(No Model.) 2 Sheets—Sheet 1.

J. S. STEVENS, C. G. MAJOR & D. P. EDWARDS.

LIFT AND HOIST.

No. 282,236. Patented July 31, 1883.

Fig. 1.

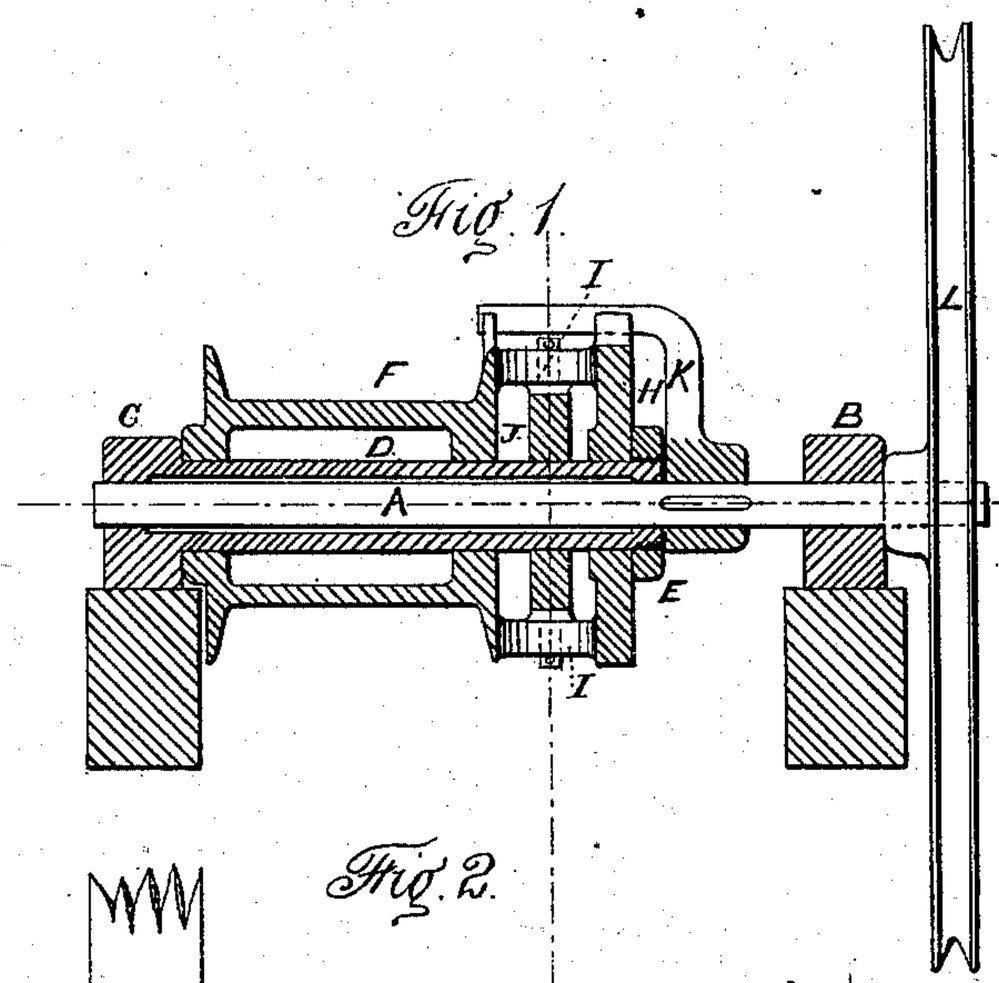


Fig. 3.

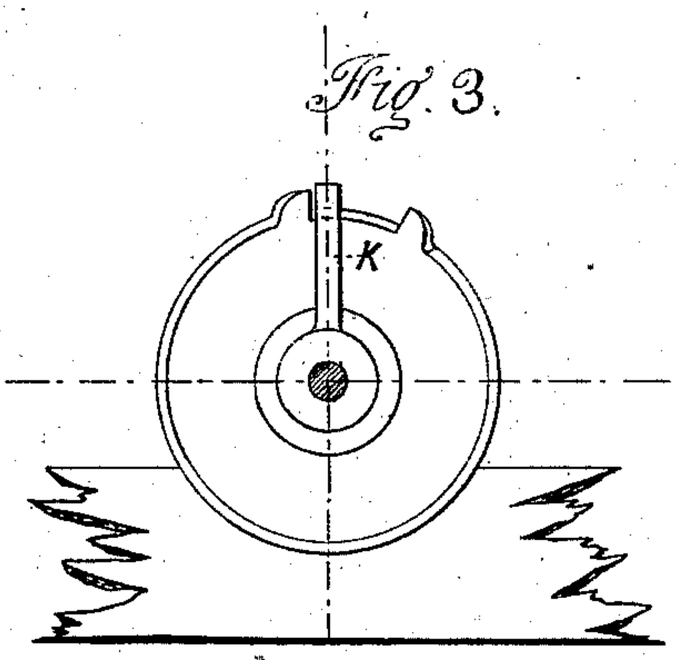


Fig. 2.

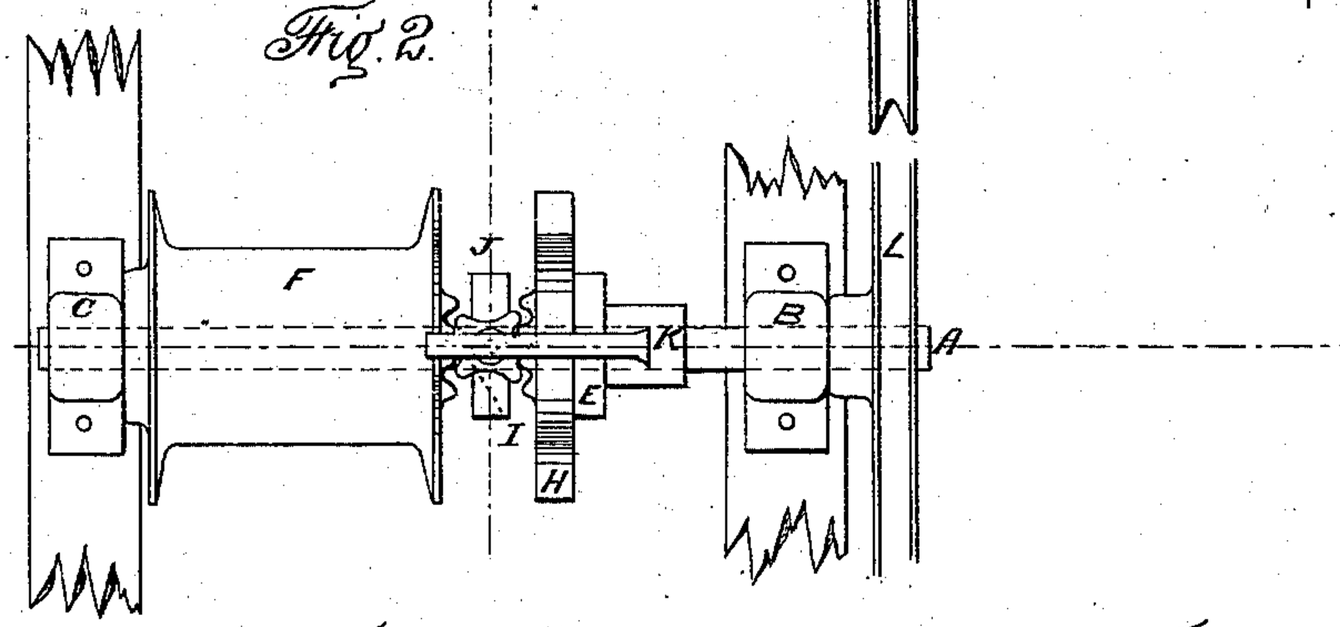


Fig. 4.

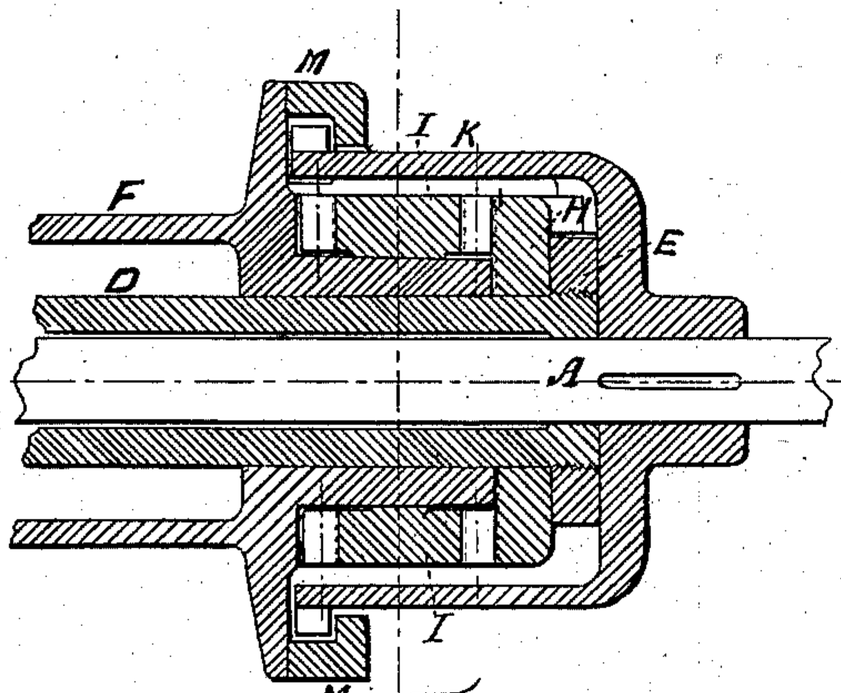


Fig. 5.

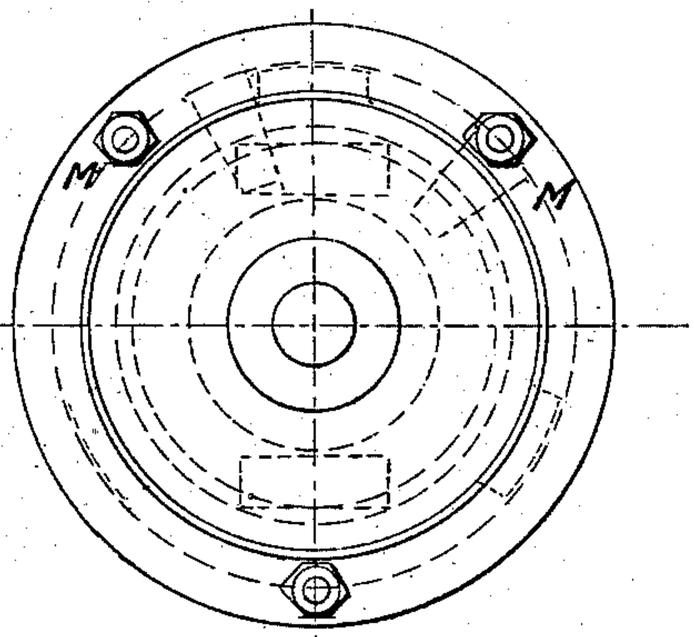
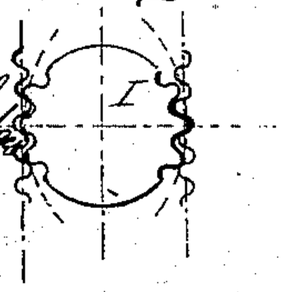


Fig. 6



Witnesses
Percy Thomas Hedges
Arthur Carter.

Inventors
John Saudeus Stevens
David Pugh Edwards
Charles George Major
per FM Rogers Attorney

(No Model.) 2 Sheets—Sheet 2.

J. S. STEVENS, C. G. MAJOR & D. P. EDWARDS.

LIFT AND HOIST.

No. 282,236. Patented July 31, 1883.

Fig. 10.

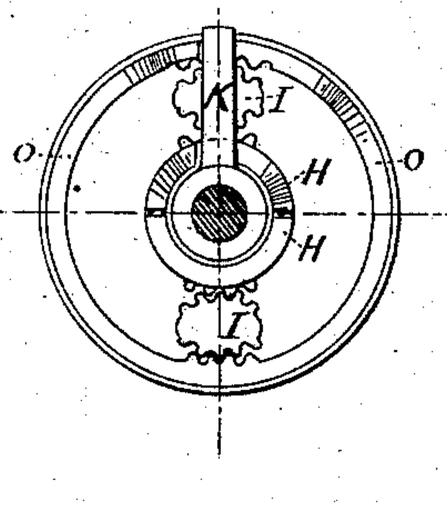


Fig. 11.

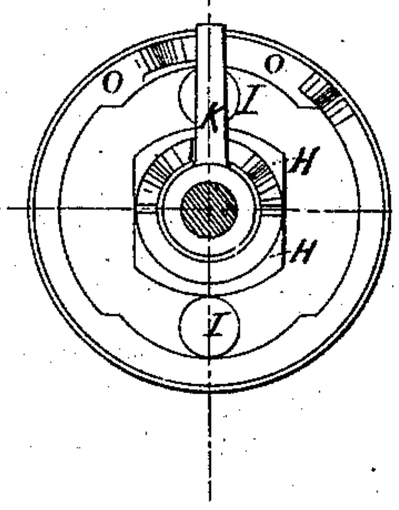


Fig. 12.

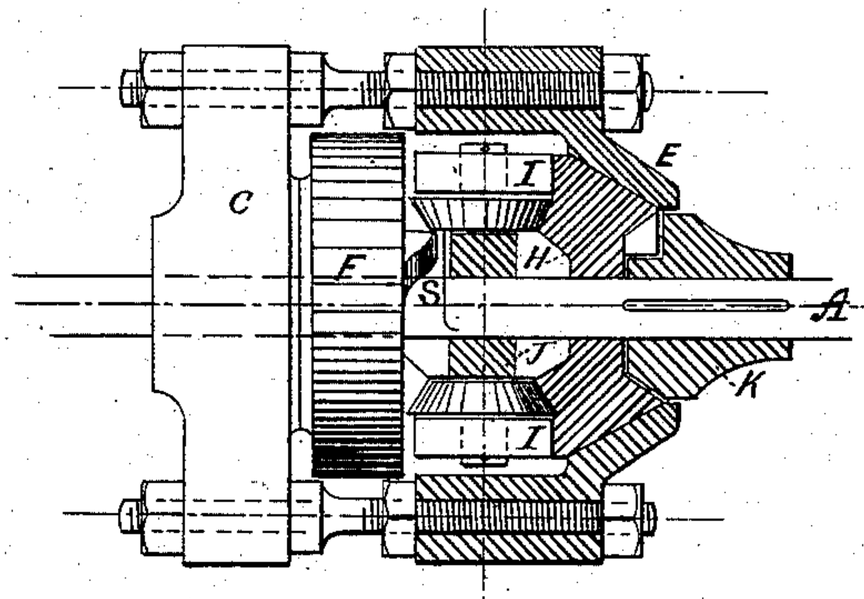


Fig. 14

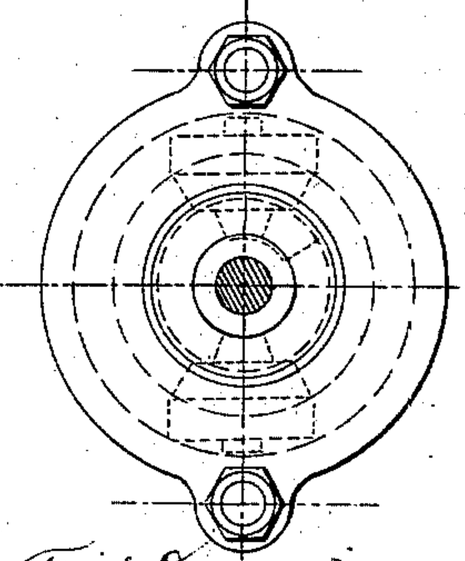


Fig. 8

Fig. 7.

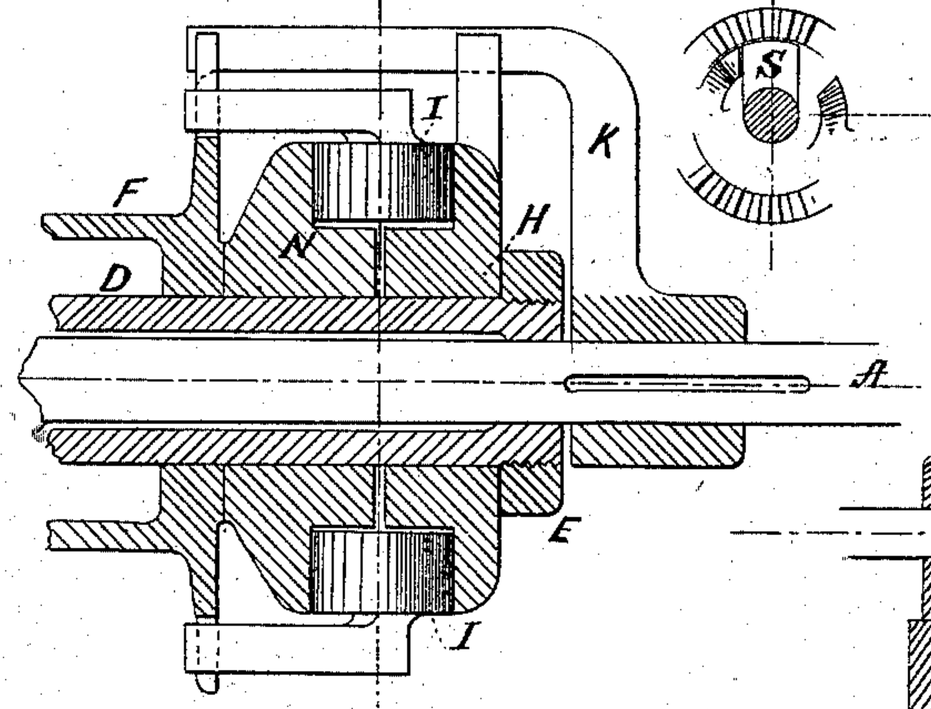


Fig. 13

Fig. 9.

Witnesses
Percy Thomas Hedges
Arthur Carter.

Inventors
John Saudeo Stevens.
David Hugh Edwards
Charles George Major
per J. M. Sayles attorney

UNITED STATES PATENT OFFICE.

JOHN S. STEVENS, CHARLES G. MAJOR, AND DAVID P. EDWARDS, OF LONDON, ENGLAND.

LIFT AND HOIST.

SPECIFICATION forming part of Letters Patent No. 282,256, dated July 31, 1883.

Application filed March 12, 1883. (No model.) Patented in England September 6, 1882, No. 4,240.

To all whom it may concern:

Be it known that we, JOHN SANDERS STEVENS, CHARLES GEORGE MAJOR, and DAVID PUGH EDWARDS, subjects of the Queen of Great Britain, residing at James Works, Queen's Road, Battersea, London, England, have invented certain new and useful Improvements in Lifts and Hoists, applicable to frames, winches, and all other kinds of lifting, hauling, and winding machinery; and we do hereby 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 appertains to make and use the same.

Our invention relates to improvements in lifting and winding machinery, by means of which the load or balance-weight is self-sustained in any position when the motive power in either direction ceases. Power by hand or other means is used in lifting or lowering the load.

In this description the same letters of reference apply to the same or equivalent parts in all the figures.

In figure 1, motive power is applied in any convenient manner to the shaft or spindle A, Figs. 1, 2, 3, running freely in two bearings, B and C. One bearing, C, is continued along the shaft as a sleeve or tube, D, terminating in a fixed collar, E, of larger diameter than the sleeve, and occupying a portion of its length. A loose collar, H, also runs freely upon the sleeve D. On the faces of barrel F and loose collar H nearest each other teeth or indentations are provided. Placed between the barrel and loose collar H, and engaging with the opposite sets of teeth, are two or more cams, I, pivoted at their centers on pins projecting from a loose collar, J, also free upon the sleeve D. The cams I are so formed that when their shortest center lines or axes lie parallel with that of the sleeve D, they allow the collar H and barrel F to mutually approach and to run freely; but if their shortest axes be inclined to that of the sleeve in either direction they will thrust the barrel F tightly up to the bearing C, and the loose collar H tightly up to the fixed collar E, these movements increasing directly with and relatively to the inclination of the toothed cams to the sleeve D. Fastened to the shaft A and revolving with it is a boss, with an arm, K, projecting over the loose collar H and extending to the end of the barrel F. This arm engages with a projection on the barrel F and with another similar projection on collar H in such a manner that when it is in contact with both the barrel and loose collar H, by means of their teeth, bring the cams I to their center or parallel position. A second pair of projections are provided on the barrel and collar H, so that if the arm K is moved in the reverse direction it will produce the same result. Now, if the shaft A is caused to revolve—say by power applied through the driving-wheel L—the arm K, being secured to the shaft, will cause the parts F H I I to assume the above-described positions, in which the barrel and loose collar H are free on the sleeve D, and the arm K, acting as a driver, will cause all the loose parts to revolve, and a rope wound upon the barrel would raise or haul a load, irrespective of the direction of rotation of the shaft. If the power applied through the wheel L be withdrawn, the load will cause the barrel F to move backward, and it will carry with it the arm K and shaft A, but will leave the loose collar H stationary, the effect being that the longer axis of the cams thrusts asunder the barrel F and loose collar H and causes them to bind against the bearing C and fixed collar E, the resulting friction preventing any further movement. Upon power being again applied the arm K drives forward the barrel until the cams I I are again parallel, and at this point meets the projection on the loose collar H, carrying all with it, as before. If it be desired to lower the load, the direction of the power is reversed. The arm K then leaves the barrel and revolves until it strikes projection on loose collar H, forcing it in the direction the load is pulling the barrel. The latter being at rest, the collar H causes the cams I to approach parallelism, and, freeing the barrel, allows it to follow the effort of the load, the movement continuing so long as the arm K and loose collar H follow up the barrel. When the shaft A ceases to revolve, and with it the arm K and collar H, the barrel, moving slightly forward under the influence of the load, again binds itself by means of the toothed cams I I, and as these cams are formed to exert a thrust

when their parallelism is disturbed in either direction, the barrel will be held fast irrespective of the direction in which the load is pulling against it. The apparatus is therefore double or reverse acting.

In our second arrangement, Figs. 4, 5, 6, the bell K may be secured to the barrel F by a ring, M, as against axial movement, but left free as to revolution. Then the thrust of the toothed cams I I will cause the fixed collar E to be grasped tightly between the loose collar H and the bell K, producing the same results as before.

In our third arrangement we produce the same results as in our first and second by replacing the toothed cams by a loose collar, N, Figs. 7 and 8, free upon the sleeve. In the inner face of collar H are cut two or more semicircular recesses. Exactly opposite these a corresponding series of flat segmental recesses are cut in the face of the collar N. Fitting into the cavities formed by the juxtaposition of the two series of recesses are cams I I, provided with arms engaging with the flange of barrel F. The recesses in H form sockets in which the cams I swivel. Inclination in the arm of cam I produces thrust between collars H and N, with results as before.

In our fourth arrangement, Figs. 9, 10, the sleeve D, fixed to the bearing C, is made without a collar at the other end. The barrel F runs freely on the sleeve and the arm K is keyed to the shaft A, as before. On the end of the barrel is provided a projecting ring, O, on the inner circumference of which are formed teeth, as in an internal-toothed wheel. On the sleeve D and within the ring is a loose collar, H, split in halves. On the outside of these halves are teeth corresponding to those in the ring on the barrel. Between the two opposing sets of teeth are disposed radially two or more toothed cams, I I, as described for first arrangement. If the toothed cams are held in the radial or mean position, all the parts are free to revolve. If any relative movement of revolution occurs between the barrel F and the split collar H in either direction, the toothed cams will force the split collar H tightly upon the sleeve D and all the parts will be held. Projections are provided, as before, on the barrel F and the split collar H, to engage with the arm K, and if power is applied to the latter it forces all the parts into the mean position and enables them to revolve freely, as hereinbefore described.

In our fifth arrangement, Fig. 11, we omit the teeth from parts O I H, making the ring O with internal helical surfaces, I I, as plain cylindrical rollers, and H either with cylindrical or helical surfaces. Relative motion between barrel F and ring O with split collar H will cause the rollers I I to wedge themselves into an ever-decreasing space, and thus thrust the split collar H upon the sleeve D. The arm K, as before, returns all to the mean position.

In our sixth arrangement, which is specially suited to winches and cranes, Figs. 12, 13, 14, shaft A runs freely in side frame, C; a fixed clutch, E, is secured to frame C; a pinion, F, is provided with bevel-teeth or inclined surfaces on its side and runs freely upon shaft A; a loose collar, H, is provided with surfaces or teeth corresponding to pinion F, and fits the clutch E; a loose collar, J, carries cams I, with or without teeth, and to suit the corresponding faces of pinion F and collar H. A is the hand-shaft, and has secured to it a boss, K, which has projections engaging with similar projections on collar H. The shaft has forged upon it an arm, S, which also engages with projections on pinion F. The latter is connected by gearing to the drum-shaft. Motion given to the shaft A brings everything into the mean position by boss K and arm S, and by same means communicates motion to pinion, and therefore to drum. Motion imparted by the load to the pinion F leaves collar H behind, brings cams I I into action, and couples up, as before, between clutch E and frame C.

Having now described our invention and the best method of carrying out the same, we would have it understood that we do not confine ourselves to the precise details shown and described, as they can be modified in many ways without affecting our invention.

We claim—

The combination of parts, as described, or their equivalent, with lifting, hauling, and winding machinery in which there is a driving wheel or pulley to receive the power, a driven drum or its equivalent to transmit the power to the load, by means of which combination the whole apparatus is at all times free to receive motion through the driving wheel or pulley in either direction, but is automatically coupled up to a fixed bearing, or the frame of the machine or its equivalent, immediately motion in either direction commences at the barrel or load-sustaining end of the apparatus.

In testimony whereof we affix our signatures in the presence of witnesses.

JOHN SANDERS STEVENS.
CHARLES GEORGE MAJOR.
DAVID PUGH EDWARDS.

Witnesses:
FRANCIS MURRAY ROGERS,
ARTHUR ROBERT CARTER.

Witnesses to signature of David Pugh Edwards:
THOS. W. STEPHENS,
Notary Public, Cardiff.
JAMES A. ORR,
39 *Lower Cathedral Road, Cardiff.*