(No Model.)

2 Sheets—Sheet 1.

S. A. MORSE & C. TYSON.

HOISTING MACHINE.

No. 291,217.

Patented Jan. 1, 1884.

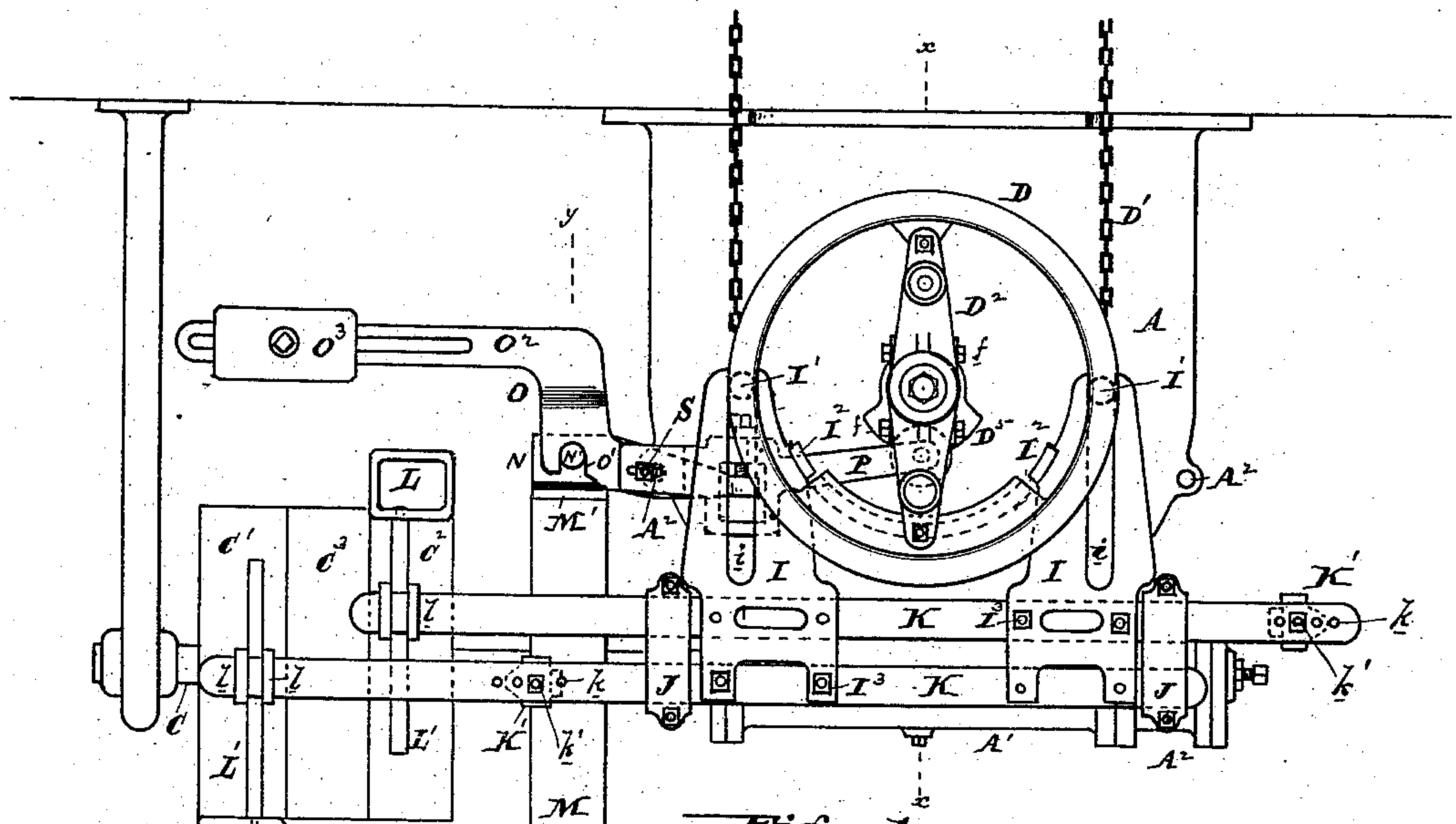

Fig. 1

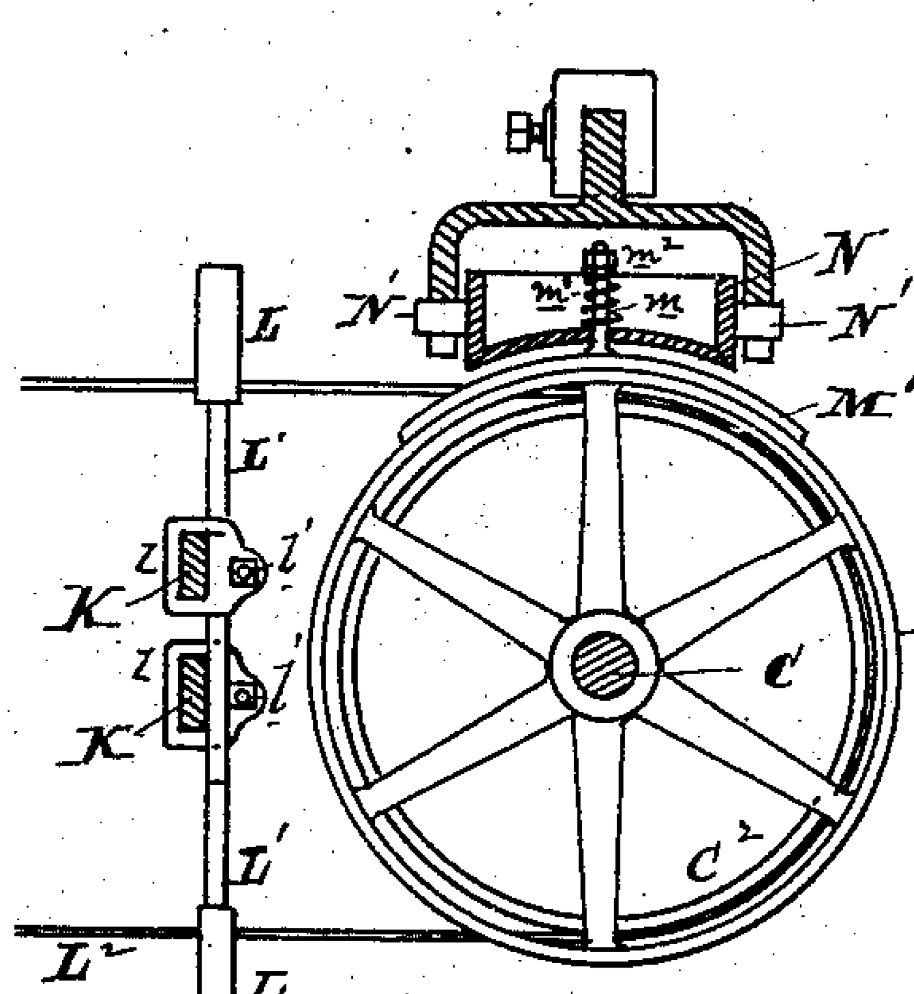

Fig. 3

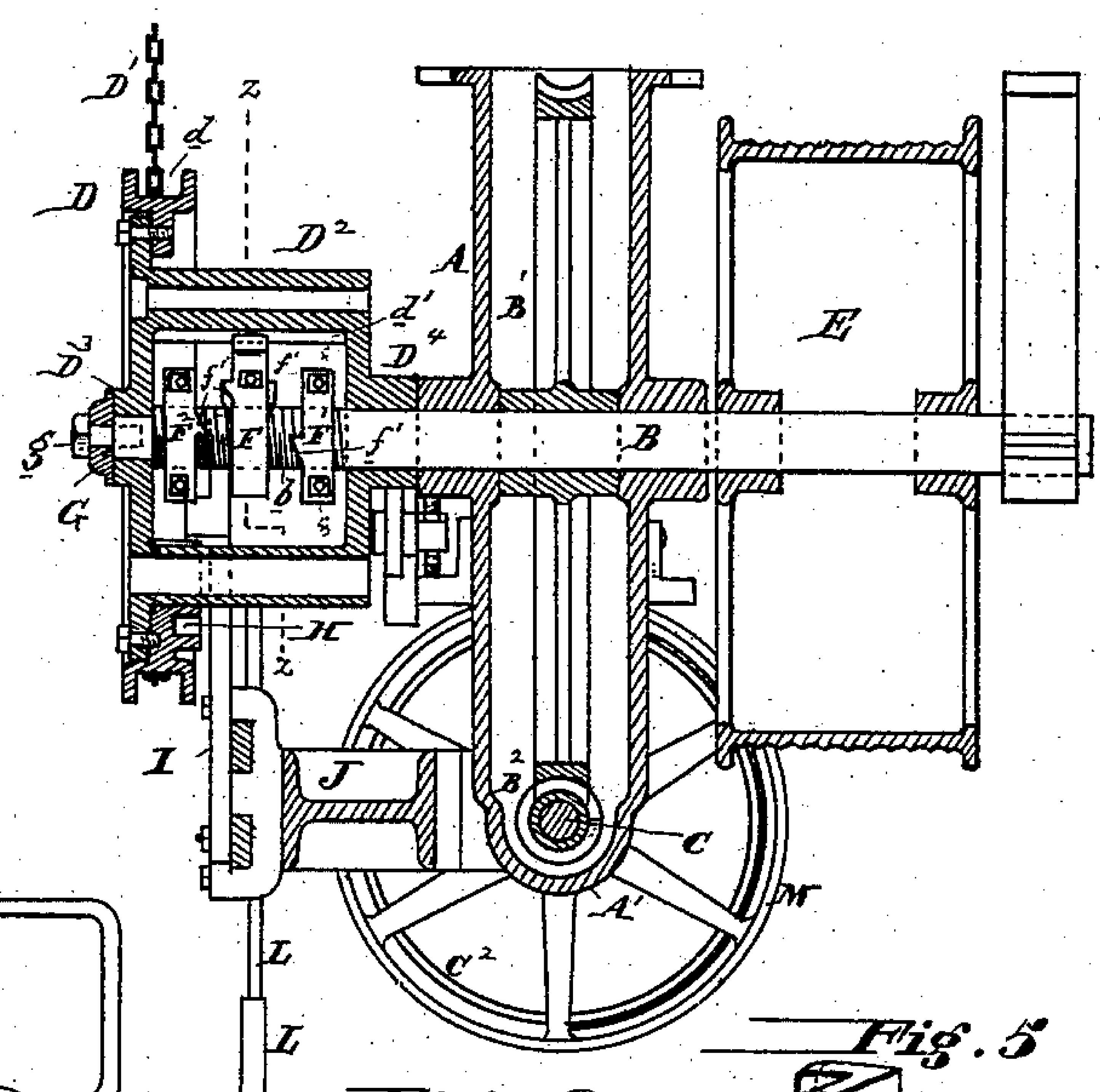

Fig. 2

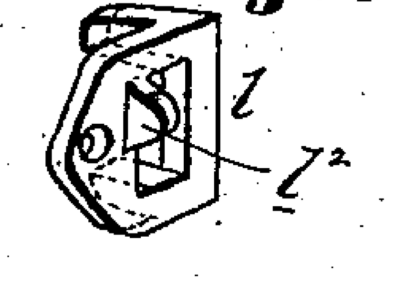

Fig. 5

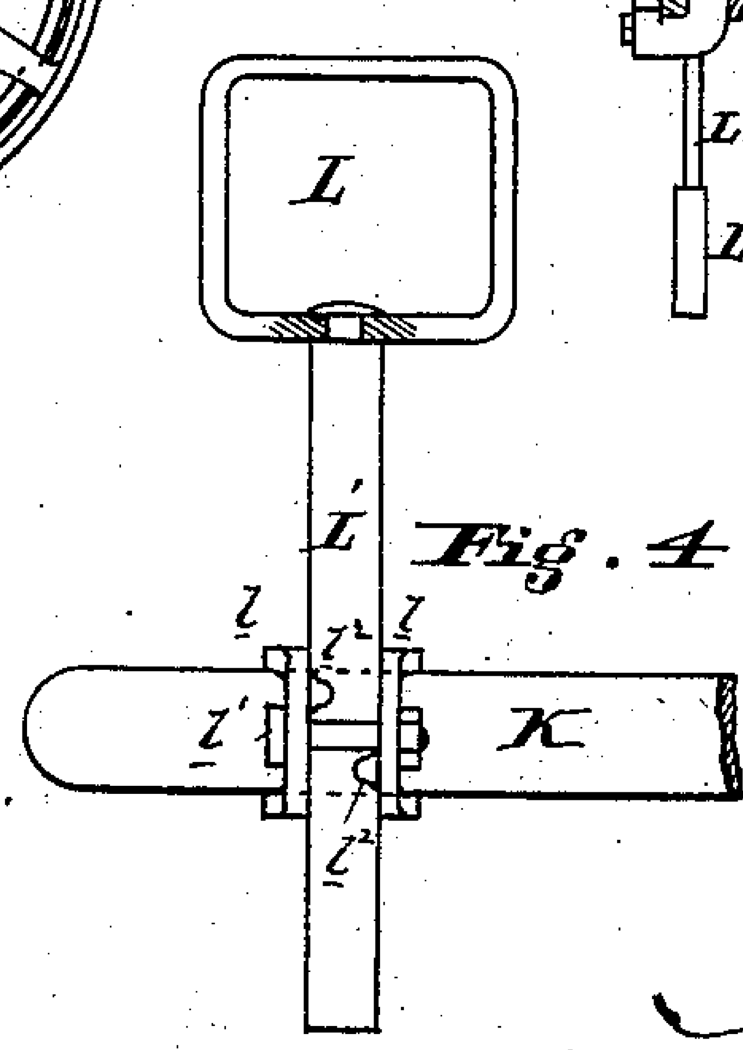

Fig. 4

Attest
William McWade
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Stephen A. Morse and
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By their atty.
[illegible]

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.)

2 Sheets—Sheet 2.

S. A. MORSE & C. TYSON.

HOISTING MACHINE.

No. 291,217.

Patented Jan. 1, 1884.

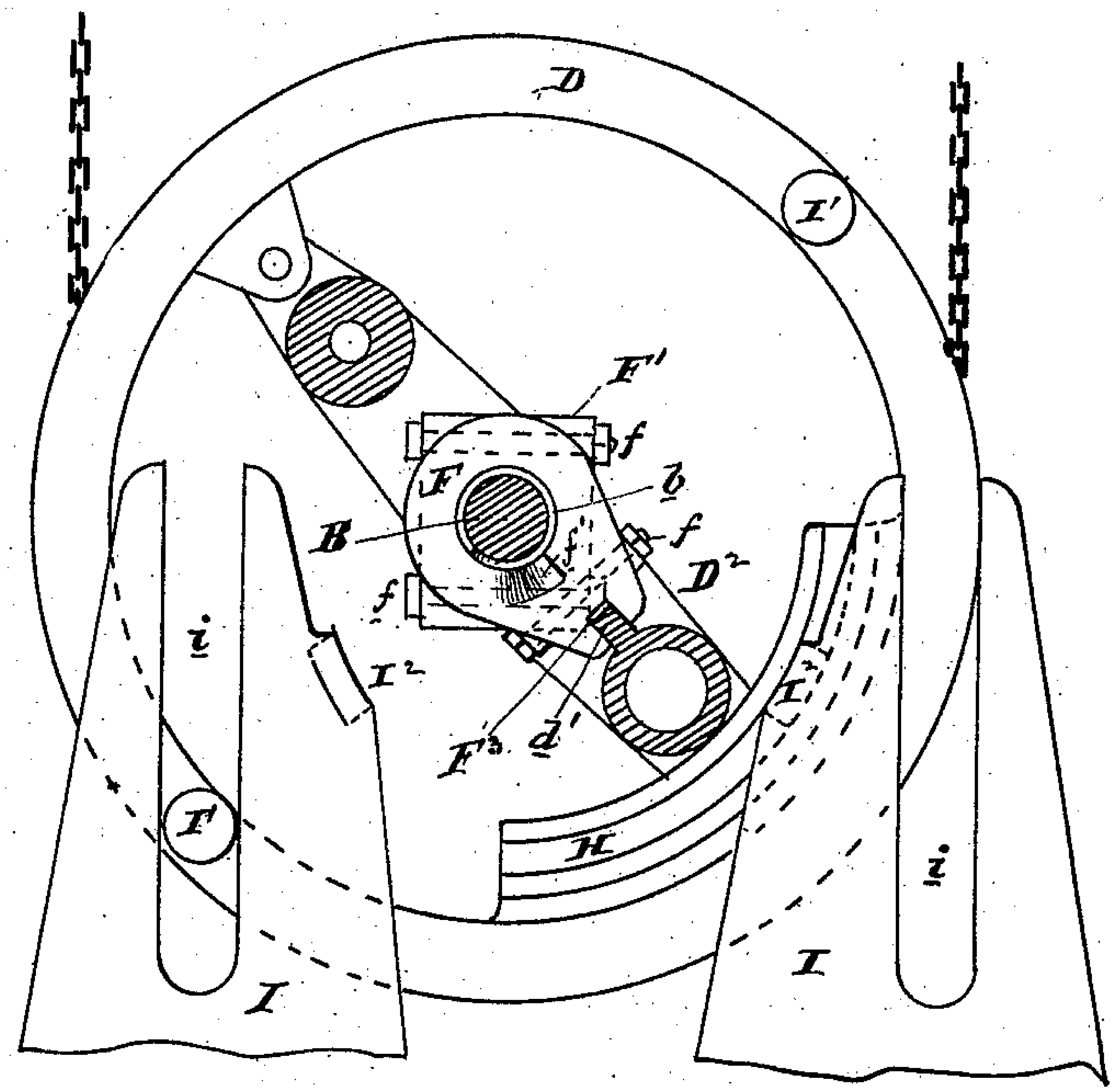
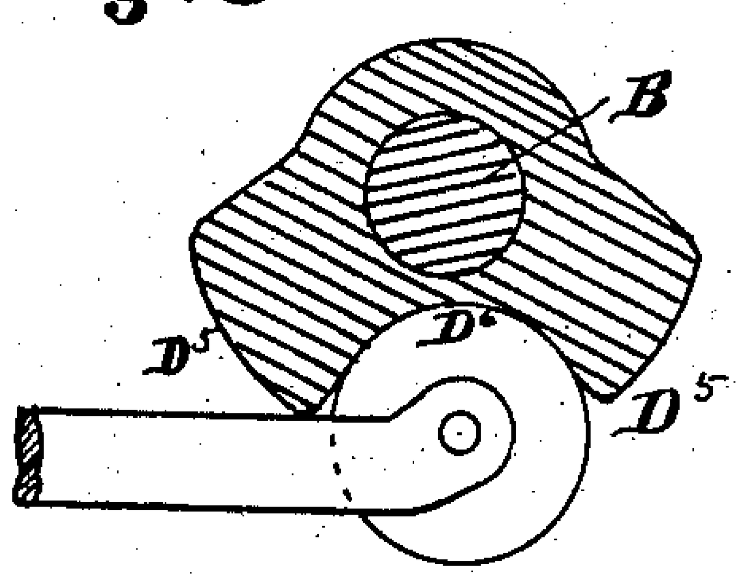


Fig. 6

Fig. 9



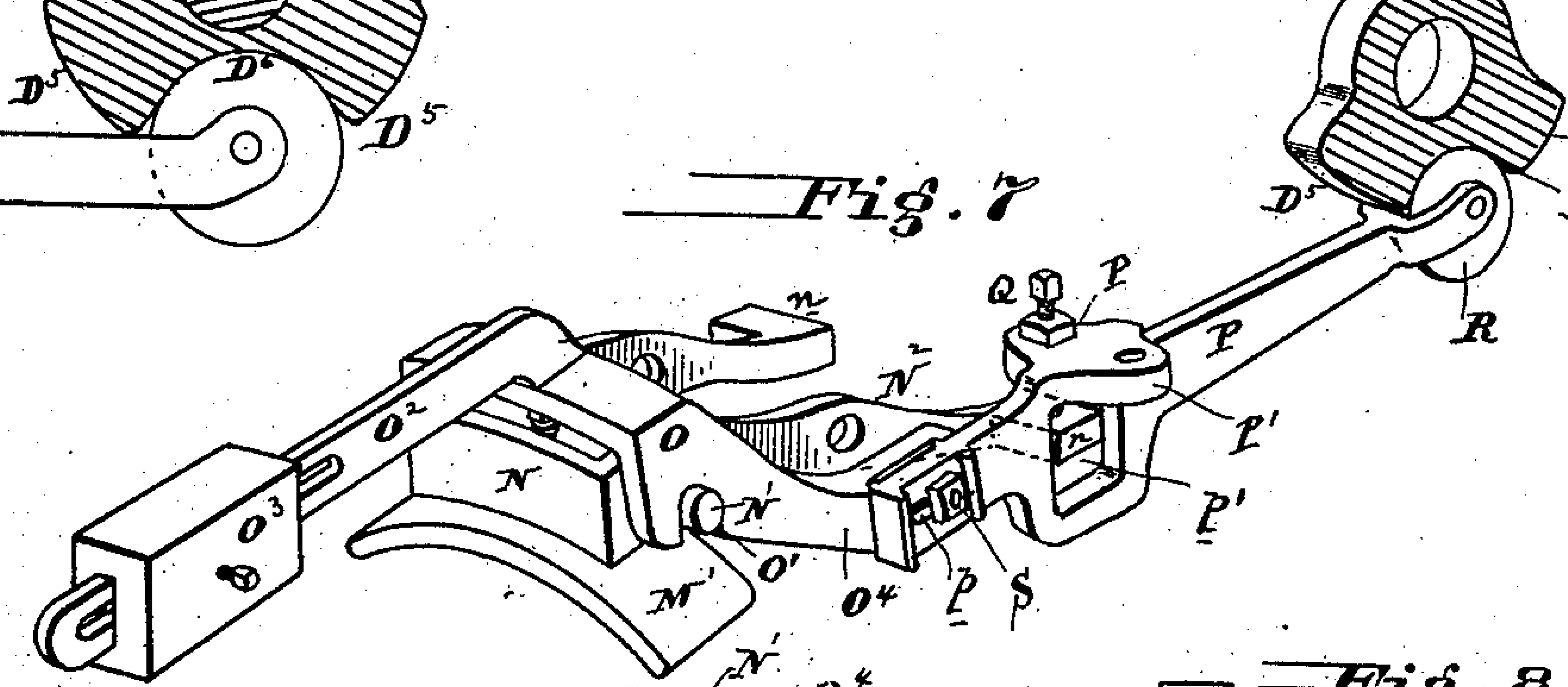


Fig. 7

Fig. 8

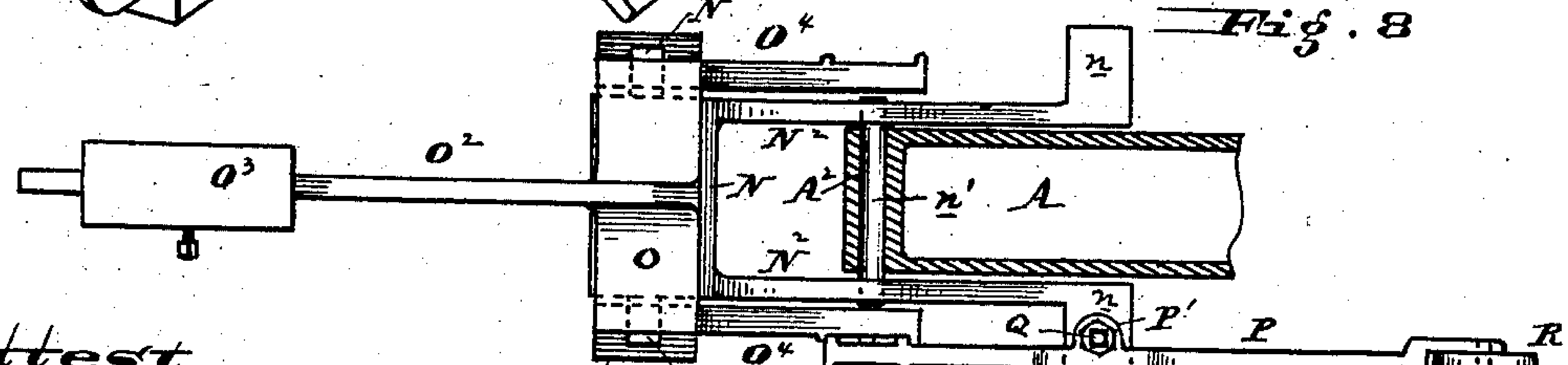


Fig. 10

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Joshua Mattack

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UNITED STATES PATENT OFFICE.

STEPHEN A. MORSE AND CHARLES TYSON, OF PHILADELPHIA, PA.

HOISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 291,217, dated January 1, 1884.

Application filed October 11, 1883. (No model.)

To all whom it may concern:

Be it known that we, STEPHEN A. MORSE and CHARLES TYSON, both of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Hoisting-Machines, of which the following is a specification.

Our invention has reference to hoisting-machines in general, but more particularly to improvements upon Letters Patent granted to S. A. Morse (one of the present applicants) on July 18, 1882, and numbered 261,377; and it consists in certain constructions having reference to the shifting of the driving-belts, brake mechanism devices, by which the machine may be made right or left handed, as desired, and in many details of construction, all of which are fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

The object of our invention is to simplify the construction, increase the strength, and improve the operativeness of a machine of this class, and at the same time render it capable of being made right or left handed.

In the drawings, Figure 1 is a front elevation of our improved hoisting-machine. Fig. 2 is a cross-section of same on line *x x* of Fig. 1. Fig. 3 is a cross-section of same on line *y y* of Fig. 1. Fig. 4 is an elevation of one of the shifting-arms, and shows its method of attachment to the shifting-bars. Fig. 5 is a perspective view of one of the clamps used to secure said shifting-arm to said shifting-bar. Fig. 6 is a sectional elevation on line *z z* of Fig. 2. Fig. 7 is a perspective view of the brake mechanism detached from the machine. Fig. 8 is a plan view of same, showing its connection with the worm-wheel box or case. Fig. 9 is a sectional elevation of the brake-cam, and Fig. 10 is a plan view of one of the buffers secured to the reciprocating shifting-bars.

A is the worm-wheel case, through which the shaft B, carrying the winding-drum E, passes, and is journaled therein. Secured to said shaft B within the case A is the worm-wheel B′. Meshing with said worm-wheel is the worm B^2, which is inclosed within the cylindrical part A′ of the case A, and is secured to the driving-shaft C, journaled in the caps on heads A^2 in the usual way. Secured to said shaft C is the brake-wheel M and also the driving-pulley C^3, and upon each side of said driving-pulley are loosely journaled the idler-pulleys C′ and C^2, around which the driving-belts L^2 pass.

Loosely journaled on the shaft B, preferably on the end opposite to which the drum E is secured, is the frame D^2, secured to which is the shifting-pulley D, which may be rotated by a chain or rope, D′. This frame and its pulley are retained upon the shaft B by a washer, G, secured to said shaft by a screw, *g*, which washer works against the outer bearing, D^3, of the frame D^2. The rim of the wheel or pulley D is provided with two pins or rollers, arranged diagonally opposite, and adapted to work alternately in their respective slots *i* in the plates I I, which reciprocate their respective shifting-bars K K, to which they are secured by bolts I^3; the said shifting bars K being supported and guided in guideways on the bracket J, which latter is secured to the case A. The plates I I are further provided with lugs I^2, which are adapted to be alternately received in the circular slot or groove H on the pulley or wheel D upon the pin or stud I′, leaving the slot *i* of the other of said plates I as shown in Fig. 6, which limits the throw of the shifting-bars K respectively in opposite directions, and the buffers K′, arranged respectively on opposite ends of the two bars K, limit the throw of said bars in the opposite directions. In other words, the slot H limits the throw of the belts onto the idler-pulleys C′ C^2, and the buffers limit the throw of said bolts onto driving-pulley C^3. These buffers may be made in any manner desired; but we prefer the construction shown, (see Fig. 10,) in which the plate k^3 fits over the bars K and carries a rubber cushion, k^2, and is secured to the said bars by bolts *k*′, which pass through holes *k* in same. There are several of said holes *k*, to enable the buffer to be set forward or back, to vary the throw of the driving-belts, so that various widths of belts may be used with the same machine. The shifting-arms L′ are provided on their ends with loops L, the latter being made of cast-iron and riveted to the wrought-iron arm L′, Fig. 4, and this arm is secured in any desirable manner to the shifting-bars K. In practice we prefer to secure them by two clamping-plates, l, which encircle the said bars K, and provided with lugs l^2, the clamping action being effected by a bolt, l', as shown, for by this construction it is unnecessary to drill holes in the bars K. and the same clamping-plates, l, may be used for either of the arms L', and only one pattern is required, the left and right plates being identical. The belts L^2 pass through said loop L, and are shifted on or off the driving-pulley C^3 by the same.

M' is the brake-shoe, and is adapted to create a friction on the pulley M, and is supported and carried by U-shaped frame N, having long arms N^2, by which said frame is pivoted to the case A by a pin, n', passing through a hole, A^3. This shoe M' is pivoted to frame N by a universal joint, consisting of a stud, m, which passes through said frame, a spring, m', which encircles said stud, and a nut, m^2, which screws upon said stud and puts the spring under tension. The ends of the arms N^2 of frame N may be provided with outwardly-extending projections or lugs n. This brake, as far as described, would at all times rest upon the wheel M, but would not give the requisite friction nor relieve the said wheel; hence it is necessary to provide means to increase the friction and also to remove the action of the brake upon starting the elevator. To accomplish this end we provide the following levers and cam: A Y-shaped lever, O, is provided with a long arm, O^2, to which the adjustable weight O^3 is secured, and with side arms, O^1, provided with bearings O'. To one of these arms O^1 is bolted an arm, P, by bolts S, and the said arm may be adjusted by slot p. The free end of this arm P is provided with a wheel, R, and at or near its middle it is provided with a slot or aperture, p', and lugs P', extending out over each side and above aperture p', and through which are screw-holes for adjusting-screws Q. This frame as a whole is now supported upon the journals N', projecting out from frame N on each side and above the brake-shoe, the said journals fitting into the bearings O', and the screw Q presses down upon the lug n of one of the legs N^2 of frame N, as shown in Figs. 7 and 8. The roller R rests normally, or when the machine is at rest, in the recess D^6, between the cam projections of the brake-cam D^4, as shown in Fig. 9, and this brake-cam is secured to or forms part of the inner journal of the frame D^2. The movement of the brake-cam D^4 either way removes the brake-shoe M' from wheel M.

In the usual construction of elevators it is common to stop the machinery automatically upon the platform or cage reaching the highest or lowest limit of its travel, and it is also customary to provide the hoisting-machine itself with a device to automatically stop the elevator should the above-described automatic stops fail from any cause, and in this machine we provide an improved means for accomplishing this result, as follows: The end of the shaft B located within the frame D^2 is screw-threaded, and upon said screw we secure two clamps, F' F^2, which are clamped by bolts f, and are preferably provided with clutch-lugs f', the said lugs being arranged to face each other. Loosely working on the screw is a nut, F, kept from rotating by a slot, F^3, working on a guide, d', on the frame D^2, and provided on each side with clutch-lugs f', to correspond with lugs f' on rigid nuts F' F^2. Now, as the shaft B rotates, the frame D^2 and nut F being stationary, the latter is moved along in either direction, according to whether the elevator is running up or down, and under normal conditions would never come in contact with nuts F' F^2; but if the regular stop becomes deranged, then the nut F clutches with either nut F' or nut F^2 and rotates the wheel D and frame D^2 and stops the elevator. By adjusting the nuts F' and F^2 nearer or farther apart, the time of action may be varied to suit the height of building in which the elevator is located. This adjustment is easily ascertained, as a revolution of shaft B and its drum E will raise the elevator a given distance, and a certain number of threads between nuts F' F^2 will correspond to an equivalent height. The teeth f' prevent the nuts from binding or locking with each other.

The operation is as follows, the apparatus being in the position shown in Fig. 1, in which the pins I' I' are both in the slots i i of the plates I I, and hence hold both the shifting-bars from motion in either direction, so that both driving-belts will be on their respective idler-pulleys, C' C^2. Now, if it is desired to run up the elevator, the chain D' is pulled in one direction, the result of which is to turn the wheel D, the groove H passing over the lug I^2 on one of the plates I, holding it rigidly from reciprocating motion, and one of the pins I' enters the slot i of the other plate and thrusts it forward, shifting one of the driving-belts onto the drive-pulley C^3 through the agency of its bar K and belt-shifting arm. This same action rotates the cam D^4, the projection D^5 depressing the lever P, raising the weight O^3, and removing the shoe M' from the brake-wheel M. Now, the rotation of the shaft C rotates the worm B^2, and it in turn rotates the worm-wheel B', to which the shaft B is secured, and this in turn revolves the winding-drum, which winds up or gives out the lifting ropes or cables. Any given amount of friction may be given by adjustment of the weight O^3 and the screw Q, which latter is used specifically to vary the contact of the shoe M' with the wheel M, for by screwing it down the said shoe may be removed entirely from the brake-wheel at a time when the machine is at rest and the greatest pressure should be exerted. If the wheel D is rotated in the opposite direction, then the opposite belt is shifted and the brake removed, as before; but now the machine runs in the opposite direction and lowers the elevator. If it is desired to change the machine from a left-hand to a right-hand machine, or vice versa, the usual heads to the cylinder-case A′ are removed and exchanged and the shaft C reversed. Then the pin n' of the brake device is removed and the brake mechanism moved around and secured to the corresponding hole, A^3, on the other side of the case A, and the arm P is removed and bolted to the other arm, O^4, so as to keep it in contact with the brake-cam D^4, and the screw Q is changed again to the hole P′ on the inside of the arm P. The bars K are then turned end for end, and the plates I I are preferably bolted to the opposite bars to what they were formerly bolted, as these plates I I can not be moved; or, if desired, the bars K K may be turned end for end, and also exchanged for each other. Then the same old bolt-holes will suffice, and the machine is converted into a left-hand machine without altering any parts thereof.

While we prefer the construction shown, we do not limit ourselves thereto, as our invention may be modified in various ways without departing therefrom.

We are aware of the patent to Clem, April 8, 1879, No. 214,102, and claim nothing therein set forth or claimed.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of a shifting-wheel, a brake-cam secured thereto, mechanism actuated by said wheel to actuate the driving-belts, and gravity-brake mechanism arranged to be thrown out of action upon rotating said shifting-wheel in either direction, and into action when said wheel is in its normal position, or between said motions, substantially as and for the purpose specified.

2. The combination of a brake-cam and brake with the driving-shaft of a hoisting-machine, and means to vary the position of the brake-shoe with reference to its actuating-lever, substantially as set forth, to regulate or vary the time of the application of said brake, substantially as and for the purpose specified.

3. The combination of a brake-cam and brake with the driving-shaft of a hoisting-machine, a brake-wheel upon said driving-shaft, a driving-wheel, and two idler-wheels, belt-shifters, and shifting mechanism to actuate said belt-shifters, and means to vary the position of the brake-shoe with reference to its actuating-lever, substantially as set forth, to regulate or vary the time of the application of said brake to said brake-wheel, substantially as and for the purpose specified.

4. The combination of the casing A, frame N N^2, pivot n', brake-shoe M′, frame O, having arm O^2, weight O^3, arm P, screw Q, and cam mechanism to vibrate said arm P, substantially as and for the purpose specified.

5. The combination of the casing A, having apertures or holes A^3 on each end thereof, frame N, having two legs or arms, N^2, arranged to straddle said case A, pivot n', brake-shoe M′, frame O, pivoted to frame N, having arm O^2, and arms O^4, also arranged to straddle said case A, weight O^3, arm P, screw Q, and cam mechanism to vibrate said arm P, whereby said brake mechanism may be made right or left handed on the said case A, substantially as and for the purpose specified.

6. A belt-shifting device for hoisting-machines, which consists of a shifting-wheel provided with two pins arranged diametrically opposite to each other, in combination with shifting-bars and slotted plates secured thereto, within which the said pins work to move said bars, and suitable devices, substantially as set forth, to hold one of said bars stationary while the other is being moved, or vice versa, substantially as and for the purpose specified.

7. A belt-shifting device for hoisting-machines, which consists of a shifting-wheel provided with two pins, arranged diametrically opposite to each other, and a circumferential slot or groove arranged between said pins, in combination with shifting-bars and slotted plates secured thereto, within which the said pins work to move said bars, and also lugs or projections which fit into the circumferential groove, and thereby prevent the said plates from moving, said circumferential groove and one of said pins on said shifting-wheel acting respectively upon the separate shifting-bars and their plates at the same time, whereby one is held stationary while the other is being moved, substantially as and for the purpose specified.

8. The combination of wheel D, having pins I′ I′ and circumferential groove H, shifting-bars K K, having plates I I, provided with slots i i, and lugs I^2 I^2, substantially as and for the purpose specified.

9. The combination of wheel D, having pins I′ I′ and circumferential groove H, shifting-bars K K, having plates I I, provided with slots i i, and lugs I^2 I^2, the said lugs I^2 and groove H limiting the throw of the bars K in one direction, and suitable buffers secured to said bars K, to limit the throw of same in the opposite directions, substantially as and for the purpose specified.

10. The combination of wheel D, having pins I′ I′ and circumferential groove H, shifting-bars K K, having plates I I, provided with slots i i, and lugs I^2 I^2, the said lugs I^2 and groove H limiting the throw of the bars K in one direction, and suitable adjustable buffers secured to said bars K, to regulate and limit the throw of same in the opposite directions, substantially as and for the purpose specified.

11. The combination of wheel D, having pins I′ I′ and circumferential groove H, shifting-bars K K, having plates I I, provided with slots i i, lugs I^2 I^2, and buffers K′, consisting of plate k^3 and rubber or flexible cushion k^2, substantially as and for the purpose specified.

12. The combination of the pins I′ I′, ar-

ranged substantially opposite to each other, and adapted to move around a fixed point, with plates I, having slots i, there being a time when both of said pins are in said slots when the plates are held stationary, but when said pins are moved in either direction one of same passes out of the slot in one of said plates, while the other passes in and shifts the other of said plates, substantially as and for the purpose specified.

13. The combination of the pins I' I', arranged substantially opposite to each other, and adapted to move around a fixed point, with plates I, having working-slots i, there being a time when both of said pins are in said slots when the plates are held stationary, but when said pins are moved in either direction one of same passes out of the working-slot in one of said plates, while the other passes in and shifts the other of said plates, and mechanism, substantially as set forth, to hold one of said plates stationary while the other is being shifted, substantially as and for the purpose specified.

14. The combination of shaft C, worm B^2, worm-wheel B', shaft B, having a screw-thread, b, on its end, stationary but adjustable nuts F' F^2, clamped upon the screw-threaded end of shaft B by bolts f f, and traveling nut F, and suitable mechanism actuated, when the said nut F comes in contact with either of said nuts F' F^2, to automatically stop the rotation of shaft B, substantially as and for the purpose specified.

15. The combination of shaft C, worm B^2, worm-wheel B', shaft B, having a screw-thread, b, on its end, stationary nuts F' F^2, traveling nut F, arranged to slide longitudinally in a frame, D^2, shifting-wheel D, and shifting devices actuated upon said wheel being rotated in either direction, substantially as and for the purpose specified.

16. The shifting-bars K, in combination with the shifting-arms L' and clamping-plates l, having lugs l^2, and secured together by bolts l', substantially as and for the purpose specified.

17. The shifting-arm for a belt-shifter, consisting of a wrought-iron rod or bar, L', having a cast-iron loop riveted to its end, substantially as and for the purpose specified.

18. The combination of brake-wheel M, a pivoted frame, N, having bearings N', a brake-shoe, M', secured to said frame N by flexible or universal joint frame O, supported on said bearings, and having arms P and O^2, weight O^3, and cam D^4, having projections D^5 D^5, and recess D^6, substantially as and for the purpose specified.

19. An adjustable shifting-arm for belts, in combination with a shifting-bar arranged to reciprocate in fixed guides, said arm being arranged at right angles to said bar, and an adjustable clamping device to secure said arm to said bar and allow it to be adjusted in the direction of its length, substantially as and for the purpose specified.

20. An adjustable shifting-arm for belts, in combination with a shifting-bar arranged to reciprocate in fixed guides, said arm being arranged at right angles to said bar, and an adjustable clamping device to secure said arm to said bar and allow it to be adjusted both in the direction of its length and that of the shifting-bar, substantially as and for the purpose specified.

In testimony of which invention we hereunto set our hands.

STEPHEN A. MORSE.
CHARLES TYSON.

Witnesses:
R. M. HUNTER,
WILLIAM MCWADE.