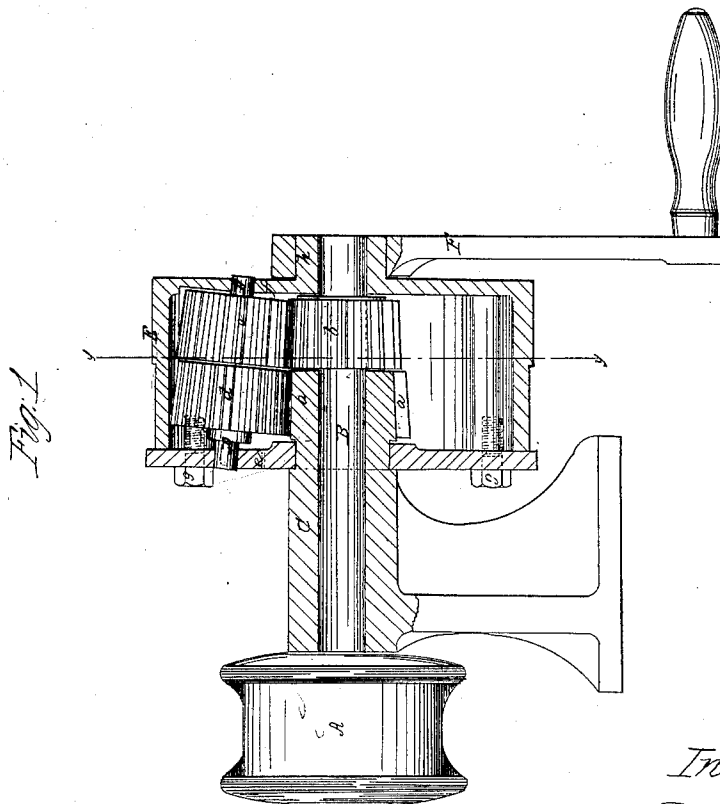
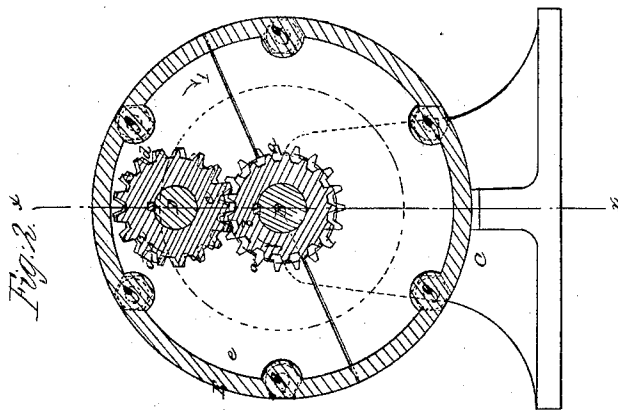


*J. F. Rochon,  
 Canstn & Windlass.*

*N<sup>o</sup> 37,110.*

*Patented Dec. 9, 1862.*



*Witnesses:*

*James Smith  
 Charles*

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# UNITED STATES PATENT OFFICE.

J. F. ROCHOW, OF NEW YORK, N. Y.

## IMPROVEMENT IN HOISTING APPARATUS.

Specification forming part of Letters Patent No. 37,110, dated December 9, 1862.

*To all whom it may concern:*

Be it known that I, J. F. ROCHOW, of the city, county, and State of New York, have invented a new and Improved Hoisting Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a longitudinal vertical section of my invention, the plane of section being indicated by the line *x x*, Fig. 2. Fig. 2 is a transverse vertical section of the same, taken in the plane indicated by the line *y y*, Fig. 1.

Similar letters of reference in both views indicate corresponding parts.

This invention is based on the principle of the differential wheels; and its object is to produce a hoisting apparatus of great power in a small compass.

The invention consists in the arrangement of two cog wheels with a different number of teeth, that one with the largest number of teeth being stationary and the other being secured to the axle of the drum of the hoisting apparatus, in combination with two other cog-wheels having the same number of teeth, and attached to a tumbling-shaft which is carried round the center of the drum-shaft in such a manner that by the combined action of the two wheels on the tumbling-shaft and the differential wheels a slow rotary motion is imparted to the drum-shaft, and that the power applied to the tumbling-shaft is multiplied in proportion to the number of teeth of the gear-wheel on the drum-shaft divided by the difference between the number of teeth of said wheel and that of the stationary wheel.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation with reference to the drawings.

The drum A, on which the hoisting rope or chain winds, is secured to a shaft, B, which has its bearing in a box or frame, C, of cast-iron or any other suitable material. To the end of the box C a cog-wheel, *a*, is rigidly attached, and another cog-wheel, *b*, is fastened to the shaft B close before the cog-wheel *a*. The wheel *b* has one or more teeth less than the wheel *a*, and it gears into a wheel or pin-

ion, *c*, which is firmly attached to the tumbling-shaft D. Another pinion, *d*, which gears into the stationary wheel *a*, is also rigidly attached to the tumbling-shaft D, and the two pinions *c d* are provided with the same number of teeth. The tumbling-shaft D has its bearings in two disks, *e f*, which form the heads of a drum, E, the disk *e* having its bearing on the outside of the box C, behind the wheel *a*, and the disk *f*, on the end of the main shaft, B, as clearly shown in Fig. 1. The disk *f* is cast in one piece with the face of the drum E, and the two disks *e f* are connected together by screws *g*. From the center of disk *f* a square, *h*, projects to apply the winch F.

The operation is as follows: By imparting to the drum E a rotary motion in the direction of arrow 1, Fig. 2, the tumbling-shaft D is carried around the wheels *a b*, and the pinion *d*, by gearing in the wheel *a*, assumes a rotary motion in the direction of arrow 2. If the wheel *d* has nineteen cogs, each complete revolution of the drum causes the pinion *d* to rotate over the same distance; or, if this pinion is provided with nineteen teeth, to make one complete revolution. This motion is imparted to the tumbling-shaft D and pinion *c*, and the latter, being the same size as the pinion *d*, will complete one revolution at the same time the pinion *d* completes its revolution. It is obvious that if the wheel *b* had the same number of teeth as the wheel *a*, the main shaft B would remain stationary; but if the wheel *b* has only seventeen teeth to the nineteen of the wheel *a*, each tooth of the latter wheel, through the action of the pinions *d c*, will produce  $\frac{1}{17} - \frac{1}{19} = \frac{2}{323}$  of a revolution of the wheel *b* in the direction of arrow 3, and consequently the nineteen teeth of the wheel *a* will produce  $\frac{19 \times 2}{323} = \frac{2}{17}$  of a revolution of the wheel *b* and with it of the main shaft B and drum A. By making the winch F twice as long as the radius of the drum A the power applied to the winch will be increased seventeen times, and it is obvious that by changing the proportion between the number of teeth of the wheels *a b* the power can be still further increased with the same number of wheels.

Instead of making the wheels *a b* of unequal diameters and numbers of teeth, they may be made equal, and the pinions *c d* might be made to take the place of the differential

wheels; or both pair of wheels may be made of unequal diameters and numbers of cogs.

When desired, the drum F may be used as a brake-wheel by placing a suitable strap around its circumference. In most cases, however, no brake will be required, the position of the wheels and pinions being such that a weight suspended from the drum A will not be able to produce a motion of the pinions *c d*, tumbling-shaft D, and drum E. By this arrangement of the wheels *a b c d* the whole hoisting apparatus can be brought into a very small compass, and the power can be multiplied to any desired degree without materially increasing the size or weight of the working parts.

Having thus fully described my invention,

what I claim as new, and desire to secure by Letters Patent, is—

1. The arrangement of the differential wheels *a b*, in combination with the box C, main shaft B, tumbling-shaft D, with pinions *c d*, and drum E, all constructed and operating substantially as and for the purpose herein shown and described.

2. The tumbling-shaft D, when the same is arranged with two wheels or pinions, *c d*, to operate in combination with the wheels *a b*, substantially in the manner and for the purpose set forth.

JULIUS FERDINAND ROCHOW.

Witnesses:

JAMES LAIRD,  
EDW. W. HODGSON.