

(No Model.)

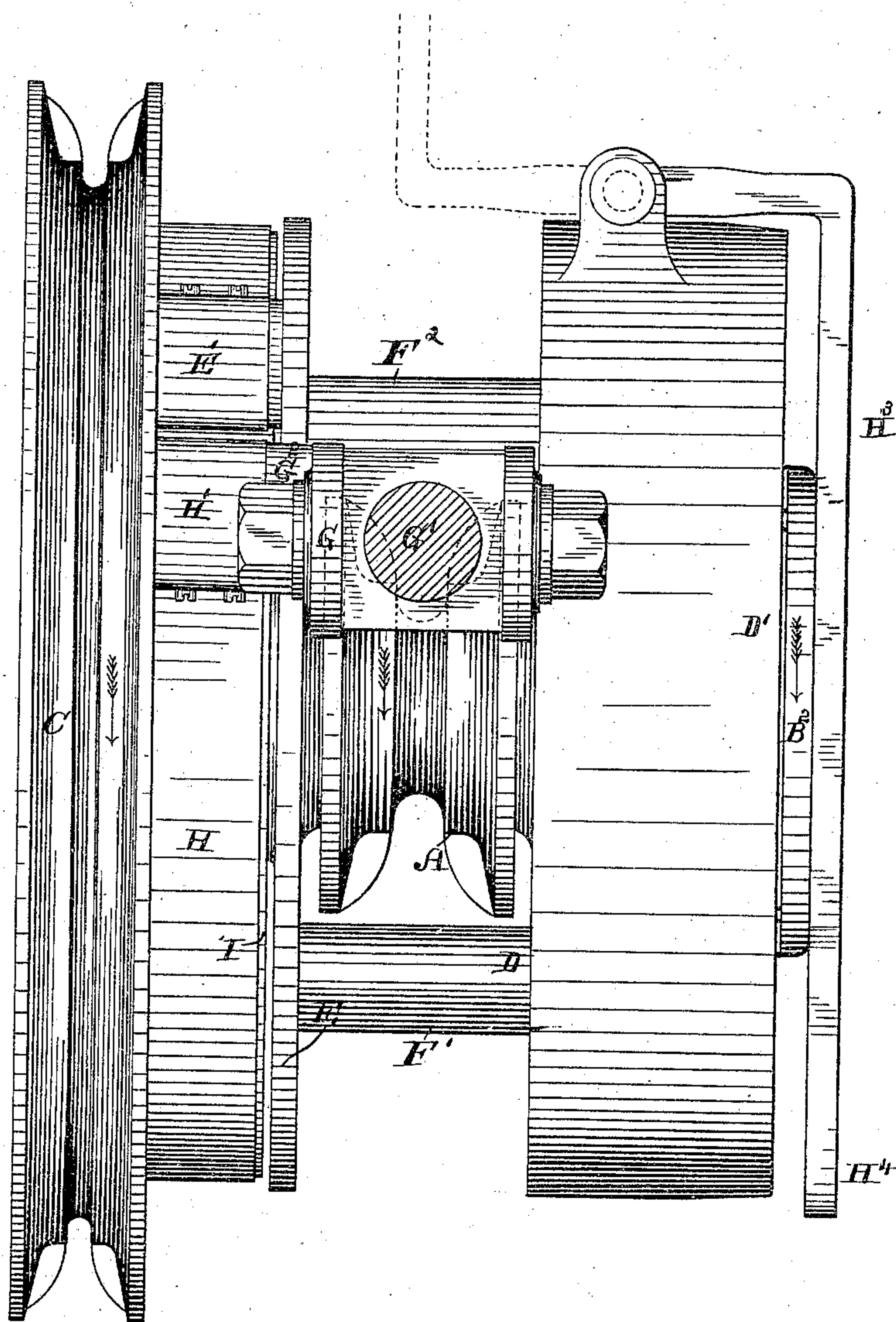
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T. A. WESTON.
HOISTING MECHANISM.

No. 413,004.

Patented Oct. 15, 1889.

Fig. 1.



WITNESSES

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By His Attorneys

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(No Model.)

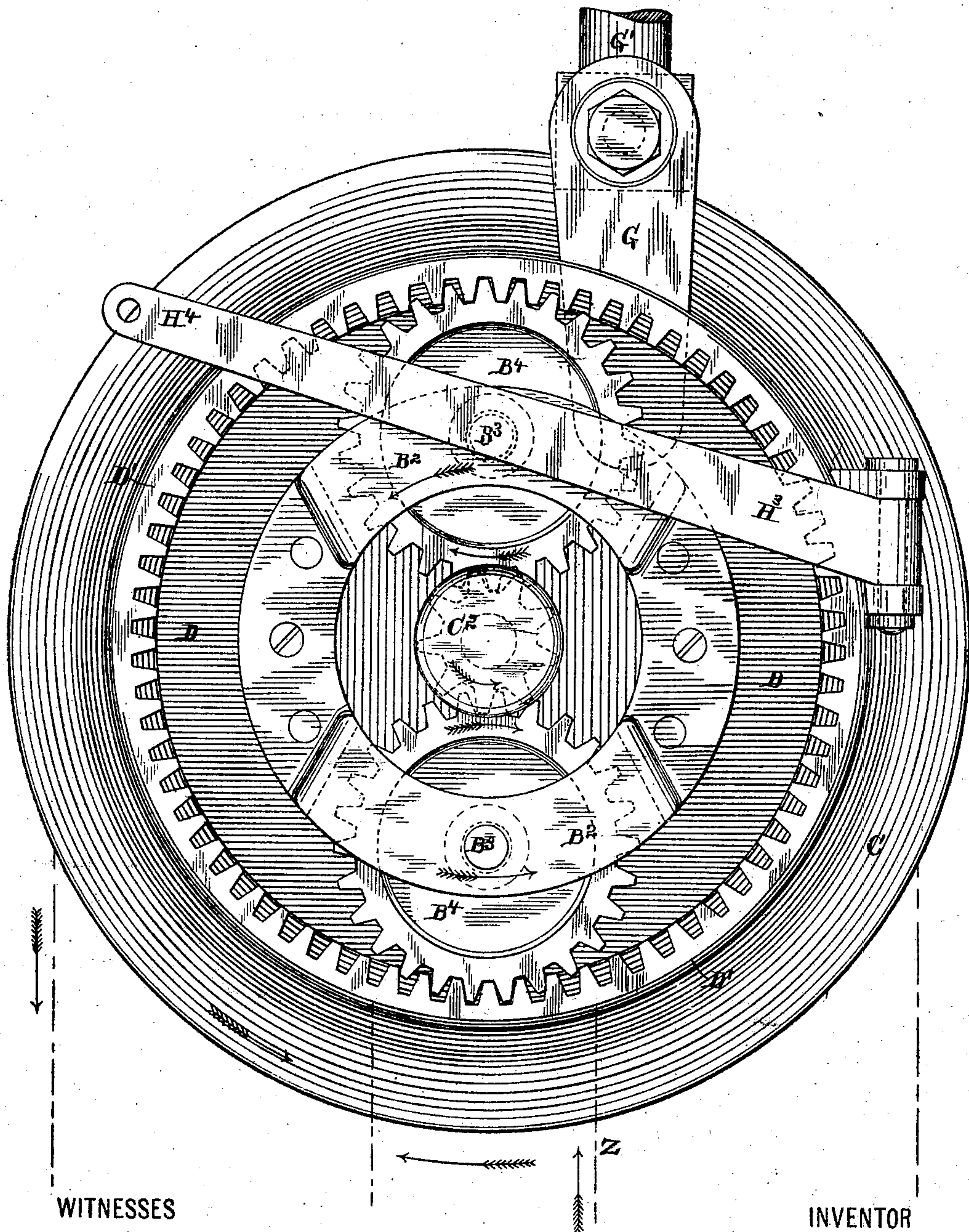
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Fig. 2.



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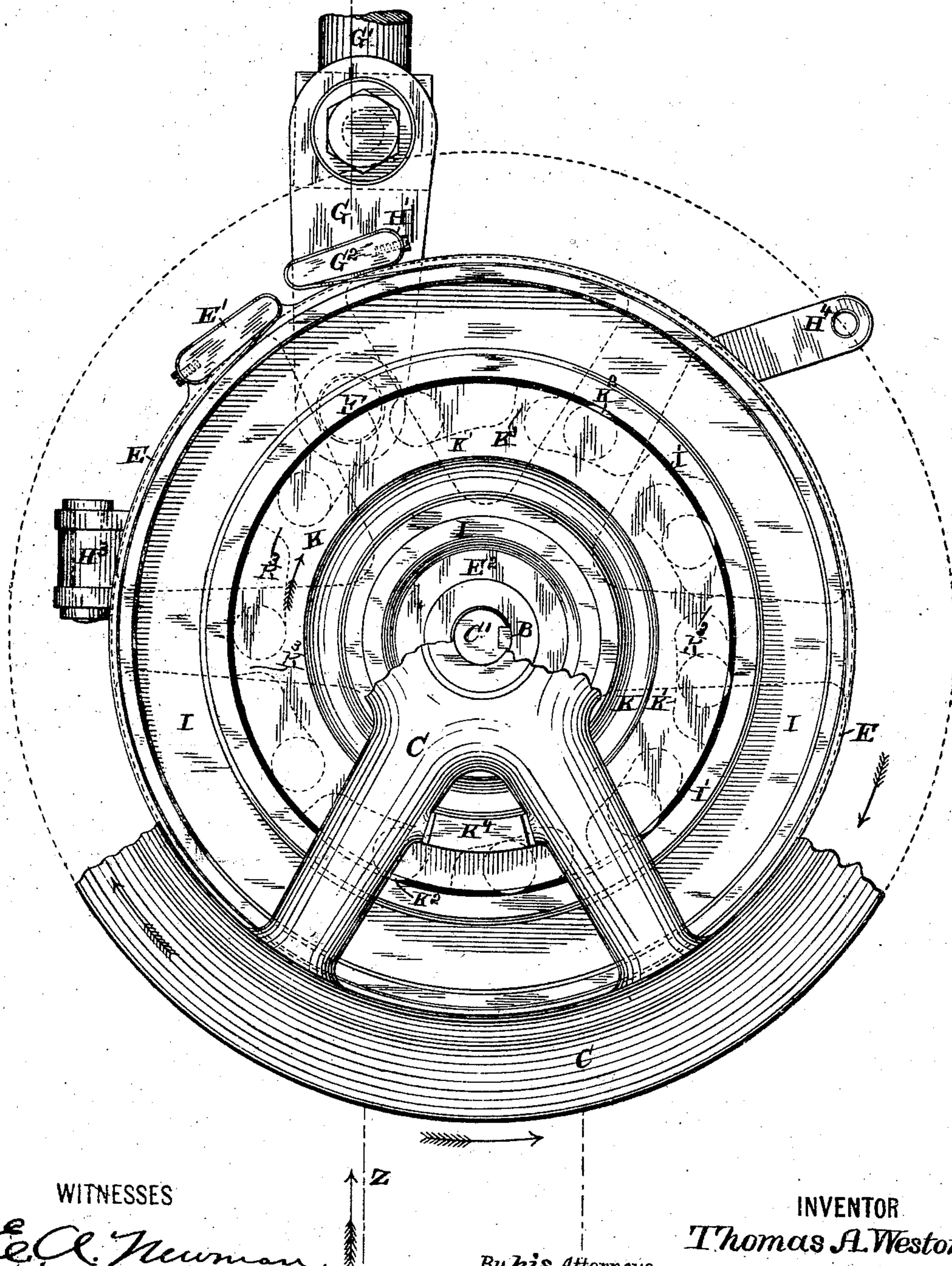
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Fig. 3.



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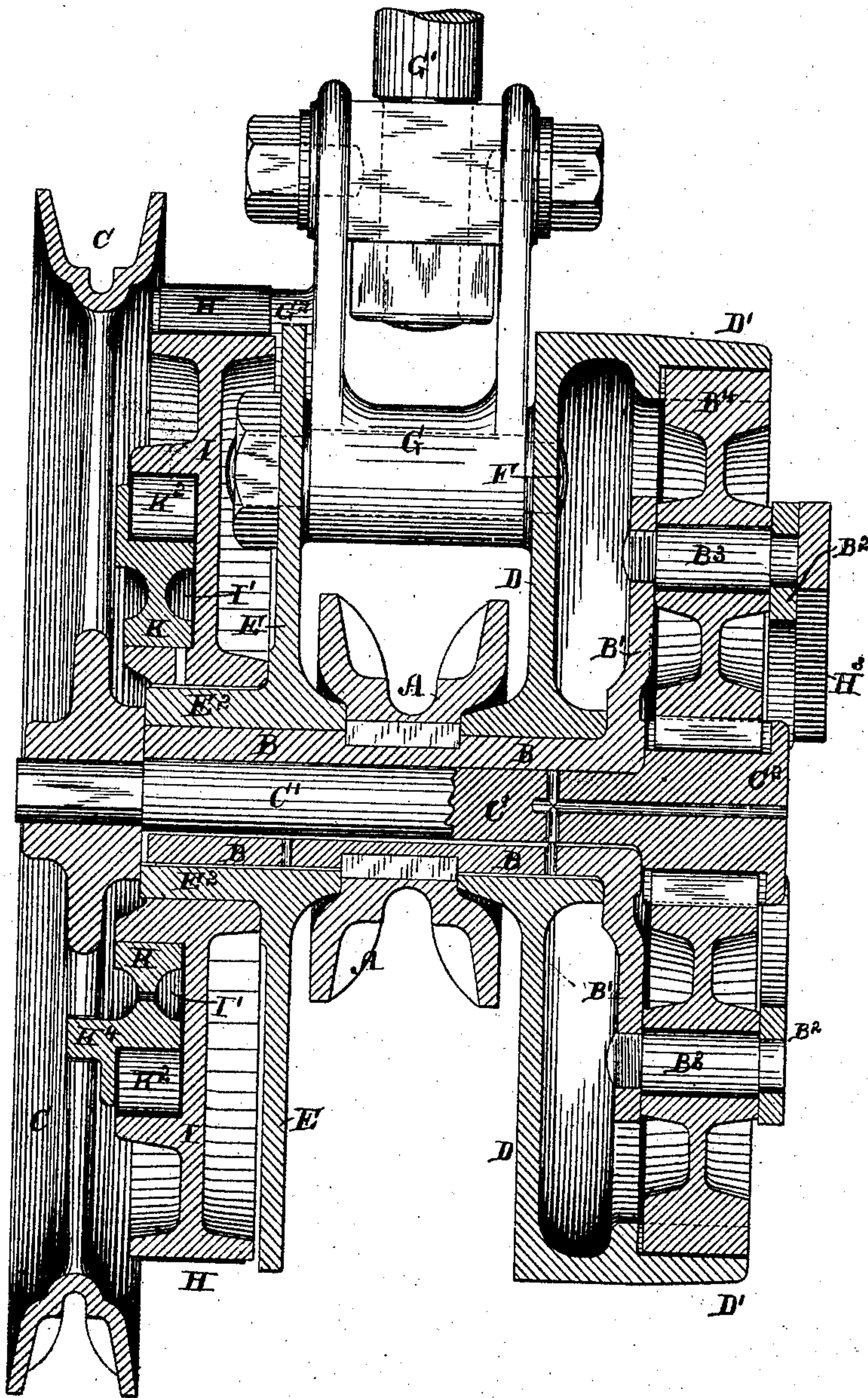
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Fig. 4.



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UNITED STATES PATENT OFFICE.

THOMAS A. WESTON, OF STAMFORD, CONNECTICUT, ASSIGNOR TO THE
YALE & TOWNE MANUFACTURING COMPANY, OF SAME PLACE.

HOISTING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 413,004, dated October 15, 1889.

Application filed October 10, 1887. Serial No. 251,953. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. WESTON, of Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Hoisting Mechanisms, of which the following is a specification.

My invention relates, primarily, to portable and fixed hoists employing a type of gearing known to mechanics as "sun-and-planet" gearing, some features of my invention being more generally applicable, as will appear hereinafter.

Prominent features of a hoist embodying my invention are—

First. A special arrangement of the mechanism and frame-work of the hoist, wherein the main lifting-sheave is placed within the machine between the two frame sides and upon a hollow shaft, the driving-pulley exterior to the frame on one side of the machine, and a system of sun-and-planet gearing exterior to the frame on the other side of the machine. I thus obtain a compact and symmetrical construction of a sun-and-planet-gear hoist having the minimum of friction with the load-chain and suspension-hook very nearly in the vertical central line of the machine.

Second. An independent cam and roller check-wheel to check the backward motion of the machine, the said check-wheel being a separate piece not integral with any other and therefore easily renewable by itself, and so applied to one of the two parts between which the check action is desired that the excessive radial strains of the cam-faces and rollers are wholly avoided, being self-contained within the body of the said part, and thus kept from distorting the machine in which the device is incorporated and from frictionally impeding its free motion.

Third. A peculiar yoke or hanger whereby the machine is suspended or supported, the pivotal motion of which yoke, caused by its oblique position in regard to the entire load-strain upon it, serves to operate a friction-brake to sustain the load.

I am aware that heretofore there have been many prior inventions or devices having ob-

jects in common with some of the objects of this my present invention; but they are obtained by means sufficiently different to need no particular reference here.

My improvements consist in the organizations of parts, which I will now point out in detail, and then succinctly specify in my claims.

In the accompanying drawings, Figure 1 is a plan, the neck of the suspension-hook being shown in section. Fig. 2 is an elevation of the outer and geared side of the machine, showing the suspension-hook as broken away. Fig. 3 is an elevation of the other outer side, having the driving-pulley broken away partly to expose the cam check-wheel and rollers, and the suspension-hook broken away. Fig. 4 is a vertical section with the suspension-hook shown as broken away.

A is the toothed lifting-sheave, attached to the hollow main shaft B. The sheave A has its periphery formed to engage with the links of a lifting-chain having at its lifting end the usual hook. The shaft B is carried by bearings in the frame sides D and E.

C is the driving-sheave, operated by the usual endless hand-chain, and it is keyed to the shaft C', the latter turning within the shaft B. The shaft C' carries a pinion C², the latter engaged with the equal "planet-pinions" B⁴, which turn on pivots B³, carried by and revolving with the flange B' of the hollow shaft. To the flange B' is attached a ring or frame B² to support the outer ends of the pivots B³. The pinions B⁴ also engage with the fixed annular wheel D', forming part of the frame side D. The two frame sides D and E are united by three studs F F' F², only one of which F is shown in Figs. 3 and 4, and the other two are shown in Fig. 1, the stud F forming the pivot of the yoke G. The yoke G has an ordinary hook G' and a side horn G². To the horn G² is attached one end of the brake-strap H, the other end being secured to the horn E', cast upon the frame side E. The frame side E, by a central boss or bearing E² on its outer side, supports a brake-pulley I, embraced by the strap H. Within the pulley I, in an annular recess I', is placed the check-wheel K, having its pe-

riphery formed into a series of short cam-surfaces K' , each provided with a roller K^2 , confined to its own cam-surface by projections K^3 . The latter carry the rollers around with the rotations of the check-wheel K one way within the annular recess I' of the pulley I . The contrary motion of the check-wheel K within the recess I' is prevented by the wedging action of the rollers between the cam-surfaces K' and the opposite inner annular rim of the recess I' . The check-wheel K has on its side a horn or lug K^4 , embraced by a slightly-larger opening in the driving-pulley C , whereby the said parts C and K are loosely engaged or clutched to each other, so as to rotate or to be at rest together. The said cam and roller checking device is old in its main features. It is shown in a somewhat improved form as the subject of claim No. 7 in the specification of my United States Patent No. 333,906, January 5, 1886, and in this my present invention I have further and substantially improved it by making the check-wheel K a separate piece by itself, not integral with any adjacent piece, but placed within an annular recess I' in the pulley I , so that all its severe radial strains from its cam action on the rollers are received upon and confined between two opposing concentric walls of the recess I' in the body of the pulley I .

In all former constructions of this device its severe strains take full effect upon the bearings to which it is applied, tending to separate the said parts from each other and causing excessive journal-friction. The separate casting K , with its rollers, furnishes a pawl or check device between the pieces C and I . It is integral with neither, but is loosely clutched with the sheave C and intermittently connected with the pulley I by the slipping and cam action of its cam-surfaces and rollers.

The check-wheel K , exposed to the severe indenting action of the rollers on its cam-surfaces, is by this my construction easily renewable when worn without replacing therewith any adjacent part, and its cam-strains cannot pass beyond the annular recess containing it.

The yoke G , pivoted upon the stud F , is held thereon obliquely to the strain-line of the load by its attachment to the strap H . The tendency of the yoke G to straighten into the line of the load-strain thereon tightens the strap H around the pulley I with varying force as the load varies. The pulley I , thus frictionally grasped by the strap H , becomes an abutment to the check-wheel K and sheave C , thus affording the needful check or self-sustaining action against the backward motion of the hoist and the running down of the load when the operator lets go the hand-chain upon the sheave C . He can lower the load, however, by driving the sheave C backward, and with it the brake-pulley I , against the frictional resistance of the strap H .

The hoisting motion is as follows: Rotary motion being applied to the sheave C and

shaft C' , its "sun pinion" C^2 causes the planet-pinions B' to roll around the fixed annular wheel D' . The pinions B' therefore not only rotate upon their own axes or pivots, but at the same time rotate around the main center or axial line of the shaft C' and its pinion C^2 . In the latter motion or orbit the pinions B' carry with them the flange B' , on which they are pivoted, the hollow shaft B , the sheave A , and the chain thereon, and thus lift a suspended load. The said hoisting motions are indicated by arrows upon the several parts in Figs. 2 and 3. The reverse motion, by continually overhauling the hand-chain, constitutes the slow or safety lowering motion explained above. A rapid or ordinary brake-lowering action is provided as follows: H^3 is the brake-lever, pivoted to the frame side D . When not in use, the said lever folds across the frame side, as shown in Figs. 1 and 2. For use it is swung out radially, as shown by dotted lines in Fig. 1. To its outer end H^4 a cord is attached, and by the said cord and lever the block or hoist can be swung bodily or turned slightly upon the pivot F in the direction of the long curved arrow W , Figs. 2 and 3. The said movement unwraps or slackens the strap H from the pulley I , and thus the load can be lowered at any desired speed. Upon ceasing thus to deflect the block from its normal position the load-strain at once restores it thereto and automatically applies the brake, as already explained, the hoist and load being automatically self-sustaining always when left alone.

I claim as my invention—

1. The combination, with a hoist-frame, of a driving-sheave exterior to the frame on one side thereof, a train of sun-and-planet gearing exterior to the frame on the other side thereof and carried on the flanged extension of the hollow shaft, a driving-shaft upon which said sheave is fixed, and which gears with and gives motion to said train of gearing, a hollow shaft journaled in the two sides of the frame through which said driving-shaft passes, and the main lifting-sheave carried on said hollow shaft, substantially as set forth.

2. The combination, with a hoist-frame provided with a train of sun-and-planet gearing, of a main lifting-sheave secured to a hollow rotatory main shaft, the latter journaled at each end in the frame, and provided with a flange exterior to the hoist-frame and carrying the planet-pinions, and within the said rotatory hollow main shaft a driving-shaft, substantially as set forth.

3. The combination, with a hoist-frame, of a purchase-gearing consisting of a driving-sheave and its attached shaft, the latter journaled within a hollow main shaft, a driving-pinion made integral with the said driving-shaft, planet-pinions engaged with the driving-pinion, and also with a fixed annular wheel integral with the hoist-frame and external thereto, the said planet-pinions pivoted to and driving a flange or disk integral with

the main hollow shaft, and the main hollow shaft journaled at each end in the frame and attached to a main lifting-sheave, substantially as set forth.

5 4. In a portable hoist, the combination of the hoist-frame in two parts D E, connected together by studs, as shown, said part D being provided with the annular flange D', the lifting-sheave A between the two parts D
10 E, the hollow shaft B, to which the sheave is fixed, provided with the flange B', the pinions B¹ thereon, the driving-pinion C² and its shaft C', brake-pulley I, check-wheel K and rollers, brake-strap H, and yoke G, substantially
15 tially as set forth.

5. In a portable hoist, the combination of the hoist-frame in two parts D E, connected together by studs, as shown, said part D being provided with the annular flange D', the
20 lifting-sheave A between the two parts D E, the hollow shaft B, to which the sheave is fixed, provided with the flange B', the pinions B¹ thereon, the driving-pinion C² and its shaft C', driving-pulley C, brake-pulley I,
25 check-wheel K and rollers, brake-strap H, yoke G, and brake-releasing lever H³, substantially as set forth.

6. In a portable hoist, the combination, with pulleys between which a check action is
30 effected, of a separate cam check-wheel, which,

with its rollers, occupies an annular groove in the body of one of the said pulleys and is loosely clutched to the other, substantially as set forth.

7. In a portable hoist, the combination of 35 the pulley C with the brake-pulley I, and the check-wheel K, having lock K⁴, located within the pulley I, and clutched to the pulley C by said lug K⁴, substantially as set forth.

8. The combination, in a hoist embodied in 40 a pulley-block frame, of a strap-brake and a pivoted yoke, which is attached to the suspension-hook, whereby the brake is operated by the weight of the hoist and of any load thereon, substantially as set forth.

9. The combination, in a hoist embodied in 45 a pulley-block frame, of a strap-brake, and a pivoted yoke, which is attached to the suspension-hook, whereby the brake is operated by the weight of the hoist and of any load 50 thereon, and an operating-lever for withdrawing the brake from action, substantially as set forth.

In testimony whereof I have hereunto subscribed my name.

THOS. A. WESTON.

Witnesses:

SCHUYLER MERRITT,
GEO. E. WHITE.