(No Model.) 3 Sheets—Sheet 1.

P. SWEENEY.

MECHANICAL POWER FOR ELEVATORS, &c.

No. 499,605. Patented June 13, 1893.

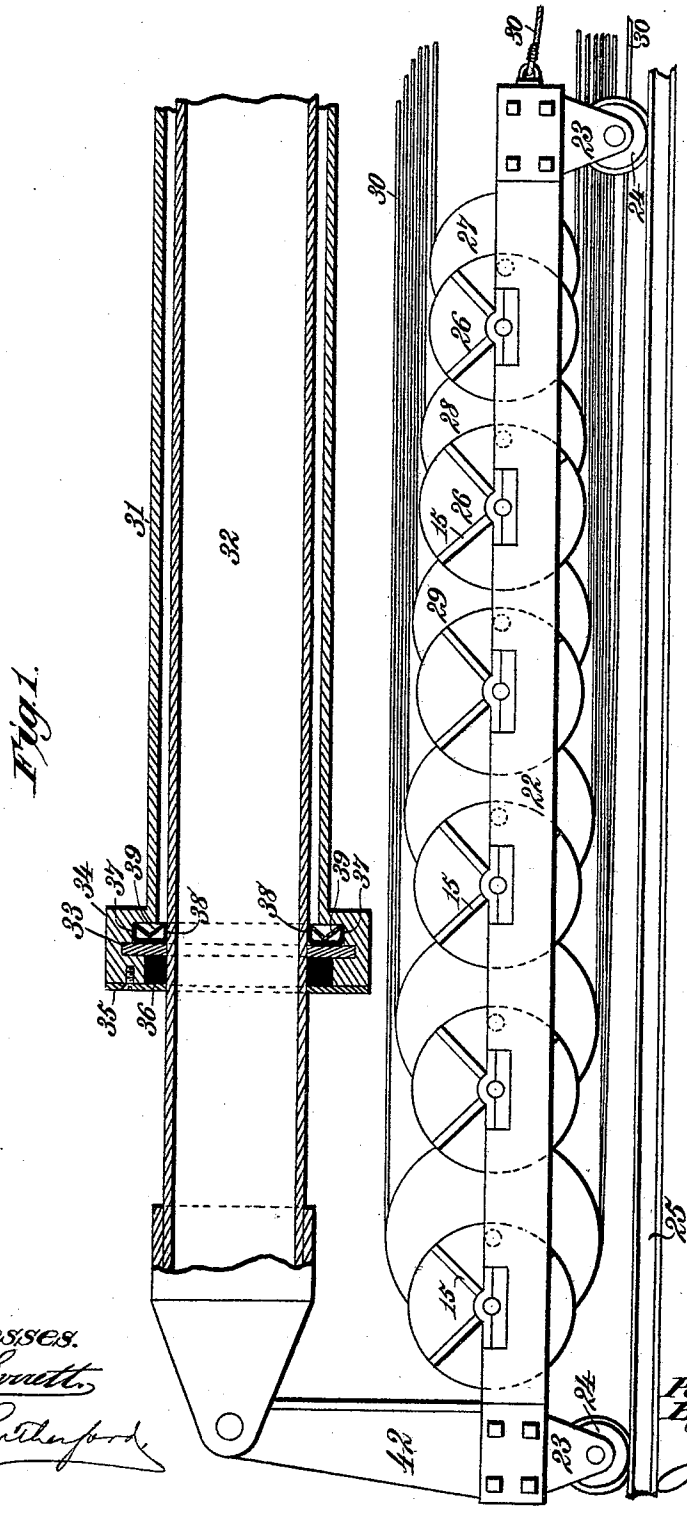

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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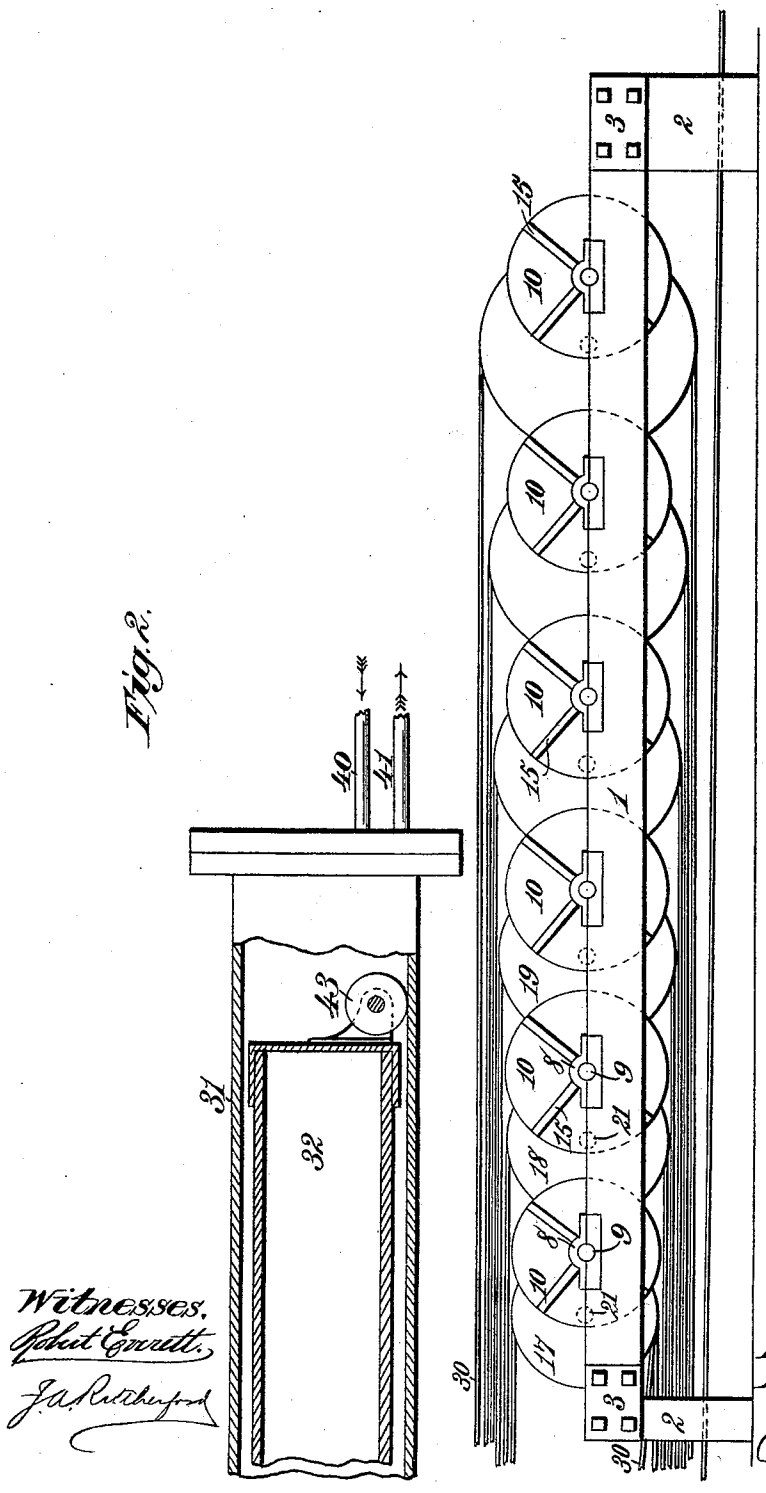
Fig. 2.



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3 Sheets—Sheet 3.

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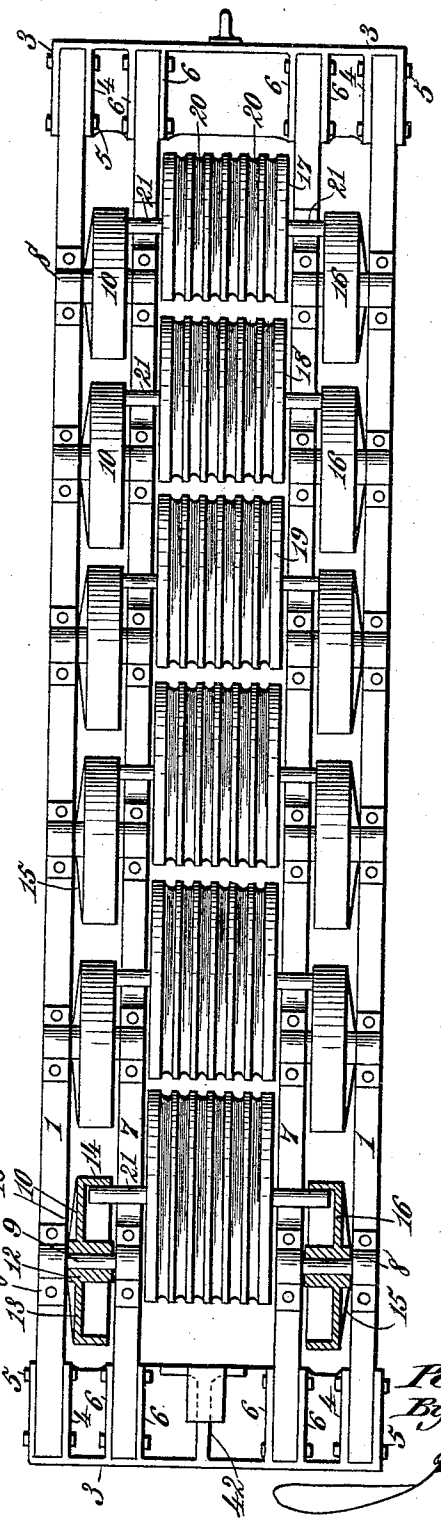

Fig 3.

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UNITED STATES PATENT OFFICE.

PETER SWEENEY, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO CHARLES H. BOYER, OF SAME PLACE.

MECHANICAL POWER FOR ELEVATORS, &c.

SPECIFICATION forming part of Letters Patent No. 499,605, dated June 13, 1893.

Application filed November 27, 1891. Renewed July 28, 1892. Again renewed May 15, 1893. Serial No. 474,359. (No model.)

To all whom it may concern:

Be it known that I, PETER SWEENEY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Mechanical Powers for Elevators and other Purposes, of which the following is a specification.

My invention relates to that class of mechanical powers used in the application of powerful traction to the accomplishment of mechanical results, such, for example, as the raising of heavy weights, like elevators, or lifts, and other purposes.

It is the object of my present invention to provide a mechanism of this type, having a simple and comparatively inexpensive construction, and capable of great power.

It is my purpose, also, to eliminate from such a mechanism a very considerable part of the friction usually found in similar apparatus, and to afford an apparatus whereby a large multiple of power shall be obtained from the expenditure of a small unit of force, and in which there shall be a very slow and imperceptible wear of the parts, the bearings upon which the strain is directly thrown being roller-bearings, and those to which said strain is communicated being of such slow rotation as to have no perceptible wear, while the number of such bearings is such that the strain is divided throughout a series of points and falls moderately upon each.

The invention consists in the novel features of construction and new combinations of parts hereinafter fully set forth and then more particularly pointed out and defined in the claims which conclude this specification.

To enable others skilled in the art to which my invention pertains to make, construct and use the same, I will proceed to describe said invention in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation, partly in section, showing a part of the power-mechanism. Fig. 2 is a similar view, showing the remaining portion of said mechanism, which is of such extent, longitudinally, that it can not be shown upon a single sheet of drawings. Fig. 3 is a plan view of part of the apparatus shown in Figs. 1 and 2.

In the said drawings, the reference-numeral 1 indicates a strong, rectangular frame, formed usually of wood, having considerably greater length than width, and rigidly fastened upon any suitable form of base, or support, above which it is preferably, though not necessarily, raised by short corner-brackets 2. The ends of the long sills of the frame may be connected in any ordinary manner, but I prefer to employ for this purpose metallic angle-plates 3, the ends of which are lapped over upon the outer faces of said sills. Parallel with these overlapping ends are portions 4, which lie against the inner faces of the sills and are fastened by bolts 5, passing through the sill and through overlapped ends of the plates, as shown in Fig. 3. At a short distace from each of the long sills, plates 6 spring from the inner face of the angle-plates 3. These plates are parallel with each other and with the sills, and between each pair is inserted the end of a sill 7, co-extensive with the frame 1. Upon the outer sills of said frame and the sills 7 are mounted journal-boxes 8, which receive the journals 9 of pulleys 10, which lie in the space between the parts supporting the bearings. Said pulleys are ordinarily formed of a single casting, which includes the hub 12 and journals 9, together with the circular body 13 of the pulley, upon which is formed a strong flange 14, turned inward, or toward the sill 7, its interior circular face being substantially parallel with the axis of the pulley. The hub and circular body of the pulley are strengthened by radial ribs, or webs 15, formed at suitable intervals.

Opposite to the pulley last described, or upon the transversely opposite part of the frame, is arranged a second and similar pulley 16, of like construction and having a similar journal-support, its axis of rotation being substantially coincident with that of the pulley on the other side of the frame. At suitable intervals throughout the length of the frame I arrange these pulleys in pairs, usually as close together as permitted by the diameters of the traction-pulleys. These intervals may be varied, however, according to circumstances, and the pulleys may themselves be of varying diameter, or they may all be of the same diameter, or substantially so.

The numerals 17, 18, 19, &c., indicate the traction-pulleys, each having a series of grooves 20, for the cable, whereby a large frictional surface of contact is provided. Each pulley is provided with a shaft 21, the ends thereof crossing the frame and the journals resting upon the interior faces of the pulley-flanges 14. As the traction exerted is substantially parallel, in its line of strain, with the length of the sills, the shafts of the traction-pulleys will be drawn nearly into the same plane with the axes of the pulleys 10. When no traction is exerted gravity would normally drop these traction-pulleys, until the journals of the shafts 21 rested upon the lowest points of the flanges 14. This displacement is prevented by the sills 7, upon which the shafts of the traction-pulleys rest, when no strain is exerted. The edges on which the shafts rest are slightly below the level at which the shafts lie when traction is exerted, in order that there may be no retarding contact with said edges when the pulleys are in action.

The traction-pulleys are of increasing diameter, successively, from one end of the frame to the other, after the ordinary arrangement in the differential pulley.

In line with the frame described is arranged an independent frame 22, of substantially similar construction, but having hangers 23, in which are journaled wheels 24, by which the frame is converted into a carriage, movable upon rails 25. Upon the four longitudinal sills of this frame are journaled the double series of flanged pulleys 26, similar to those already described. The flanges of these pulleys support the journals of a series of traction-pulleys 27, 28, &c., of successively increasing diameter from one end of the carriage to the other; the only difference from the arrangement shown in the series 17, 18, 19, &c., being that the increase in diameter is toward the opposite end of the carriage, in contradistinction to an increase in the same direction. Thus, the smaller traction-pulleys in both series will be at the adjacent ends of the stationary frame and carriage, and the pulleys of greatest diameter at the most remote extremities of the two series. The two series are connected by a cable 30, having its end attached to one end of the carriage and thence carried over the pulley 17 upon the stationary frame, and placed in one of the end grooves thereof; thence around the pulley 27, which is the proximate member of the series upon the carriage, and so on, back and forth until all the grooves in the pulleys 17 and 27 are filled by the cable. The latter then passes to the second pulley 18 of the traction-series upon the stationary frame, and then over the pulley 28 of the movable series, until all the grooves of both pulleys are filled. In like manner it extends over the corresponding members of both series, and from the last groove of the largest pulley in the movable series it is led beneath both series to the point where traction is to be applied and is attached to, or connected with, the object to be moved in any suitable manner.

The reference numeral 31 indicates a cylinder, usually of considerable length, and having such other dimensions as circumstances may require. The open end of said cylinder receives a piston, which may be of any preferred form, as, for example, a cylindrical body 32, either hollow or solid, of suitable length, and packed into the open end of the cylinder 31 by means of an annulus 33, set in an interior, circumferential groove in a thick collar 34, surrounding the mouth of the cylinder. Between this annulus and an outer, attachable plate 35, a fibrous packing 36 may be placed, of any suitable kind. Against the inner face of the annulus 33, in a broad groove formed for the purpose in the collar 34, but of less depth than that in which the annulus lies, is placed a cupped annulus 37, of leather, or other suitable material, having sufficient flexibility. The flat face of this flexible annulus lies against the annulus 33, and its concentric edges 38 lie against the exterior of the cylindrical piston and the bottom of the groove in the collar. Within the cupped annulus 37 is laid a spreading annulus 39, substantially V-shaped in cross-section, its apex resting against the flat face of the annulus and its concentric edges against the inner faces of the edges 38 of the annulus, to maintain the latter in suitable position. The piston is driven outward by hydraulic, or other pressure, the medium employed being admitted to the cylinder by an inlet-pipe, 40, and removed by an exhaust-pipe 41. The end of the piston is connected to a bracket 42 on the end of the carriage. In order to diminish friction to the utmost possible extent, the closed, or solid end of the piston is supported by a caster-wheel 43, which travels on the lower, inner face of the cylinder. I make the piston, preferably, of wood, for the sake of avoiding unnecessary weight and expense, and it may be solid, or consist of a cylindrical shell, as already stated.

I may arrange the cylinder 31 above, or below, or upon either side of the movable carriage, or I may use two cylinders and place the carriage between them.

What I claim is—

1. A mechanical power, for operating elevators and other purposes, consisting of a stationary series of differential traction-pulleys, a double series of flanged pulleys, supporting the journals of the traction-pulleys upon the inner faces of their flanges, a carriage, a series of differential pulleys mounted thereon, a series of flanged pulleys supporting the journals thereof, a cylinder arranged in parallelism with the line of traction and a piston in said cylinder connected to the carriage, substantially as described.

2. In a mechanical power, the combination with a fixed and with a movable series of differential traction-pulleys of a double series

of flanged pulleys, between which the fixed series lies, a similar double series of flanged pulleys for the movable series, a continuous cable successively connecting the traction-pulleys in one series with the corresponding pulleys in the other series, supports for the shafts of the traction-pulleys to maintain them nearly in the axial plane of the flanged pulleys when at rest, and means for imparting movement to the movable series, substantially as described.

3. In a mechanical power, the combination with a stationary series of differential traction-pulleys, of a double series of flanged pulleys supporting the journals of the traction-pulleys upon the interior faces of their flanges, parallel sills supporting the journals of the flanged pulleys and maintaining the shafts of the traction-pulleys nearly in the same plane with the journals of the flanged pulleys, a movable series of differential pulleys and a cable having a plurality of turns about the corresponding pulleys in both series, substantially as described.

4. In a mechanical power, the combination with fixed parallel sills supporting the journals of two similar series of flanged pulleys, of a series of differential traction-pulleys arranged between the two series of flanged pulleys, their journals resting against the interior faces of the flanges, a series of similar, differential, traction-pulleys, a similar double series of flanged pulleys supporting the same, a carriage consisting of a frame of parallel sills mounted on wheels and supporting the journal-bearings of the flanged pulleys, a piston consisting of a cylindrical wooden body of suitable length having one end connected to a bracket on the end of the carriage and a caster-wheel upon the other end, a cylinder receiving said piston and having a collar surrounding its open end, a packing-annulus set in an interior groove in said collar, a cupped, flexible annulus having its flat face resting against the inner flat face of the packing-annulus, its two concentric edges being turned inward, one lying against the outer face of the piston and the other in a groove in the collar, a spreading annulus, V-shaped in cross-section, lying within the cupped, flexible annulus, and means for driving said piston outward, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal in presence of two subscribing witnesses.

PETER SWEENEY. [L. S.]

Witnesses:
LOUIS KLEIN,
JOHN G. CHARLES.