

No Model.)

G. A. ARMINGTON.

DIFFERENTIALLY GEARED PULLEY BLOCK OR LIFTING DEVICE.

No. 562,790.

Patented June 30, 1896.

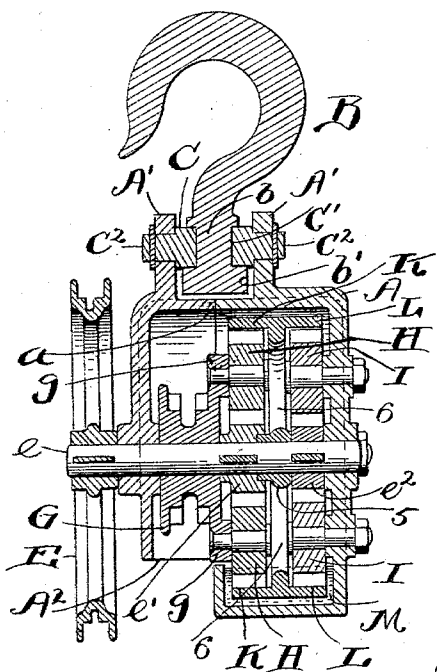


Fig. 1.

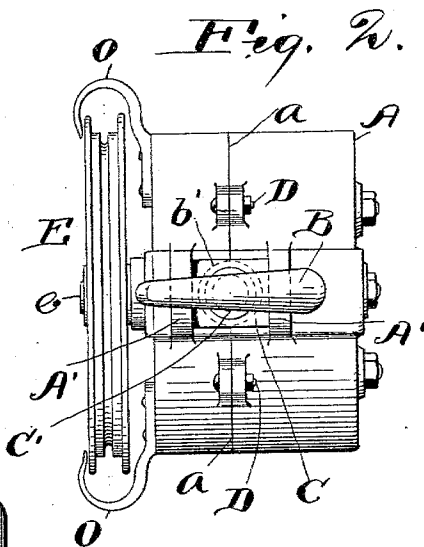


Fig. 2.

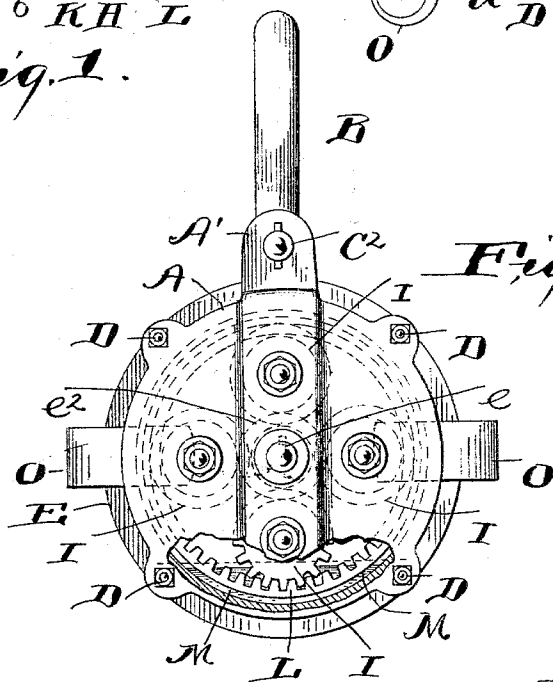


Fig. 3.

Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE A. ARMINGTON, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-FOURTH
TO ROBERT B. HARTNESS, OF SAME PLACE.

DIFFERENTIALLY-GEARED PULLEY-BLOCK OR LIFTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 562,790, dated June 30, 1896.

Application filed February 3, 1896. Serial No. 577,793. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. ARMINGTON, of Cleveland, Cuyahoga county, Ohio, have invented certain new and useful Improvements in Differentially-Geared Pulley-Blocks or Lifting Devices; and I 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 pertains to make and use the same.

My invention relates to improvements in differentially-geared pulley-blocks or lifting devices, the object being to provide a differential pulley-block or lift that is powerful, capable of sustaining the load being lifted at any point, that is compact and occupies little space vertically, that involves an arrangement of spur-gearing of high efficiency, and whose shell or case at its lower end is suitably shaped or constructed to form a chamber for receiving the oil or lubricant employed in maintaining the spur-gearing properly lubricated.

With this object in view my invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a central vertical section of a differential pulley-block embodying my invention. Fig. 2 is a top plan of the same, and Fig. 3 is a right-hand end elevation relative to Figs. 1 and 2 and shows portions broken away and in section to more clearly show the construction.

My improved differentially-geared pulley-block or lifting device comprises, preferably, a cylindrical shell A, closed, or substantially closed, at its ends, and provided at the top with a hook B for suspending the block from the supporting object. (Not shown.) Hook B is connected with the block in such a manner that the latter shall not only be capable of swinging in a vertical plane, but shall also be capable of turning in a horizontal plane, and to this end shank *b* of the hook is circular, and extends through a corresponding hole *C'* in a horizontally-arranged cross bar or pin *C*, and at its lower end terminates in a head *b'*, engaging the under side of member *C*, and the latter is horizontally trunnioned at *C²* in the upwardly-projecting ears *A' A'* of shell

or case A. Case or shell A is preferably composed of two pieces joined together at a point centrally between the two upwardly-projecting ears *A' A'*, as at *a*, and the two pieces are suitably bolted together, as at *D*, in any approved manner. The hand-chain engaging sprocket-wheel *E* of the block is operatively mounted upon one end of the horizontally-arranged shaft *e*, that has suitable bearing in shell or case A. The lifting-chain engaging sprocket-wheel *G* is loosely mounted on shaft *e* within one end of the chamber of shell A, and two spur-pinions *e' e²* are operatively mounted upon said shaft a suitable distance apart between wheel *G* and the opposite end of the chamber of said case or shell. Any suitable number of slowly-revolving spur-gears *H* are arranged circumferentially of, and in mesh with, pinion *e'*, and are suitably supported from radially-arranged arms *g* of wheel *G*. Any suitable number of stationary spur-gears *I* are arranged circumferentially of pinion *e²*, and are suitably supported from shell or case A. Gears *H* mesh with the internal gear *K*. Gears *I* mesh with the internal gear *L*. Said internal gears are preferably integral with each other, as shown in Fig. 1, and are provided with a common hub *h*, loosely mounted upon shaft *e*, between the two pinions *e'* and *e²*, and connected, by any suitable number of arms *h*, with the rims of said gears.

It will of course be understood that the arrangement of the differential gearing and the number of teeth in the various gears are such that the desired power is communicated to the lifting-wheel *G*. For instance, the internal gears *K* and *L* may have a corresponding number of teeth, while pinion *e'* has a greater number of teeth than pinion *e²*, or pinions *e'* and *e²* may have the same number of teeth, while internal gear *K* has a greater number of teeth than gear *L*, or other combinations may be employed.

The hereinbefore-described construction and arrangement of parts not only forms a differentially-geared pulley-block that is exceedingly powerful, and capable of sustaining the load at any point, but that occupies little space vertically, and involves an arrangement of spur-gearing having great efficiency.

I would also remark that the member of shell or case A that supports gears I is, at its lower end, suitably shaped or constructed to form a reservoir M for receiving oil or lubricant, and said reservoir is open at the top and extends upwardly into the path of the slowly-revolving pinions H, so that said pinions and the connecting-gearing will be kept properly lubricated during their operation.

10 Shell or case A is open below wheel G, as at A', to accommodate access to the gearing and oil-reservoir and to accommodate the location and operation of the lifting-chain. (Not shown.)

15 Concluding, I would remark that any suitable number of gears H and I may, as already indicated, be provided; but for the purpose of enhancing the strength and durability of the device I prefer to employ at least several gears H' and several gears I, arranged in the manner hereinbefore described.

O designates two chain-guides attached to opposite sides, respectively, of shell or case A, and arranged to guide the hand-operated chain (not shown) employed in communicating power to wheel E.

What I claim is—

1. A differentially-geared pulley-block or lifting device comprising a shell or case A; a suitably-actuated shaft *e* suitably supported in said case or shell; lifting-wheel or rotating member, G, loosely mounted upon the shaft within the aforesaid shell or case, and differential spur-gearing within the shell or case and establishing operative connection between the shaft and lifting member, and comprising two pinions *e'* *e''* operatively mounted upon the shaft within said case or shell, several revolving spur-gears meshing with and

arranged at suitable intervals circumferentially of pinion *e'* and suitably supported from the aforesaid lifting member, internal gear K meshing with said gears, any suitable number of stationary spur-gears I meshing with and arranged circumferentially of pinion *e''* and suitably supported from the shell or case, an internal gear L meshing with said stationary gears, and the two internal gears being rigid with each other, substantially as set forth.

2. A differentially-geared pulley-block or lifting device, comprising a shell or case A; a suitably-actuated shaft *a* suitably supported in said case or shell; a lifting-wheel or rotating member, G, loosely mounted upon the shaft within the shell or case, and differential spur-gearing within the shell or case and establishing operative connection between the shaft and lifting member, and comprising the two pinions *e'* *e''* operatively mounted upon the shaft a suitable distance apart within the shell or case, the two internal gears K and L rigid with each other and loosely mounted upon the shaft between said pinions, the set of revolving gears H meshing with pinion *e'* and internal gear K and suitably supported from the aforesaid lifting member, and the stationary gears I meshing with the other pinion *e''* and internal gear L, and suitably supported from the case or shell, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 22d day of January, 1896.

GEORGE A. ARMINGTON.

Witnesses:

C. H. DORER,

ELLA E. TILDEN.