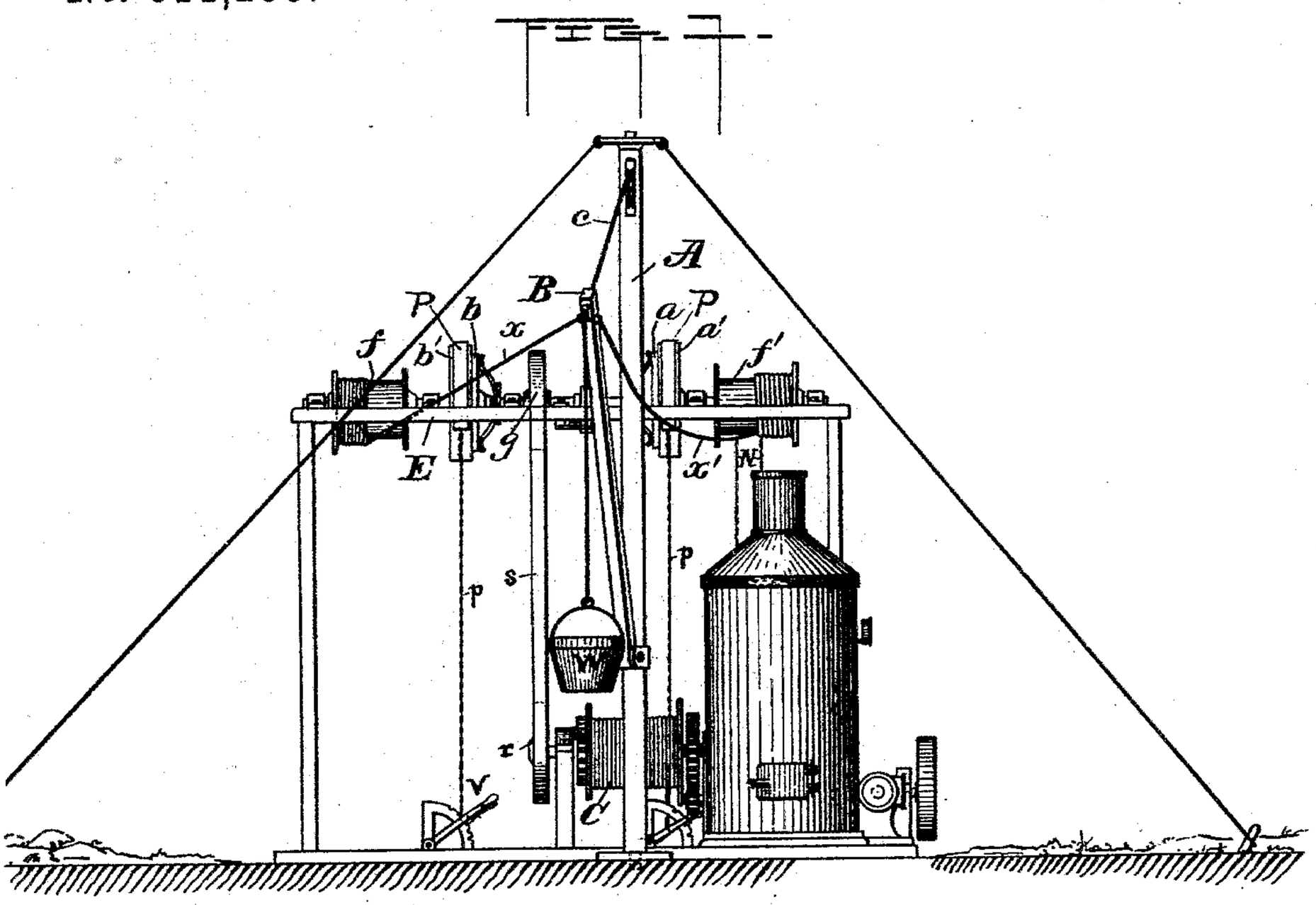
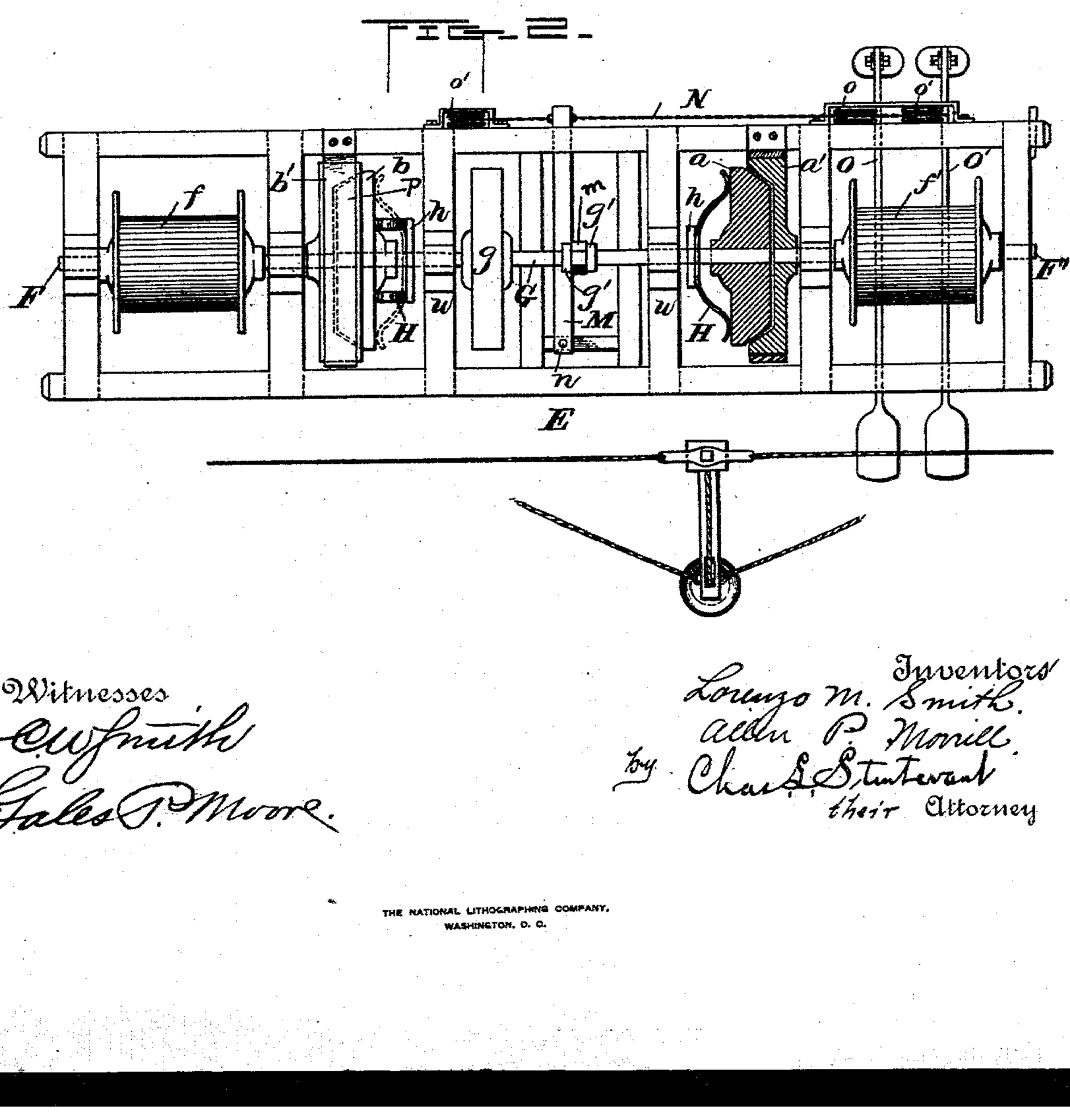
(No Model.) 2 Sheets—Sheet 1.

L. M. SMITH & A. P. MORRILL.

HOISTING APPARATUS.

No. 511,255. Patented Dec. 19, 1893.





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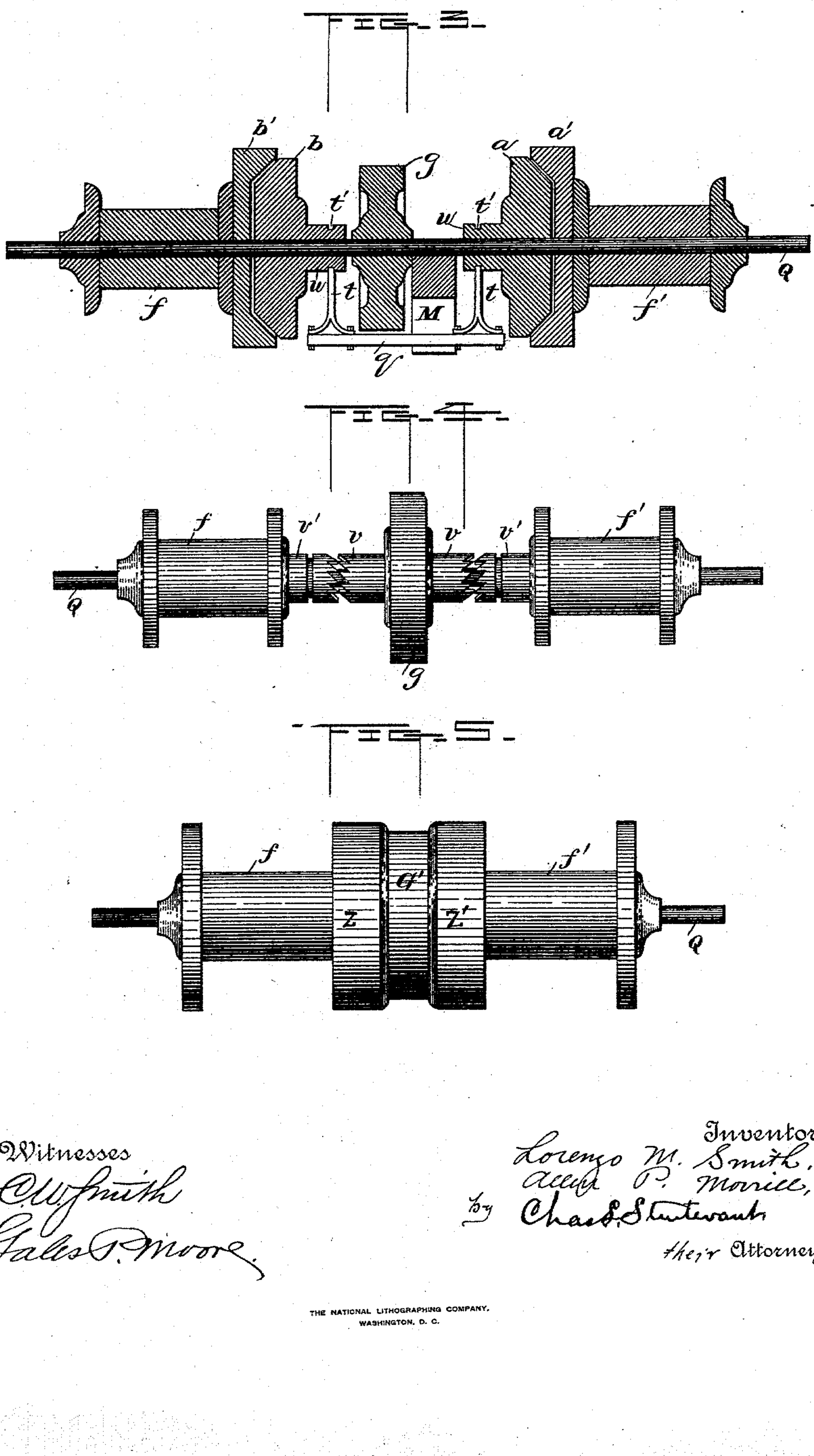

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UNITED STATES PATENT OFFICE.

LORENZO M. SMITH AND ALLEN P. MORRILL, OF SHIPTON, CANADA.

HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 511,255, dated December 19, 1893.

Application filed July 11, 1893. Serial No. 480,159. (No model.)

To all whom it may concern:

Be it known that we, LORENZO M. SMITH and ALLEN P. MORRILL, subjects of the Queen of Great Britain, residing at Shipton, in the county of Richmond, Province of Quebec, Dominion of Canada, have invented certain new and useful Improvements in Hoisting Apparatus, of which the following is a description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Our invention relates to hoisting apparatus, and more particularly to means for swinging the boom at the same time that it is being raised.

The invention consists in the various matters hereinafter described and claimed, and is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of our device applied to a hoisting derrick. Fig. 2 is a plan view of the boom swinging drum; and Figs. 3, 4 and 5 are modifications.

In the drawings, A is the main portion of a derrick, B its boom, C the winding drum of a hoisting engine, and *c* the rope from said drum to the boom by which the latter is raised, all of these elements being of well known construction. Hitherto it has been customary to elevate the boom to the required height and then by hand swing the same around by means of ropes attached to its end. These two operations have been found to consume a considerable amount of time and in order that the swinging may be effected simultaneously with the hoisting, we have provided a second winding drum receiving motion, preferably, from the hoisting drum, and so attached to the boom as to produce the desired result. This second drum is placed above the first drum C and is constructed in three divisions. Suitably journaled in the frame E are two shafts F and F′ having only rotary movement, and a central shaft G so fixed in its bearings as to be capable of both rotary and lateral movement. Upon this central shaft is keyed a pulley *g*, while at either end it carries a gear *a*, *b*, moving laterally with the shaft and adapted to be thrown into and out of engagement with corresponding gears *a′*, *b′*, carried by the shafts F, F′, respectively. These shafts are each further provided with a winding spool *f*, *f′*, from which are ropes *x* and *x′*, attached to the end or other suitable part of the boom by means of which it is swung to the right or left as may be desired.

It is obvious that the gears *a*, *b*, *a′*, *b′*, may be of any suitable construction, but we prefer to use friction pulleys as shown in the drawings. Here the gears *a*, *b*, are truncated cones, while the gears *a′*, *b′*, are blocks hollowed out upon one face to receive these cones. Preferably we make the hollow in the pulleys *a′*, *b′*, deeper than the height of the cone portion of the pulleys *a*, *b*, so that when they are forced together the inclined surfaces of the cones are the only portions which touch the pulleys, thus allowing for wear.

Normally the central shaft G is in such a position that the gears carried thereby are out of engagement with the gears on the shafts F and F′, and in order to return this central shaft to such position after the gears have been forced into contact, we provide in the present instance springs H fastened to blocks *h* fitting loosely over the shaft G and prevented from sliding toward the center by the portions *u* of the frame, while the free side of the springs bears against the pulley *a* or *b* as may be the case. It is obvious, however, that many other forms of spring may be employed, *e. g.*, a spiral may be wound about the shaft, one end of this bearing against a fixed portion of the frame and the other against the pulleys or other suitable projections upon the shaft, this spring being so placed that movement of the shaft laterally one way or the other will compress it.

Many constructions may be employed to shift the central shaft G. In that herein illustrated, two collars *g′*, *g′* are secured to the shaft between which fits the block *m* provided with a groove for the passage of the shaft. This block is attached to a bar M at one portion pivoted to a part of the frame as *n* and at its free end having secured to it a rope or chain N, one part of which passes to the right over a suitable pulley as *o* to a lever O, while the other part of the rope or chain passes to

the left and then back over suitable pulleys as o' to another lever O'.

Brakes are applied to the shafts F and F' and while these may be of a variety of forms, we prefer that shown in the drawings, in which bands P secured to the back of the frame pass over the pulleys a', b', and have attached to their forward ends a rope or chain p fastened to a suitable lever V.

The drum C is provided with a pulley r and this through the band s and pulley g imparts motion to the shaft G.

The operation of our machine is as follows: The article to be hoisted, W, being fastened to the derrick rope, the drum C is caused to rotate, thus raising the weight and at the same time through the connections above mentioned, rotating the central shaft G. Suppose, then, it is desired to swing the boom to the left. The lever O is depressed and held in this position either by the operator or by suitable notches in the frame, and by this the pulley b is brought into contact with the pulley b'. This will cause the spool f to rotate and wind the rope x, thus swinging the boom, the rope x' unwinding freely as the shaft F' is free to rotate. When the boom has been swung to the desired position, the lever O is released and the springs H will carry the shaft G to its normal position out of engagement with the side shafts, while any tendency of the boom to swing back from the place to which it has been brought is prevented by the application of the brake P. Should it be desired to swing the boom to the right, the spool f' with the corresponding lever, pulleys, &c., would be employed.

This machine has been used very advantageously in mining, and while we prefer to construct the parts as herein described and illustrated, it is manifest, as has been mentioned throughout the specification, that many modifications may be made without departing in the least from the spirit of our invention. Some of the most important of these modifications are illustrated in Figs. 3, 4 and 5.

Referring first to the construction shown in Fig. 3, Q is a single shaft upon which is fixed the pulley g, and keyed upon the same so as to be rotated with the shaft and at the same time allowed lateral movement, are the gears a, b. The winding spools f, f', fit loosely over the shaft but have no lateral movement, and each spool carries at its inner end one of the gears a', b'. To the shifting lever M is attached a bar q which carries at each end a projection t fitting in the slot t' of the sleeves u, said sleeves forming a part of the gears a, b. From this it will be seen that the gears a, b are always in rotation, while by shifting the lever M either of the spools f, f' may be thrown into use.

Of course, as shown in Fig. 4, clutch or other suitable forms of gears may be substituted for the cone pulleys and their corresponding blocks, or, as further shown in Fig. 4, the pulley may be fixed upon the shaft and have extending from it the clutch sleeves v, v, the spools f, f' fitting loosely upon the shaft and being provided with corresponding sleeves v', v', motion being imparted to one or the other of the spools by moving said spools laterally, for which purpose I may employ suitable shifting mechanism, *e. g.*, that already described.

Fig. 5 illustrates a construction in which the spools f and f' fit loosely upon the shaft Q and have between their inner ends a loose pulley G', said inner ends being formed into pulleys Z, Z'. The loose pulley G' corresponds to the pulley g in the construction illustrated in Fig. 2, thus receiving the driving belt s from the hoisting drum C. When, therefore, it is desired to swing the boom, the belt is merely shifted from the loose pulley G' to either pulley Z or Z', each of which is rigidly connected to its respective spool f or f', thus causing the desired spool to rotate and wind the rope attached to the boom.

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

1. A winding mechanism for hoisting apparatus comprising a central shaft, a secondary independent spool-carrying shaft upon each side of said central shaft, and means whereby connection may be established between the central shaft and either of said side shafts; substantially as described.

2. A winding drum for hoisting apparatus comprising a central shaft, a secondary spool-carrying shaft upon each side of said central shaft, means whereby said central shaft may be thrown into connection with either of said side shafts, projections upon said central shaft, a plate fitting upon the central shaft and having no lateral movement with respect to the frame of the drum, and springs fastened at one part to the plate and at another bearing against the projections upon the shaft; substantially as described.

3. A hoisting apparatus comprising a derrick, a boom attached thereto, a winding drum having a pulley thereon, connections between said drum and the boom for raising the same, a secondary drum frame, a central shaft in said frame, a pulley upon said central shaft, a belt connecting the pulley upon the winding drum with the pulley upon the central shaft, a secondary spool-carrying pulley upon each side of the central shaft, a rope running from each of said spools to opposite sides of the boom, a truncated cone pulley upon each end of the central shaft, a corresponding hollow-faced pulley upon each secondary shaft, shoulders upon said central shaft, a block fitting between said shoulders, said block being attached to a lever pivoted at one end to the frame of the drum, a rope attached to the other end of said lever, one end of the rope passing to the right to a lever O and the other end passing to the left, then to a lever O', a

brake upon each of the secondary shafts, a plate fitting upon the central shaft, one near each end thereof, said plates being prevented from lateral movement with respect to the frame, and springs between said plates and the pulleys upon the central shaft; substantially as described.

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

LORENZO M. SMITH.
ALLEN P. MORRILL.

Witnesses:
A. A. MACLEAY,
JOHN S. KIDDLE.