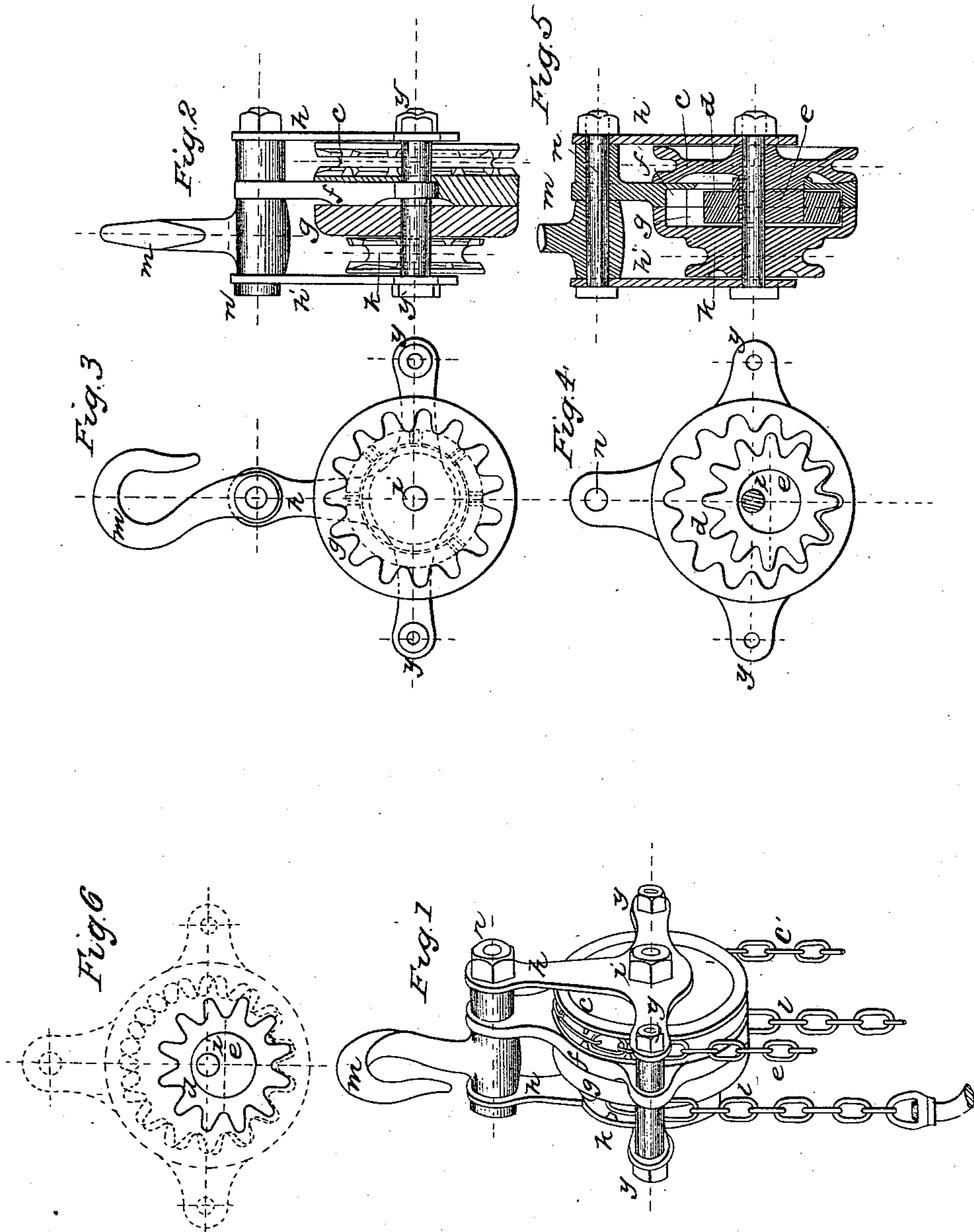


J. PICKERING.

Apparatus for Raising Weights.

No. 84,577.

Patented Dec. 1, 1868.



Witnesses
John Collyer
Richd. Arison

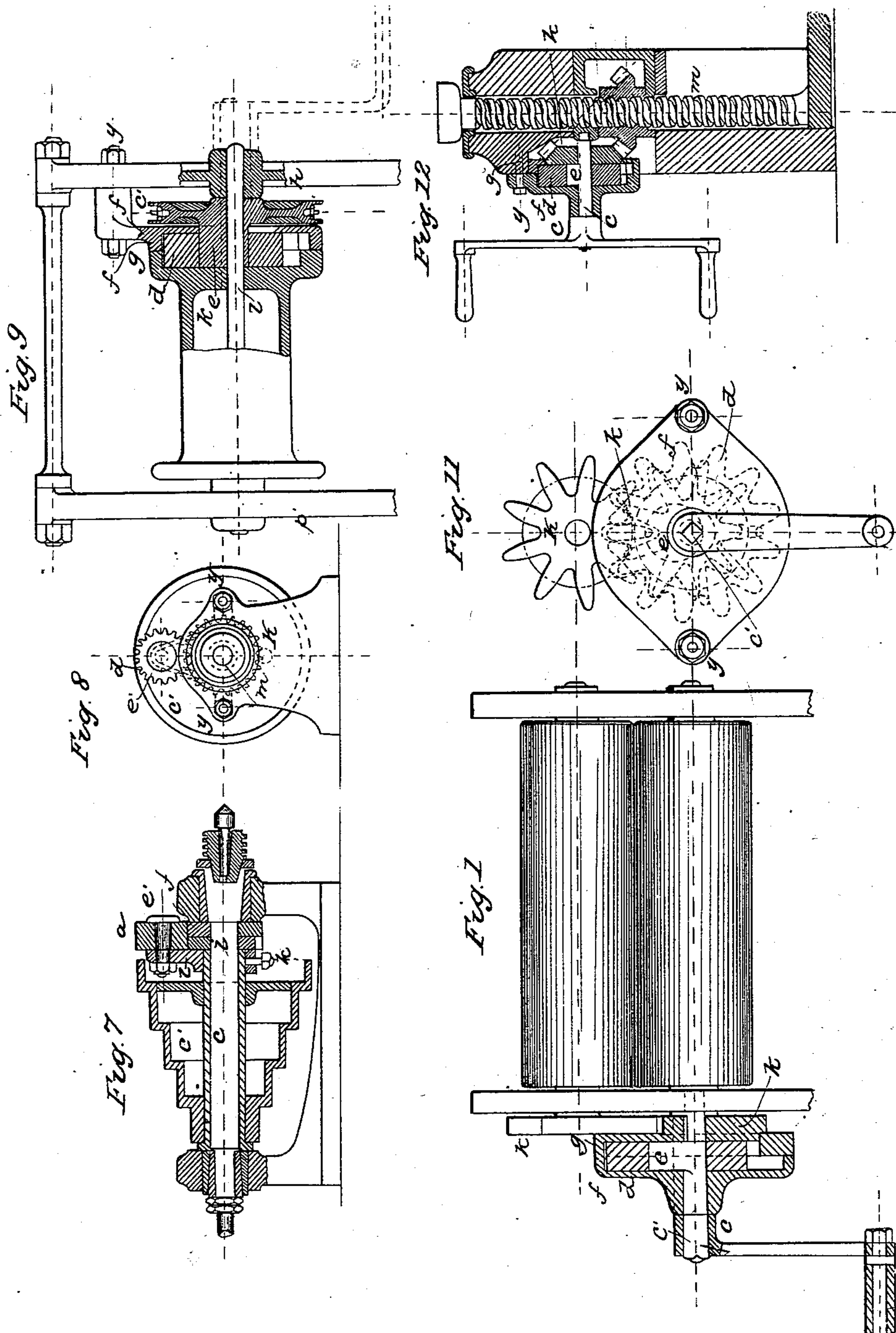
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JONATHAN PICKERING, OF STOCKTON-ON-TEES, ENGLAND.

IMPROVEMENT IN APPARATUS FOR RAISING WEIGHTS.

Specification forming part of Letters Patent No. 84,577, dated December 1, 1868.

Be it known that I, JONATHAN PICKERING, of Stockton-on-Tees, in the county of Durham, England, have invented certain new and useful Improvements in Devices for Raising Weights, and other purposes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, and to the letters of reference marked thereon, like letters indicating like parts wherever they occur.

To enable others skilled in the art to make and use my invention, I will proceed to describe it.

My invention consists in arranging and constructing an improved apparatus for reducing the speed of motion less than the speed by which it is actuated, and is applicable to all machines where power is required.

I make it in the following manner: I use a common chain-pulley, with sunken chamber in the periphery, to receive the links of an endless chain. On one side of this chain-pulley I fix a crank-pin or eccentric, and upon this crank-pin or eccentric I fit a toothed wheel, which is made to revolve loosely upon the said crank-pin or eccentric, and is made to revolve with the chain-pulley also, thus describing the sun-and-planet motion. This planet toothed wheel is surrounded with two internal-toothed wheels, which are each half the breadth of the former wheel, and are the size of the orbit of the inner planet-wheel. These two orbit-wheels I make with one or more teeth, different in number, but each fitted so as to allow the inner planet-wheel to work therein. I secure one of these orbit-wheels to the frame-work of the apparatus. The other runs loose upon the axle. This axle is made to pass through the frame. When I use this improved purchase to a pulley-block, I also attach a second chain-pulley on the axle, and fix it to the loose orbit-wheel. A chain is placed over this second chain-pulley, which will be used to raise weights.

The power is obtained by the motion communicated to the first-named chain-pulley running on the axle, carrying round with it the toothed planet-wheel, which gears into the aforesaid orbit-wheels. The difference in the number of teeth in the orbit-wheels gives a

corresponding reduced speed to the second chain-pulley.

For a hoist, I use a drum of any required length, in lieu of the second chain-pulley. This drum will wind on the chain or rope in hoisting. Thus I make a combination of hoisting-block and winch. I apply this latter modification to a wringing-machine; but instead of the aforesaid drum, I use the roller of the machine; and instead of the first chain-pulley, I fix to the planet-wheel's eccentric or crank-axle an ordinary crank-handle.

I apply the apparatus to a screw lifting-jack in a similar way, only that in the place of the second chain-pulley I fix a bevel-pinion wheel, which works into another bevel-toothed wheel. This wheel, being attached to the screw-nut, forces it round, and so lifts the screw.

For the application of this apparatus to a crane, lathe, or other machinery, I make the two orbit-wheels, if required, with teeth outside the periphery, instead of the internal-toothed wheels heretofore named. I secure one orbit-wheel to the frame, and the other to the axle intended to be driven. The planet-wheel is made to work into the orbit-wheels externally, being kept at proper position with an arm working on the center axle, through which the crank-pin is fixed. I vary the sizes of each of the orbit-wheels, if needful to do so, with the planet-wheel to fit, or multiply of the number to obtain more speed. This is simply a modification of the internal arrangement.

Having explained the nature of my invention, I will proceed to describe, with reference to the accompanying drawings, the manner in which the same is to be performed.

Figure 1, Sheet 1, represents a perspective view of one application of this invention to the raising of weights. Fig. 2 is an end elevation; and Figs. 3, 4, 5, and 6 represent, respectively, the internal arrangement and general construction of the same.

The same letters indicate the same parts throughout.

c is a chain-pulley, made with sunken chambers in its periphery, to receive the links of an endless chain, *c'*, upon which chain-pulley is cast an eccentric, *e*, which carries a planet toothed wheel or pinion, *d*. This wheel or pinion is allowed to revolve loosely on the ec-

eccentric *e*, and gears into the two orbit or internal-toothed wheels, *f* and *g*, each of which is half the breadth of the pinion *d*. The orbit-wheel *f* is fixed to the frame-work *h* by the bolts *y y*, so that it has no motion whatever; but the orbit-wheel *g*, which has one or more teeth different in number than the orbit-wheel *f*, is loose, so that it revolves on the bolt or axle *i*, which passes through the frames *h* and *h'*, and carries the before-mentioned chain-pulley *c* and eccentric *e*. Upon the orbit or internal-toothed wheel *g* is attached a chain-pulley, *k*, with sunken chambers in the periphery, to receive the links of the lifting-chain *l*, which chain is furnished with a hook at each end, so that there is no lowering required for fresh lifts. The suspender-hook *m* is attached to the block by a bolt, *n*, passing through it, which also passes through the frames *h* and *h'*, and a projection cast on the stationary orbit-wheel *f*, thereby securing all firmly together.

Fig. 9, Sheet 2, is a longitudinal elevation, partly in section, representing a hoist according to my invention, *c* being the chain-pulley, through which the power is transmitted from the endless-chain wheel *c'* to the eccentric *e*, on which eccentric revolves the planet toothed wheel or pinion *d*. This pinion gears into the two orbit-wheels *f* and *g*, each of which is half the breadth of the pinion *d*. The stationary orbit-wheel *f* is secured to the frame *h* by bolt *y*. The rotatory orbit-wheel *g*, which has one or more teeth different in number from the orbit-wheel *f*, is fixed on the drum or winding-barrel *k*, round which the lifting chain or rope is wound. The drum *k* is fastened to the frames *h* and *h'*. This latter modification may be applied to an ordinary crab-winch, as shown by dotted lines. Instead of the chain-pulley *c*, I make a hollow cylinder, to fit the drum-shaft *i*, sufficiently long that it passes through the boss of the frame *h* and projects outside, to fix on an ordinary crank-handle. On the other end of this cylinder is attached the crank *e*.

Fig. 10 is a longitudinal elevation, partly in section, and Fig. 11 an end view, of the application of my invention, applied to a mangling or wringing machine.

c is an ordinary crank-handle fitted onto the spindle *c'*, which passes through the boss of the stationary orbit-wheel *f*. On the other end of this spindle is an eccentric, *e*, which carries the planet wheel or pinion *d*. This pinion gears into the orbit-wheels *f* and *g*. The orbit-wheel *f* is secured to the frame of the machine by bolts *y y*, and is a support to the spindle *c'*. The rotatory orbit-wheel *g* has a toothed wheel, *k*, cast on one side, which is keyed on the spindle of one of the rollers. This wheel gears into a similar toothed wheel, *k*, secured on the spindle of the other roller.

Figure 12, Sheet 2, represents a vertical section of the application of my invention by a screw lifting-jack.

c is an ordinary jack-handle, which is fitted

on the spindle end *c'*. Upon this spindle is the eccentric *e*, carrying the planet wheel or pinion *d*, which gears into the two orbit-wheels *f* and *g*. The stationary orbit-wheel *f* is fixed to the jack by one or more bolts, *y*. On the back of the rotatory orbit-wheel *g* is cast a bevel-wheel, *k*. This wheel gears into another bevel-wheel, *l*, which also forms the nut through which the screw *m* works. The bevel-wheel or nut *l* is supported by an iron box, *n*, a chamber being cut out of the jack to receive this box, the same box having provision for receiving and carrying one end of the spindle *c'*, as shown at *w*. The spindle is supported at the other end by the stationary orbit-wheel *f*.

Fig. 7, Sheet 2, is a longitudinal section, and Fig. 8 a front-end elevation, of the application of my invention to an ordinary turning-lathe.

On the hollow shaft *c* are secured the cone or belt pulleys *c'* and the crank *l*. In the end of this crank I fix a bolt or pin, *e*, which carries the planet toothed wheel or pinion *d*, which is allowed to rotate on the pinion *e'*. This pinion gears into the wheels *f* and *g* externally. The stationary wheel *f* is secured to the lathe-head by the bolts *y y*, and the rotatory wheel *g* is secured to the lathe-spindle *i*, which passes through and on which the hollow spindle *c* rotates. The lathe-spindle *i* and the hollow or cone spindle *c'* may be made to rotate simultaneously in the following manner: The crank *l* is driven by a sliding key sunk into the cylinders *c* and secured in its place by a set-screw, *k*. Slack the set-screw, and slide the crank back (on the key) toward the cone until the wheel or pinion *d* gears only into the wheel *g*, which is secured on the lathe-spindle. Then connect the crank *l*, hollow cylinder *c*, and lathe-spindle *i* by the set-screws *m m*. (Shown in Fig. 8.)

It should be understood that I am aware that machines for raising weights have been used before, and a patent was obtained by Joseph Jewsbury, in England, on or about November 20, 1862, No. 3,115; and there was another patent, obtained by William Eades and William Thomas Eades, in England, on or about June 22, 1866, No. 1,672; but in both these patents an external toothed wheel was used, geared into an internal one. The external toothed wheel is kept in guides, so that "it has no circular motion, but is free to work laterally." Neither of these apparatus has a fixed wheel similar to the wheel *f* to act as a fulcrum, giving leverage for the pinion *d*, as described in my specification.

Having thus described my invention, what I claim, is—

1. An apparatus for raising weights and for other purposes, consisting of a frame, *h*, having mounted therein, on an axle or shaft, *i*, a chain-pulley, *c*, provided with an eccentric or pin, *e*, having a planet-wheel, *d*, thereon, gearing into and rotated by a stationary wheel, *f*, and also gearing into and turning a loose wheel, *g*, the stationary wheel acting as a ful-

crum for the planet-wheel in giving motion to the loose wheel, all constructed and arranged to operate as herein described.

2. The chain-pulley *c*, with its eccentric *e*, having mounted thereon a planet-wheel, *d*, in combination with a fixed wheel, *f*, or their equivalents, for giving motion to a loose wheel, *g*, or its equivalent, when constructed and arranged to operate as herein described, and for the purposes set forth.

In witness whereof I, the said JONATHAN PICKERING, have hereunto set my hand this 4th day of July, in the year of our Lord 1868.

JONATHAN PICKERING.

Witnesses:

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Stockton-on-Tees, Durham, England.

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