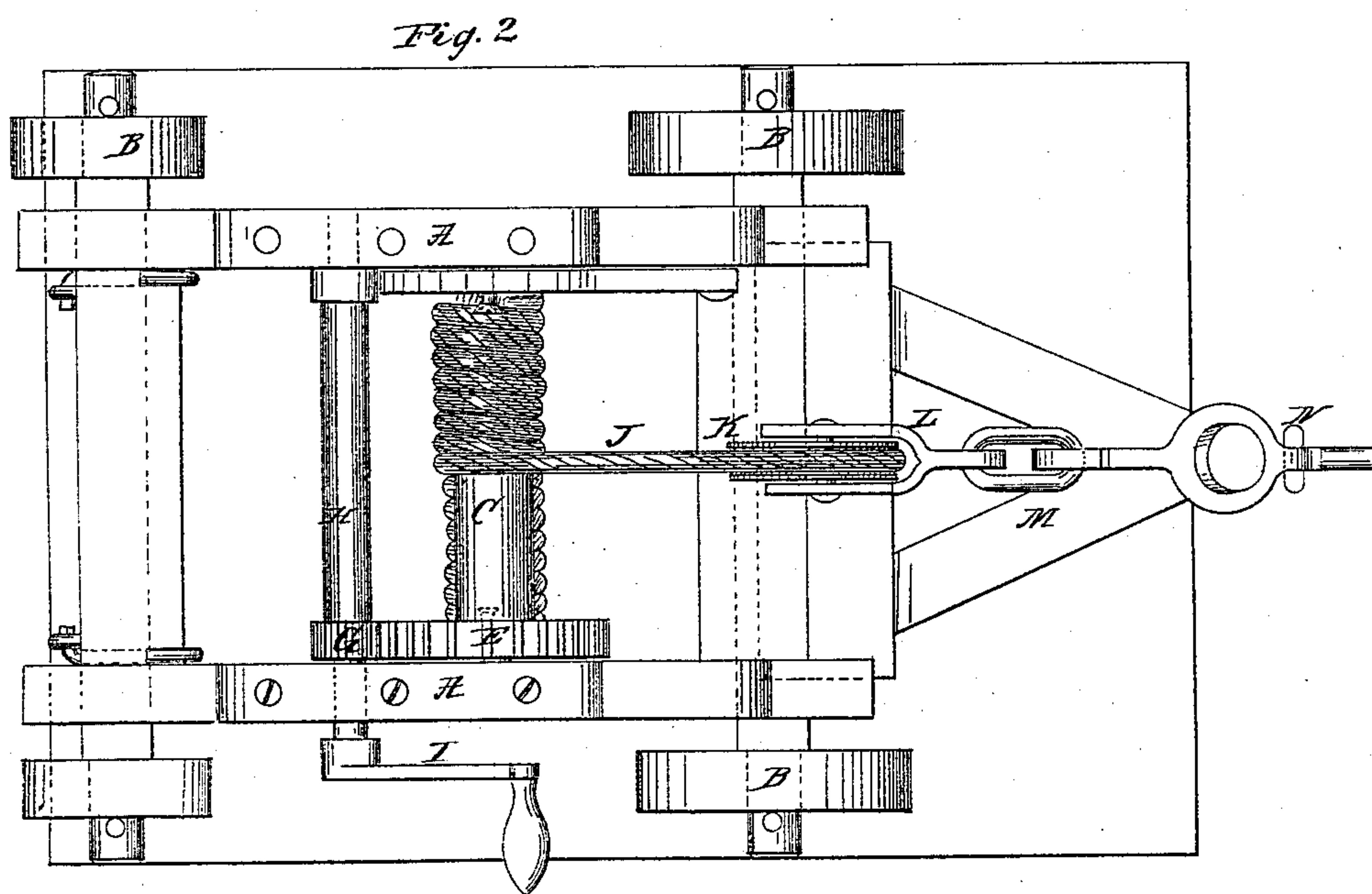
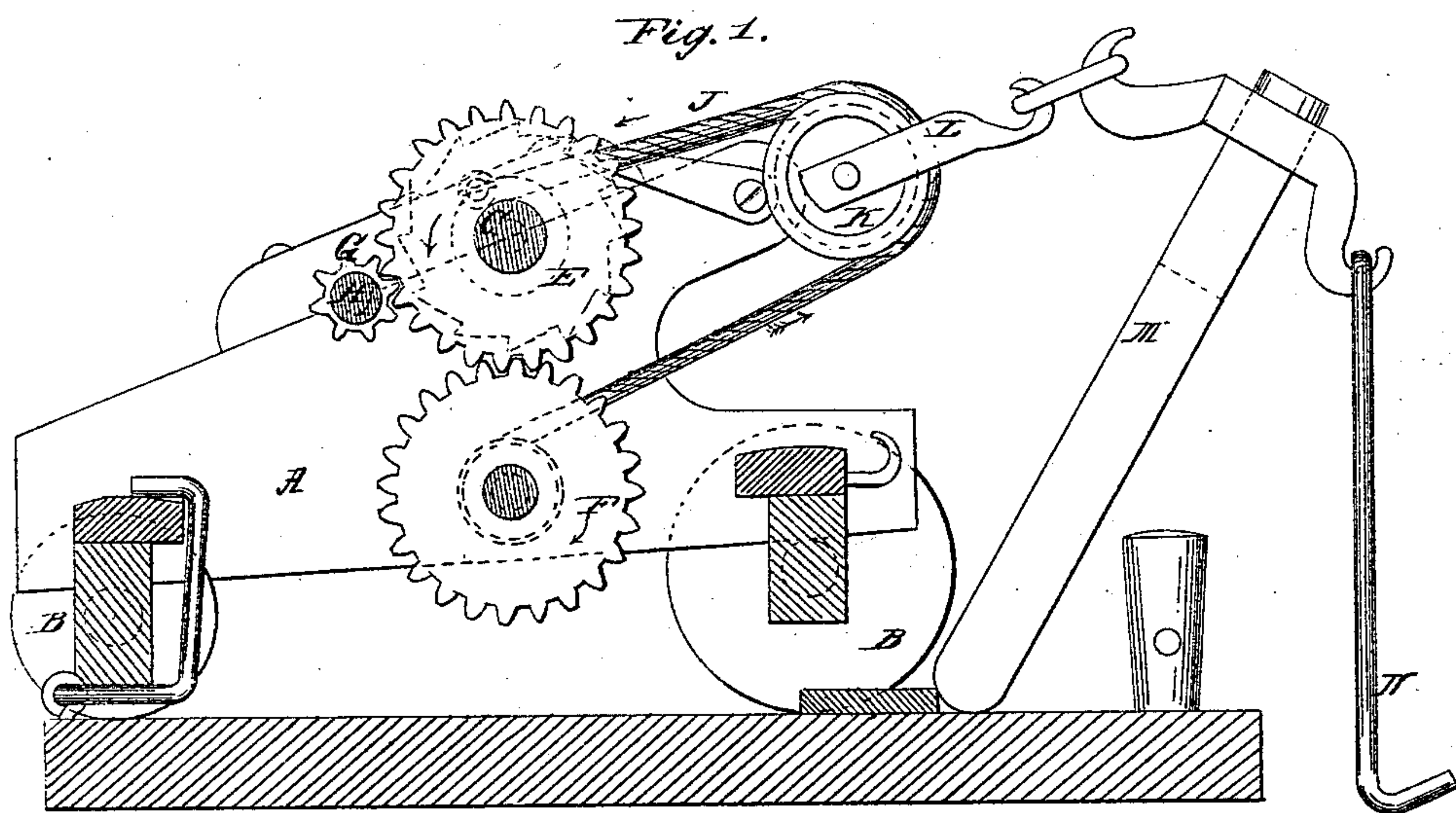


*S. W. Ruggles,  
Stump Elevator.*

*N<sup>o</sup> 36,673.*

*Patented Oct. 14, 1862.*



*Witnesses  
J. W. Ruggles  
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Attorneys*



# UNITED STATES PATENT OFFICE.

SOLOMON W. RUGGLES, OF FITCHBURG, MASSACHUSETTS.

## IMPROVEMENT IN STUMP-EXTRACTORS.

Specification forming part of Letters Patent No. 36,673, dated October 14, 1862.

*To all whom it may concern:*

Be it known that I, SOLOMON W. RUGGLES, of Fitchburg, in the county of Worcester and State of Massachusetts, have invented a new and Improved Stump-Extractor; 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. Fig. 2 is a plan or top view of the same.

Similar letters of reference in both views indicate corresponding parts.

This invention is based on the principle of the differential or "Chinese" crane; and it consists in the arrangement of two shafts or drums of unequal diameter geared together by cog-wheels, in combination with a rope or chain extending from said shafts round the sheave of a block, and with a strut or derrick, from the top end of which said block is suspended, and from which a hook or chain or other suitable device extends to the stump or other article to be raised or extracted in such a manner that by imparting a rotary motion to the two shafts or drums the rope or chain unwinds on one while it winds up on the other, and by the difference existing between the diameters or circumferences of the two shafts or drums the motion of the block, as compared with that of the power imparting motion to the two shafts or drums, is very small, without much friction in the working parts, and consequently a powerful and considerably increased or multiplied strain can be exerted on the strut or derrick and through its action on the stump or other article to be extracted or raised.

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.

A represents a frame, made of timber or other suitable material, and supported by wheels B, or otherwise arranged so that it can easily be moved from one place to another. This frame forms the bearings for two shafts, C D, which are of unequal diameters, and which are geared together by cog-wheels E F in such a manner that they make precisely the

same number of revolutions. A small pinion, G, which is attached to a shaft, H, and which gears into the cog-wheel E, serves to impart a slow rotary motion to the shafts C D, and the shaft H is provided with a winch, I, which serves to rotate the same, and with it the several cog-wheels and shafts.

J is a rope or chain, one end of which is secured to the shaft or drum C, and which passes around the sheave K, its other end being fastened to the shaft or drum D in such a manner that by imparting a rotary motion to said shafts the rope winds up on one while it unwinds from the other, and vice versa. The sheave K is suspended by a stirrup or block, L, from the upper end of a strut or derrick, M, which is placed in an inclined position over the stump or other article to be extracted or raised, and from which a hook, N, or a chain or any other suitable device, extends down, which, when fastened to the stump or other article, is capable to raise the same.

The operation is as follows: When it is desired to extract a stump, the machine is drawn to the spot and the strut M is placed in an inclined position, its top being made to overhang the stump and its feet resting against a stone or tree or any other fixed point, which will prevent them slipping backward. The hook or chain N is fastened to the stump, and the frame A is secured by means of hooks or ropes or any other suitable device, so that the same is prevented moving toward the stump to be extracted. The block L, with the sheave K, is then attached to the top end of the strut, and the shaft H is rotated in the direction of the arrow marked on it in Fig. 1. By this motion the wheel E, with the drum C, rotates in the direction of the arrow marked on the same and the rope or chain winds up on the drum C. At the same time the wheel F and drum D turn in the direction of the arrow marked on said wheel and the rope or chain unwinds from the drum D. If the circumference of the drum C be equal to three inches and that of the drum D equal to two inches, for each revolution of the drums C D three inches of rope is wound up on the drum C and two inches is unwound from the drum D, and consequently the rope encircling the sheave K is shortened one inch, or each branch of said rope half an inch, and the top end of the strut



is brought closer toward the drums C D by half an inch for each revolution of the wheels E F. By these means a very powerful strain is exerted on the hook or chain N, which is tied to the stumps or other articles to be extracted or raised.

It is obvious that if both drums C D should be made of equal diameters the same amount of rope would wind on one and unwind from the other if both rotate with the same velocity, and the block L would remain stationary; but by making the diameters unequal, or by giving to one drum a larger circumferential velocity than to the other, more rope winds on one than unwinds from the other in the same time, and the block L is made to move toward or from the drums, according to the direction in which the same are rotated.

The power which can be exerted by this apparatus is very great, and it can be multiplied *ad infinitum*, and at the same time the loss by friction is comparatively small, and all the parts are so arranged that they cannot easily get out of order.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The combination of the sheave K, strut M, and rope or chain J with geared drums of unequal diameters C D, substantially in the manner herein shown and described.

SOLOMON W. RUGGLES.

Witnesses:

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