

(No Model.)

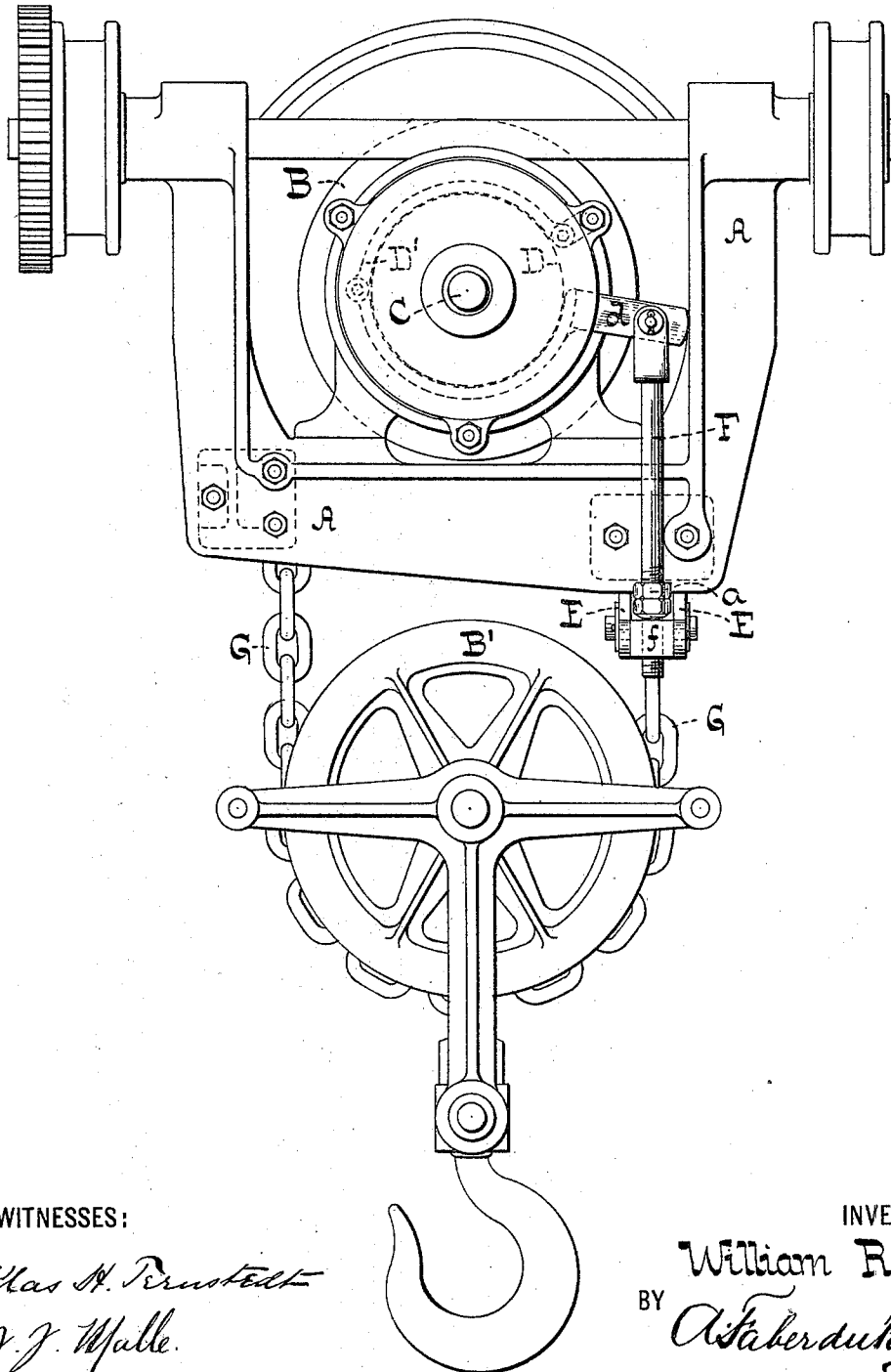
2 Sheets—Sheet 1.

W. ROTH.
HOISTING APPARATUS.

No. 519,294.

Patented May 1, 1894.

Fig. 1.



WITNESSES:

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J. J. Mable.

INVENTOR:

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

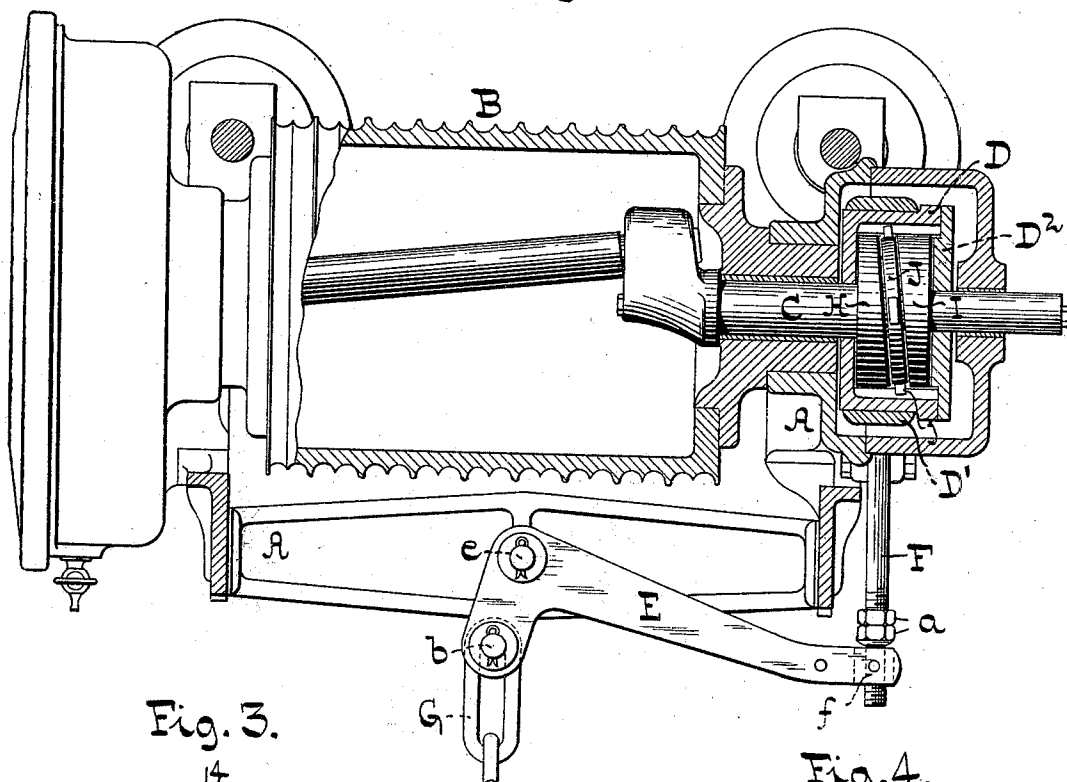


Fig. 3.

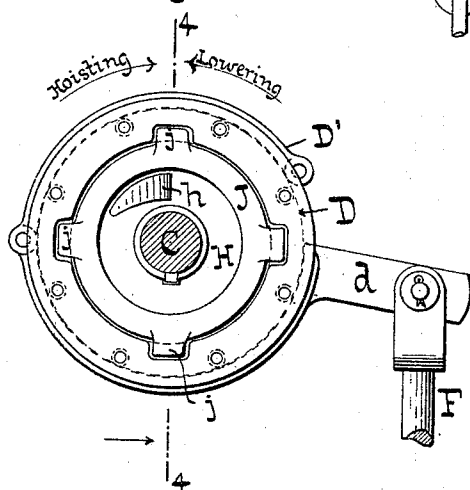
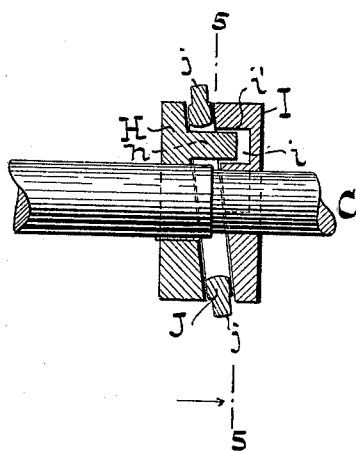


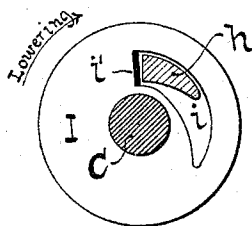
Fig. 4.



WITNESSES:

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Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM ROTH, OF NEW YORK, N. Y., ASSIGNOR TO T. SHRIVER & CO., OF
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HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 519,294, dated May 1, 1894.

Application filed October 11, 1893. Serial No. 487,894. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ROTH, a citizen of the United States, and a resident of New York, in the county and State of New York, have invented certain new and useful Improvements in Hoisting Apparatus, of which the following is a specification.

My invention has reference to improvements in hoisting apparatus and especially to automatic brake devices for sustaining the load in lowering.

It consists essentially in the combination with a brake drum arranged in line with the winding drum and adapted to remain stationary when the load is lifted and to rotate when the load is lowered, of a brake lever having one arm in connection with the brake strap and its second arm in connection with the end of the lifting chain, so that the pressure at the brake is produced by the load and is at all times proportional to the same.

The nature of my said invention will best be understood when described in connection with the accompanying drawings, in which—
Figure 1 represents an end elevation of an apparatus embodying my invention. Fig. 2 is a side elevation, partly in section. Fig. 3 is an end elevation, on an enlarged scale, of the friction drum and adjacent parts,—the cover of said drum being removed. Fig. 4 is a section in the plane 4—4, Fig. 3, through the brake cams. Fig. 5 is a section in the plane 5—5, Fig. 4.

Similar letters designate corresponding parts throughout the several views of the drawings.

Referring to the drawings, the letter A designates the frame serving to support the operating parts. In this instance I have shown the same provided with bearing wheels to allow it to be traversed along on a suitable track—the whole constituting a traveling crab or trolley, of a well known construction.

B is the winding drum, which is rotated to hoist the load from the shaft C through any suitable mechanism.

Upon the shaft C is loosely mounted a brake drum D encompassed by the usual strap D' provided with a projecting arm *d*, (Figs. 1 and 3.)

E, (Fig. 2,) is a lever pivoted at *e* centrally

with respect to the winding drum B to one of the cross bars of the frame A. To the shorter arm of said lever is connected at *b* the free end of the lifting chain G (Fig. 2),—the usual block B' (Fig. 1) being suspended in the bight. The longer arm of the lever E is connected with the arm *d* of the brake strap D' by a link F. This link I have shown as provided with a screw shank, the end of which passes loosely through a pivoted block *f* in the end of the longer arm of the lever and is provided above the block with two jamb nuts *a a* for adjustment.

The brake drum D, by suitable devices hereinafter described, is caused to rotate with the shaft in lowering the load, but on hoisting remains stationary.

From the construction above described, it is evident that in lowering the load, the pressure with which the brake strap is automatically applied to the drum by the load, is proportional to the load in a ratio depending on the leverage. Again, in view of the bell-crank nature of the brake lever (as seen in Fig. 2), this leverage varies with the load.

The means for rendering the brake drum D operative and inoperative are as follows, reference being had to Figs. 2—5: As before stated, the brake drum is mounted loosely on the shaft C. Within the drum is keyed to the shaft a side cam H provided with an oblique or helical face and with a projecting tooth *h*. Opposite to this cam is mounted loosely upon shaft C a similar side cam I provided however with a recess *i* (Figs. 4 and 5) adapted to receive the tooth *h* and forming an internal abutment *i'*. Between the two cams is placed a ring cross J which can oscillate laterally, but is held from turning by lugs *j* thereon fitting into grooves (Fig. 3) in the brake drum. The brake drum is closed by a cover D² (Fig. 2) bolted thereto—all being so constructed that when the cams H and I are not spread apart, the back of cam I is quite close to the cover.

In lowering the load, the cam H is turned with the shaft C in the direction indicated by arrows marked "Lowering" in Figs. 3 and 5, thus tending to move the tooth *h* away from the abutment *i'* of cam I. In consequence of the cam I remaining stationary for an instant

the relative position of the oblique faces is changed, and the cam I is pressed outwardly against the cover D² of the brake drum with a pressure proportional to the load. At the

5 same time the cam I participates in the rotary motion of the cam H and imparts such motion to the brake drum by frictional contact with the cover D².

10 In hoisting the load, the tooth *h* of cam H engages the abutment *i'* of cam I and the two cams revolve together without changing their relative position. The brake drum being prevented from turning by the brake strap, remains stationary while the cams rotate. The
15 function of the ring cross J is to prevent a moving contact between the faces of the two side cams H I, which might under some circumstances cause the loose cam I to participate in the rotation of the fast cam H while lowering the load, and thereby render the brake
20 useless. While the said ring cross is quite essential it can be omitted without rendering the devices inoperative. When the ring-cross is omitted, the cams are placed in contact
25 with each other, and both the tooth and abutment may be formed directly on the faces of the respective cams.

The shaft C may be driven either by hand or from a suitable motor in the usual manner.

30 While I have here shown a hoisting apparatus embodying a crab or trolley, it is evident that my invention may be applied equally well to any of the other forms of hoists, therefore I do not wish to restrict myself to its application to any specific form of hoist.
35

What I claim as new is—

1. In a hoisting apparatus, the combination of a brake drum arranged in line with the winding drum, a lever pivoted below the drum
40 and having the end of the lifting chain at-

tached to one arm thereof, a brake strap encompassing the brake drum, and a rod connecting the second arm of the lever with the brake strap, substantially as described.

2. In a hoisting apparatus, a brake drum 45 mounted loosely on the shaft and containing an oblique side cam H made fast to the shaft and provided with a tooth *h*, and a second oblique cam I opposite to cam H, loosely mounted on the shaft and provided with an abutment *i'* opposite to tooth *h*, combined with a lever having one arm connected to the brake strap of the drum and the other arm to the lifting chain, substantially as described. 50

3. In a hoisting apparatus, the combination, 55 with the brake drum loosely mounted on the shaft, of the oblique side cam H made fast to the shaft and provided with a tooth *h*, and a second oblique cam I opposite cam H, loosely mounted on the shaft and provided with an abutment *i'* opposite to the tooth *h*, substantially as and for the purpose set forth. 60

4. In a hoisting apparatus, the combination with the brake drum loosely mounted on the shaft, of the oblique side cam H made fast to the shaft and provided with a tooth *h*, a second oblique cam I opposite cam H, loosely mounted on the shaft and provided with an abutment *i'* opposite to the tooth *h*, and a ring cross J between said cams and held from rotating, substantially as described. 65 70

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 14th day of September, 1893.

WILLIAM ROTH.

Witnesses:

HARRY J. HISCOX,
ALBERT HICKS.