No. 810,884. PATENTED JAN. 23, 1906.

J. L. PILLING.

PNEUMATIC HOIST.

APPLICATION FILED DEC. 27, 1904.

2 SHEETS—SHEET 1.

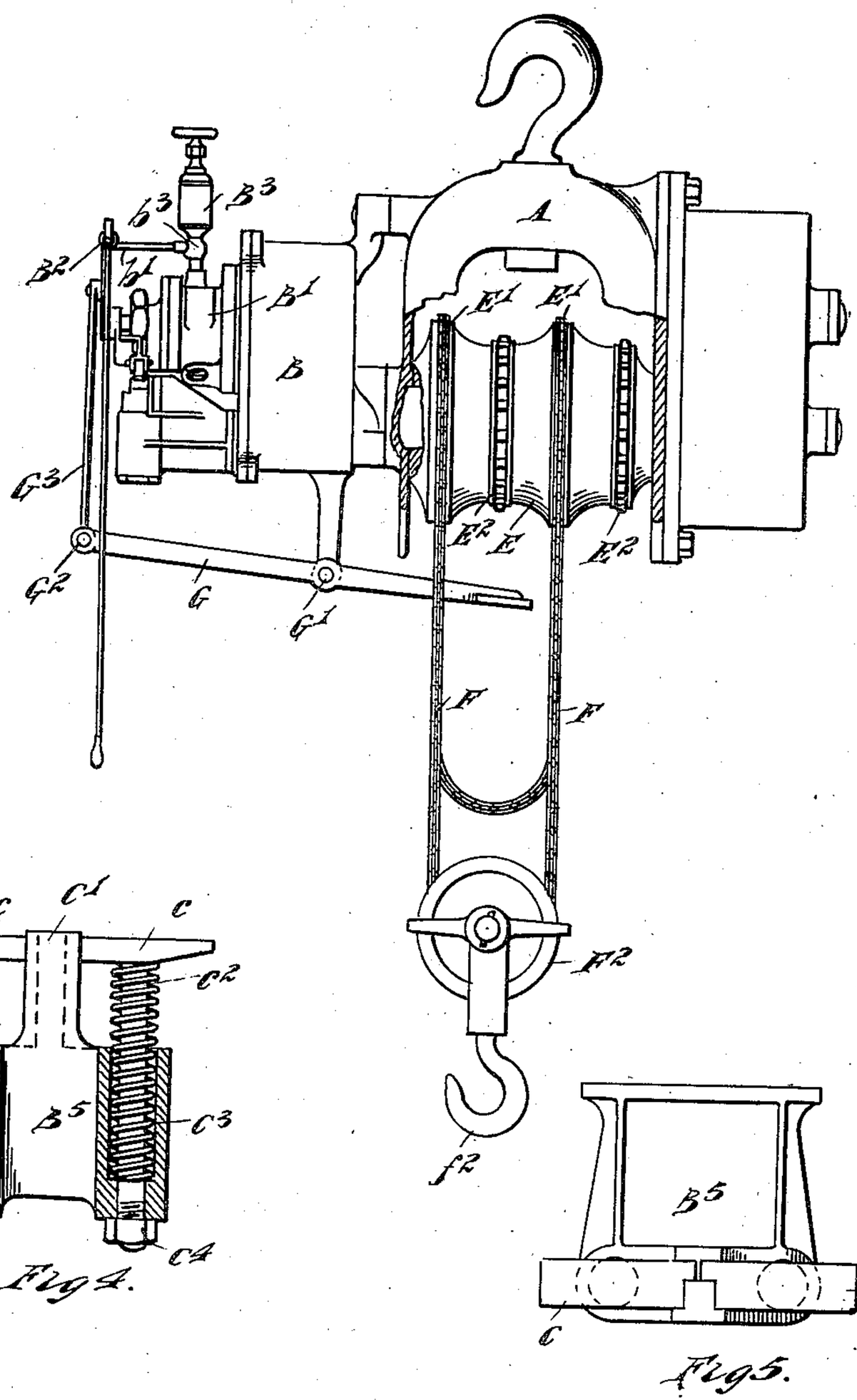

Fig 1.

Fig 4.

Fig 5.

WITNESSES

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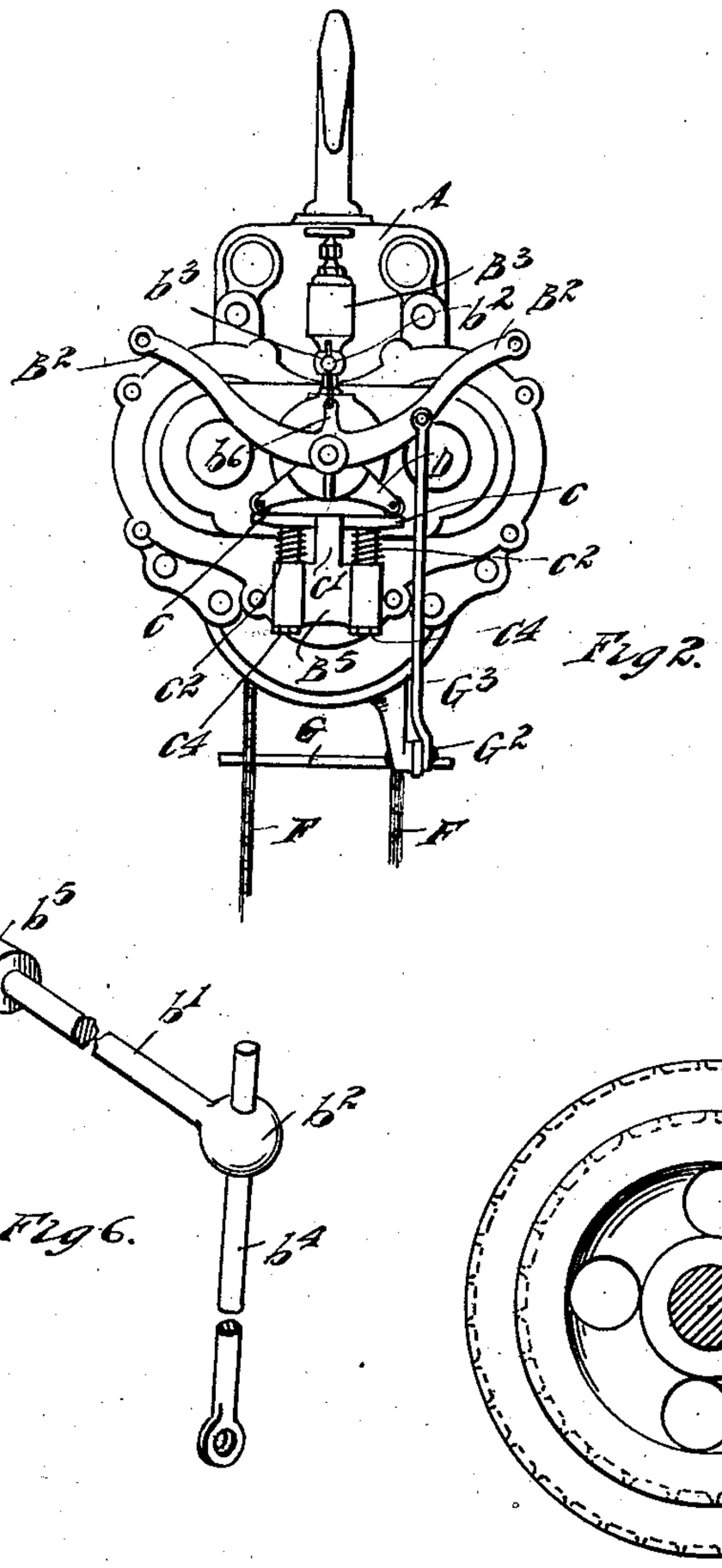

Fig 2.

Fig 6.

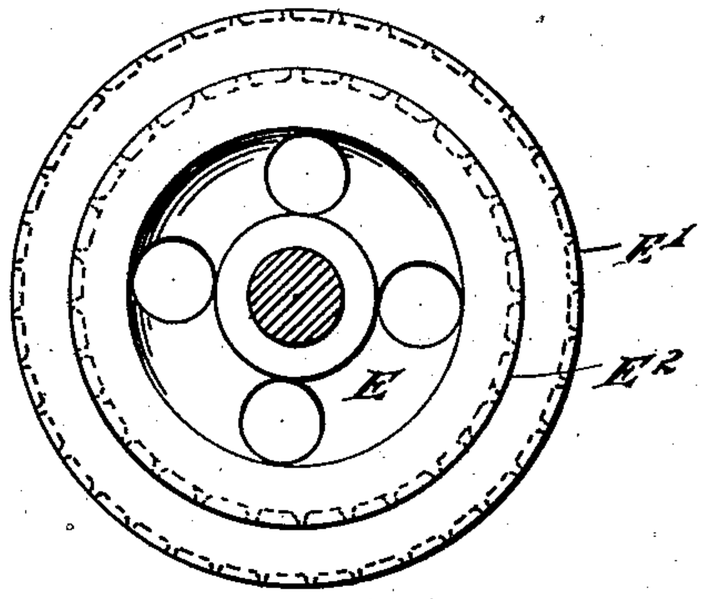

Fig 3.

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UNITED STATES PATENT OFFICE.

JAMES LOWE PILLING, OF BUCYRUS, OHIO, ASSIGNOR TO PILLING AIR ENGINE COMPANY, OF DETROIT, MICHIGAN, A CORPORATION.

PNEUMATIC HOIST.

No. 810,884. Specification of Letters Patent. Patented Jan. 23, 1906.

Application filed December 27, 1904. Serial No. 238,536.

To all whom it may concern:

Be it known that I, JAMES LOWE PILLING, a citizen of the United States, residing at Bucyrus, county of Crawford, State of Ohio, have invented a certain new and useful Improvement in Pneumatic Hoists; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to pneumatic hoists; and it consists in the improvements hereinafter specified, and pointed out in the claims.

In the drawings, Figure 1 is an elevation of a hoist embodying my invention. Fig. 2 is an end view of the same looking from the left of Fig. 1. Fig. 3 is an end view of the drum. Fig. 4 is a detail of the mechanism for returning the throttle-valve stem to its closed position. Fig. 5 is a plan view of the mechanism shown in Fig. 4. Fig. 6 is a detail of a part of the automatic valve governing the supply of oil.

A is the framework upon which the hoisting mechanism is mounted.

B is the motor, and B′ the throttle-valve governing the supply of compressed air to the motor B.

B^2 is a lever-arm by which the throttle-valve is operated.

B^3 is an oil-cup.

b^3 is a cock for regulating the flow of oil from the cup B^3.

b' is a stem by which the plug b^5 of the cock b^3 is operated.

b^2 is an enlargement on the outer end of the stem b', through which enlargement there is an aperture into which fits and slides a rod b^4, which rod is pivoted at its lower end to an arm b^6, extending vertically upward from the center of the lever-arm B^2.

c c are cross-heads guided in vertical ways in the standards C′ and having guide-rods C^2 C^2 fitting into apertures through a framework B^5, so as to be adjustable longitudinally in said apertures.

C^4 represents nuts upon the lower ends of the guide-rods C^2 and adjustable thereon, so as to adjust the position of the upper limit of travel of the cross-heads *c*. Around the guide-rods C^2 are helical springs C^3, acting to press the cross-heads *c c* upward until the nuts C^4 contact the frame B^5.

D is a double cam upon the lever or arm B^2, one side of said cam being provided with a cam-surface acting against one of the cross-heads *c* to turn the arm B^2 in one direction, and the other side of said cam acting against the other of said cross-heads *c* to turn the arm B^2 in the other direction.

When the arm B^2 is turned in one direction, the supply of air is admitted to the motor B, and at the same time the stem b' is oscillated, by means of the rod b^4 and arm b^6, to turn the plug b^5 into a position to permit of the passage of oil from the oil-cup B^3 into the motor. When the lever-arm B^2 is released, the cross-heads *c c* return it to its horizontal position, closing the exhaust and the passage from the oil-cup B^3. The normal position of the lever-arm B^2 is regulated by adjusting the nuts C^4 on the rods C^2, so as to fix the relative positions of the upper limit of the travel of the cross-heads *c*.

E is the hoisting-drum. Upon the drum E are formed two sprocket-wheels E′ E′ of larger diameter than the rest of the drum and two sprocket-wheels E^2 E^2 of equal diameter and of less diameter than the equal sprocket-wheels E′ E′.

F F represent a chain engaging the teeth of the sprocket-wheels on the drum E with two strands, a loop of the chain hanging from each side of the drum E. In one of the loops of the chain F is the pulley or sheave F^2. The other loop F′ of the chain hangs free. The weight is engaged by the hook f^2. If the chain F is placed upon the two larger sprocket-wheels E′ E′, a comparatively quick motion is secured. If said chain is placed upon the sprocket-wheels E^2 E^2, a slower motion is secured, and if one strand of said chain is put upon a sprocket-wheel E^2 and the other of said strands upon a sprocket-wheel E′ an intermediate speed is secured.

G is a lever pivoted at G′ to a hanger from the frame of the hoist. The lever G is bent at one end and extends between the strands of the chain F, which engage the pulley F^2. To the other end of the lever G is pivoted at G^2 a rod G^3, which rod engages the lever-arm B^2 at some distance from its pivot, as indicated in Fig. 2.

The motor is put in operation, raising the

weight by tilting the lever-arm B^2 toward the left, as shown in Fig. 2, thus raising the end G^2 of the lever G and lowering the other end. Should the motor not be stopped at the proper time while the weight is being raised, the pulley F^2 will contact the lever G, rocking the same about its pivot G′, tilting the lever-arm B^2 to its horizontal position, and closing the throttle-valve.

It will be observed that the guide-rods C^2 C^2 are directly beneath the cross-head at the center of effort of the cam-surfaces of the double cam D.

What I claim is—

1. In a hoisting mechanism, the combination of a rotatable horizontal shaft, a plurality of sprockets thereon, a loop-chain having its two strands passing over two sprockets, a motor to rotate the shaft, a throttle-valve to control said motor, and means adapted to be actuated manually or by contact with another portion of the mechanism whereby said valve may be actuated, substantially as described.

2. In a hoist, in combination with a drum, an actuating-motor, means provided with individual lubricating apparatus whereby the action of said motor may be controlled, and means arranged to simultaneously actuate said controlling means and its connected apparatus, substantially as described.

3. In a hoisting mechanism, the combination of a drum, a chain carrying a pulley engaging thereover, a motor arranged to actuate said drum, a throttle-valve controlling the action of said motor, an arm adapted to actuate the throttle-valve, a lever pivoted to a fixed portion of the mechanism, having an end extending adjacent to said chain, the other end of said arm being connected to the arm controlling the throttle-valve, said pulley being adapted to contact the adjacent end of said lever, substantially as described.

4. In a hoist, the combination of a shaft, a pair of large sprockets on said shaft, a loop-chain having its two strands passing over two sprockets on said shaft, a sheave having its wheel in one loop of said chain and a pair of sprockets of lesser diameter upon said shaft, for the purpose described.

In testimony whereof I sign this specification in the presence of two witnesses.

JAMES LOWE PILLING.

Witnesses:

CHARLES F. BURTON,

ELLIOTT J. STODDARD.