMBUS, OHIO.

## HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 785,641, dated March 21, 1905.

Application filed November 22, 1902. Serial No. 132,462.

*To all whom it may concern:*

Be it known that I, JOHN C. SLOCUM, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Hoisting Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a vertical central section of a hoisting apparatus embodying my improvements. Fig. 2 is a section showing the inlet and exhaust ducts and ports. Fig. 3 is a view, partly in end elevation, partly in section, of the motor-chamber, the face-plate or casing-plate being removed. Fig. 4 shows, partly in section, partly in elevation, the gearing-chamber, the end plate at that end being removed. Figs. 5, 6, and 7 show details. Fig. 8 is an end view of the cylinder of one of the motor elements. Fig. 9 is a front elevation of a hoisting apparatus embodying my improvements. Fig. 10 is a view of one end; and Fig. 11 is a view of the same end, the apparatus being shown rotated ninety degrees.

In the drawings, A represents as a whole the rope-winding or drum mechanism; B B′, the parts which serve as a framework-support and casing for the operative parts; C, the crank-shaft or main shaft of the mechanism; D, a set of gearing; E, the motor, and F the brake mechanism. With respect to each of these parts or sets of parts I prefer to employ such as are shaped and related substantially as are those shown, but at the outset state that it must be understood that with respect to each of them there can be modifications or variations in many respects without departing from the essential features of the invention.

That part of the mechanism which is indicated as a whole by A, it being the part to which is directly attached the winding-rope and around which the latter is wrapped, consists of the cylindrical peripheral wall part at $a$, the end flange $a'$, the end flange $a^2$, having a gearing-ring $a^3$, together with hubs A′ A² at the center, the peripheral parts being connected with the hubs by webs or spoke-like portions A³.

The elements of the structure which serve as a support or frame and also preferably as a casing or housing and, as aforesaid, indicated by B B′ are illustrated as being constructed as follows: At one end the part B is formed with a radial web or plate $b$, which has a hollow journal at $b'$ and a peripheral (approximately cylindrical) wall $b^2$. The radial wall B and the journal $b'$ provide a support for the hub A′ of the winding-drum. The peripheral part $b^2$, as shown, is preferably so constructed as to furnish the supply-chest, (for steam or similar agent,) the feed-ports, the exhaust-duct, and the exhaust-passage for the motor.

The motor here illustrated is of the three-cylinder trunk-engine class. Each of its component elements is indicated by E′. It has the cylinder proper, $e$, with the end $e'$ closed, except at the portway $e^2$, the other end, $e^3$, being open. It is provided with a piston $e^4$ and a piston-rod $e^5$, which is connected to the eye or eyes $e^6$, by which it is hinged to the wrist-pin $c$ of the crank-shaft. The engine-cylinder is hinged at its outer end, the wall at $e'$ at said end having an enlargement of metal at $e^7$, wherein are formed sockets $e^8$, which are fitted to trunnions $e^9$. The cylinder can vibrate around the axis of the trunnion-hinge $e^9$. The portway $e^2$ communicates with a feed-port $b^3$ and with the exhaust port $b^4$ alternately. In the peripheral rim-wall of the frame or casing or housing section B there is an annular chest or duct $b^5$, into which steam or similar agent (for many purposes compressed air) is admitted, and at $b^6$ there is a duct or passage-way for the exhaust. The ports $b^3$ communicate with the feed chest or passage $b^5$, and those at $b^4$ communicate with the exhaust-duct $b^6$. The journal portion at $e^7$ is fitted into a cavity $b^7$, formed in an enlargement $b^8$ in the casing-wall at the places where the ports $b^3$ $b^4$ are formed. The journal part $e^7$ of the cylinder oscillates in this cavity, to which it is snugly fitted, it being turned to such position as to cause the port $e^2$ to register with the feed-port $b^3$ and then to register with the exhaust-port $b^4$. The three motor elements E′ are similar to each other, each being one hundred and twenty degrees of a circle distant from its neighbor. The part at B² is in the form of a disk or circular plate

capable, first, of closing the motor-chamber; second, of furnishing support for the motor elements, and, third, of securing in place the whole structure (or one end thereof) upon an outside frame or abutment, such as shown at G. It is bolted to the peripheral wall $b^2$ and, as aforesaid, carries one of the trunnion hinges or pivots $e^9$ for each engine-cylinder. It also carries the flanges at $B^3$ or equivalent means for bolting the whole apparatus to the aforesaid frame or similar holder G.

Passing to the other end of the winding device, there is a framing and housing element at B', as aforesaid. It has a wall-section $h$, which at the center supports a hollow journal-like part $h'$ and is also connected to a peripheral (preferably cylindrical) wall $h^2$.

$h^3$ is an extension from the journal or bearing $h'$ and intended for supporting some of the gearing, as will be described.

$h^4$ is a circular disk or plate arranged radially of the axis and bolted to the outer edge of the peripheral part $h^2$. At the center it has a bearing $h^5$ for the main shaft C.

$d$ is a shaft mounted in a bearing at $h^6$ in the wall $h^4$ and in a bearing $h^7$ in the flange or bracket $h^3$, and $d'$ is a shaft mounted in a bracket at $h^8$ and in the outer wall $h^4$.

C' is a pinion on the crank-shaft C, engaged with a wheel D', keyed to the shaft $d$. $D^2$ is a smaller wheel on this shaft, meshing with the wheel $D^3$ on shaft $d'$, the last said wheel in turn meshing with the internal gearing at $a^3$, secured to the drum.

The crank-shaft C is mounted in the bearings $b'$, $h'$, and $h^5$, it being journaled directly in that at $h^5$ and being supported in the others through the medium of the hubs $A' A^2$ of the winding-drum, which are interposed between the shaft and the stationary bearings —that is to say, the winding-drum and the shaft are mounted on the same axis, but are loose in relation to each other, so that they can turn independently either both in the same direction or, if it is desired, in opposite directions. The crank-disk C' is by means of the wrist-pin $c$ connected to the piston-rods $e^5$ of the engine element.

The shaft C is provided with a brake mechanism, which may be of any suitable sort. As shown, a brake drum or wheel F' is keyed to the shaft, and with it are combined a friction-band and operating mechanism of any preferred sort.

The end wall $h^4$ is provided with a flange or bracket $H^3$, similar to that at $B^3$, at the opposite end and adapted to be bolted to a framework, such as is conventionally illustrated at G. The two end sections or elements of the frame or housing are rigidly connected by girths or bracing-plates, such as at I, bolted to the peripheral parts $b^2$ and $h^2$, so as to firmly join and brace them and prevent torsional strain or tendency to misplace one end of the frame in relation to the other. Such bracing or girding parts can be used around the periphery of the drum, and yet leave open or accessible a sufficient part thereof to allow the rope to be readily wound and unwound.

Upon inspection of the drawings and from the above description it will be seen that I provide a winding mechanism and an operating mechanism, all of whose parts are compactly arranged and are so disposed as to provide a drum-like structure with incasing or housing walls which conceal and protect all of the operative parts. Consequently not only when the machine is stationary and in operation is there no liability to accident to operatives and no danger of breakage either of the parts of the apparatus or of other bodies in case the latter should accidentally come in contact with the moving parts, but, moreover and particularly, the whole structure becomes readily portable, and therefore adapted in a superior manner for certain special uses to which such a mechanism can be put. For instance, in mines, tunnel-work, operations in quarries, this is an excellent apparatus, because of its parts being so designed and related that it can be readily moved from one place to another and as readily attached and detached from its frame G. Suppose, for example, in operating a mine it is desired to move and control cars upon inclines or tracks of such grade that they cannot be readily transported or controlled by locomotives or horses. The present apparatus is available. The temporary frame or abutment structure G is laid upon the ground, the hoisting apparatus is secured thereto, as described, the rope is extended from the drum up more or less of the incline and around a suitable guide or sheave mechanism at the other end of the path of travel of the cars, and the free end of the rope is secured to a car or car-connecting device. Then the main duct for the steam or compressed air, such as a piping laid along the mine or tunnel, is connected by a hose or piping to the steam or air chamber $b^5$, and the mechanism is ready for use either to draw a car up the incline or to control it as it moves downward under the action of gravity. Then when the path of travel of the cars is to be varied—as, for instance, after the tunnel or mine-heading has been extended farther up the incline—the winding apparatus as a whole can be moved easily to a new position inasmuch as it is only necessary to release it from the framework at G and roll it over the ground or over a temporary track-like support, the peripheral parts at $b^2$ $h^2$ being then available as wheels upon which the whole mechanism can roll and be supported. When the new location is reached, an abutment-frame or holding structure G G is provided, and the winder is again fastened in place for a new series of operations.

What I claim is—

1. A hoisting apparatus having in combina-

tion a rope-winding drum, an engine or motor mechanism, gearing or power-transmitting devices connecting the motor with the drum, and a housing inclosing the motor and the power-transmitting devices, said parts being related substantially as set forth, whereby a unitary structure is provided which can be rolled from place to place as desired.

2. In a hoisting apparatus the combination of a rope-winding drum, a motor, gearing interposed between the motor and the drum, and the housing or casing inclosing said motor and gearing and forming with the drum a unitary structure, the parts of which remain in operative relationship to each other as the apparatus is revolved bodily.

3. The combination of a rope-winding drum, bearings for said drum, a bearing-carrying frame having parts arranged at either side of the drum concentric therewith and of greater diameter than the drum and adapted to afford supporting-surfaces for bodily rolling the hoisting apparatus when desired, an engine or motor supported by said frame and power-transmitting devices interposed between said motor and the drum, said motor and power-transmitting devices being arranged inside of the periphery of the aforesaid circular supporting parts, substantially as set forth.

4. In a hoisting mechanism, the combination of the rope-winding drum, an engine or motor, power-transmitting devices connecting the motor with the drum, a framework which provides supports and bearings for all of said parts, whereby they can be rotated as a unitary structure without varying their working relations to each other, substantially as described.

5. In a hoisting mechanism, the combination of a rope-winding drum, the shaft at the axis of the drum, the framework having sections arranged at either side of said drum concentric therewith and of greater diameter than said drum, the engine or motor secured to one of said sections and connected with said shaft and power-transmitting devices interposed between said shaft and said drum, substantially as set forth.

6. A bodily-rotatable hoisting apparatus, comprising a winding-drum, a motor and power-transmitting devices, and a supporting frame or casing, all adapted to rotate while maintaining the same operative relations to each other, substantially as set forth.

7. A bodily-rotatable hoisting apparatus, comprising a winding-drum, and a frame or support for the drum having two substantially circular end portions adapted to roll along a support while resting peripherally thereon, substantially as set forth.

8. A hoisting apparatus having a winding-drum, a driving-motor, and power-transmitting devices between the motor and the drum, and a supporting-frame for said parts formed with two substantially circular sections, one at each end of the drum, whereby all of said parts as a unitary structure are adapted to roll without varying their working relations with each other, substantially as set forth.

9. In a hoisting apparatus the combination of a rope-winding drum, a supporting-frame therefor having circular portions arranged at either side of the drum concentric therewith and of greater diameter than the drum and adapted to provide bearing-surfaces for supporting the apparatus when it is desired to roll it bodily, a motor or engine carried by said framework and power-transmitting devices interposed between said motor and drum, said motor and power-transmitting devices being arranged within circles of shorter radius than the radius of the periphery of the supporting parts with which the said circles are concentric, substantially as set forth.

10. In a hoisting apparatus, the combination of a rope-winding drum, a casing or housing arranged at either side thereof concentric therewith and of greater diameter than the drum, means connecting said casings together, a motor or engine secured within one of said casings and power-transmitting devices interposed between said motor and the drum, substantially as set forth.

11. In a hoisting apparatus, the combination of a winding-drum, a framework supporting said drum, and having sections arranged at either side thereof concentric therewith and of greater diameter than said drum, a motor or engine supported by said framework at points inside of the periphery of said sections, and power-transmitting devices interposed between the motor and the drum, substantially as set forth.

12. In a hoisting apparatus the combination of the framework having circular bearing-surfaces at either side thereof adapted to support said apparatus when it is rolled from place to place, a driving-shaft mounted in bearings in said framework, a rope-winding drum mounted on said shaft, a motor or engine for operating said driving-shaft and secured to said framework and power-transmitting devices interposed between said driving-shaft and the drum, substantially as set forth.

13. In a bodily-rotatable hoisting apparatus the combination of a framework having circular bearing-surfaces at either side thereof adapted to support the apparatus when it is rolled from place to place, a driving-shaft mounted in bearings in said framework, a winding-drum loosely mounted on said driving-shaft, a motor or engine for actuating said driving-shaft secured to said framework at one side thereof and power-transmitting devices interposed between said driving-shaft and the drum, substantially as set forth.

14. A bodily-rotatable hoisting apparatus, comprising a framework having circular supporting-surfaces at either side thereof adapted to support the apparatus when it is rolled

from place to place, a driving-shaft mounted in bearings in said framework, a rope-winding drum loosely mounted on said shaft, a motor for actuating said shaft secured to one side of said framework and power-transmitting devices arranged at the other side of the framework and interposed between said driving-shaft and the drum, substantiallyas set forth.

15. In a bodily-rotatable hoisting apparatus, the combination of the framework having circular supporting-surfaces arranged at either side thereof adapted to support the apparatus when it is rolled from place to place, the drum mounted on said framework, the motor secured on said framework, the power-transmitting mechanism interposed between said motor and the drum and means for securing the hoisting apparatus rigidly in a fixed position, said means being arranged at the ends of the rotatable framework and at points nearer the axis thereof than the peripheries of said circular supporting-surfaces, substantially as set forth.

16. In a hoisting apparatus, the combination of a winding-drum, a framework supporting said drum and having a casing at one side thereof arranged concentric with said drum, an engine or motor arranged within said casing and power-transmitting devices interposed between said engine or motor and the drum, substantially as set forth.

17. In a hoisting apparatus, the combination of a winding-drum, a framework supporting said drum and having a casing at one side thereof arranged concentric with said drum, a plurality of oscillating engines arranged in said casing and power-transmitting mechanism interposed between said engines and the drum, substantially as set forth.

18. In a hoisting apparatus, the combination of the rope-winding drum, the framework supporting said drum and having a housing at one side thereof, the walls of said housing having fluid supply and exhaust ducts formed therein, an oscillating engine having its outer end pivotally mounted in said housing, and having a port arranged longitudinally of the engine-cylinder and adapted to communicate alternately with said fluid supply and exhaust ducts, and power-transmitting mechanism interposed between said engine and the drum, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN C. SLOCUM.

Witnesses:
H. C. Cross,
E. R. Merrill.