

(No Model.)

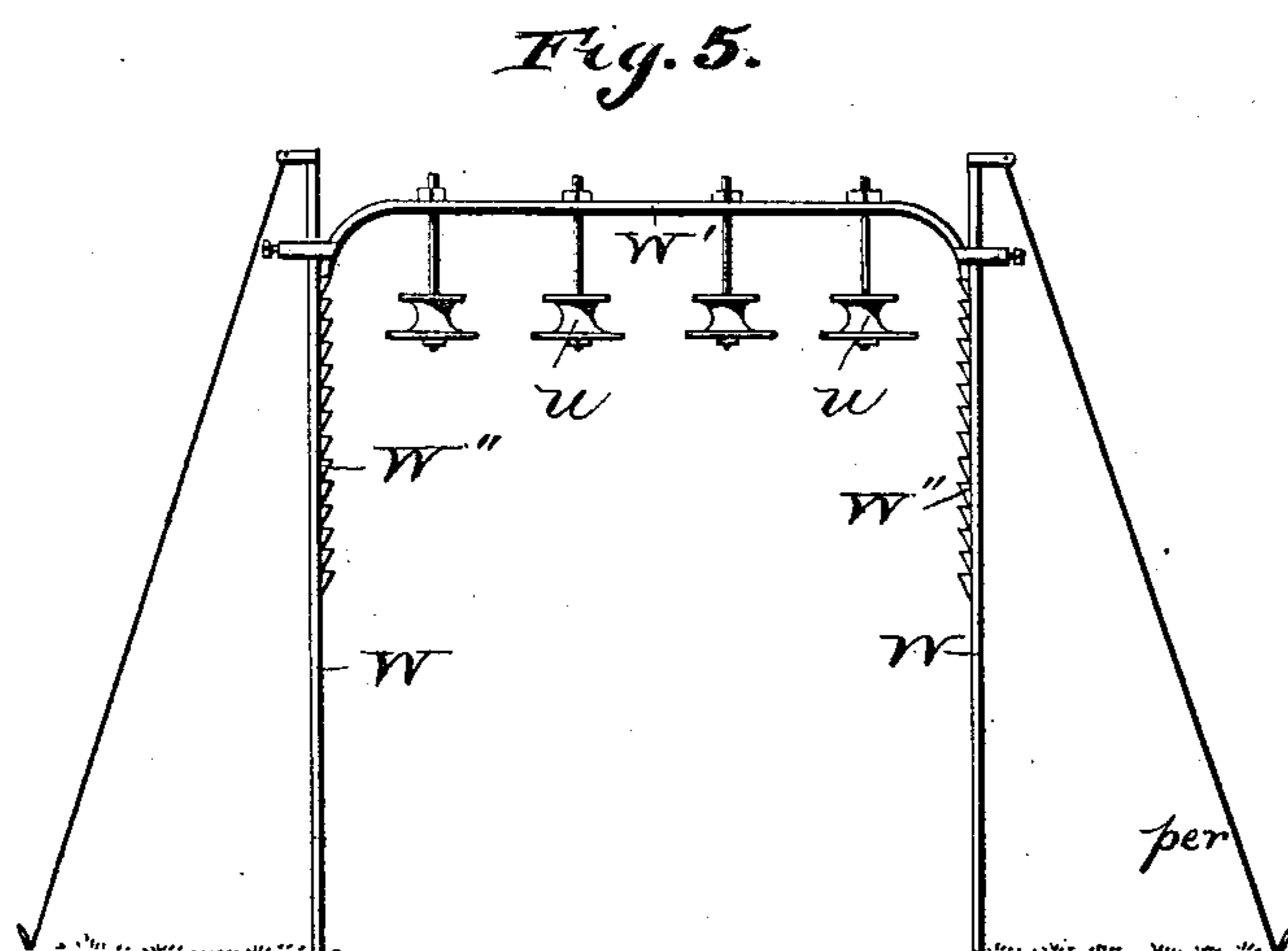
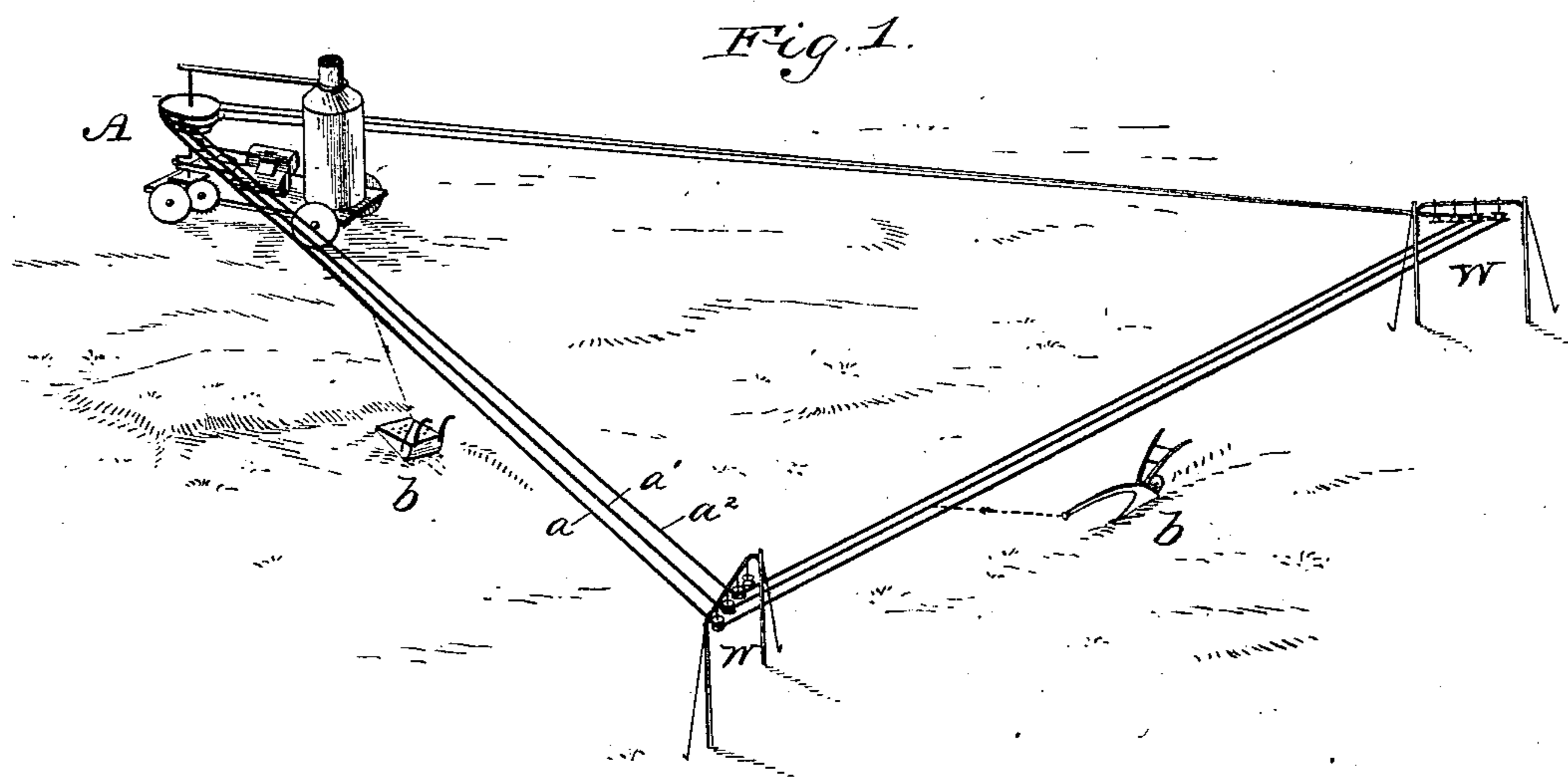
2 Sheets—Sheet 1.

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RAILROAD GRADING AND EXCAVATING MACHINE.

No. 379,722.

Patented Mar. 20, 1888.



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Fig. 2.

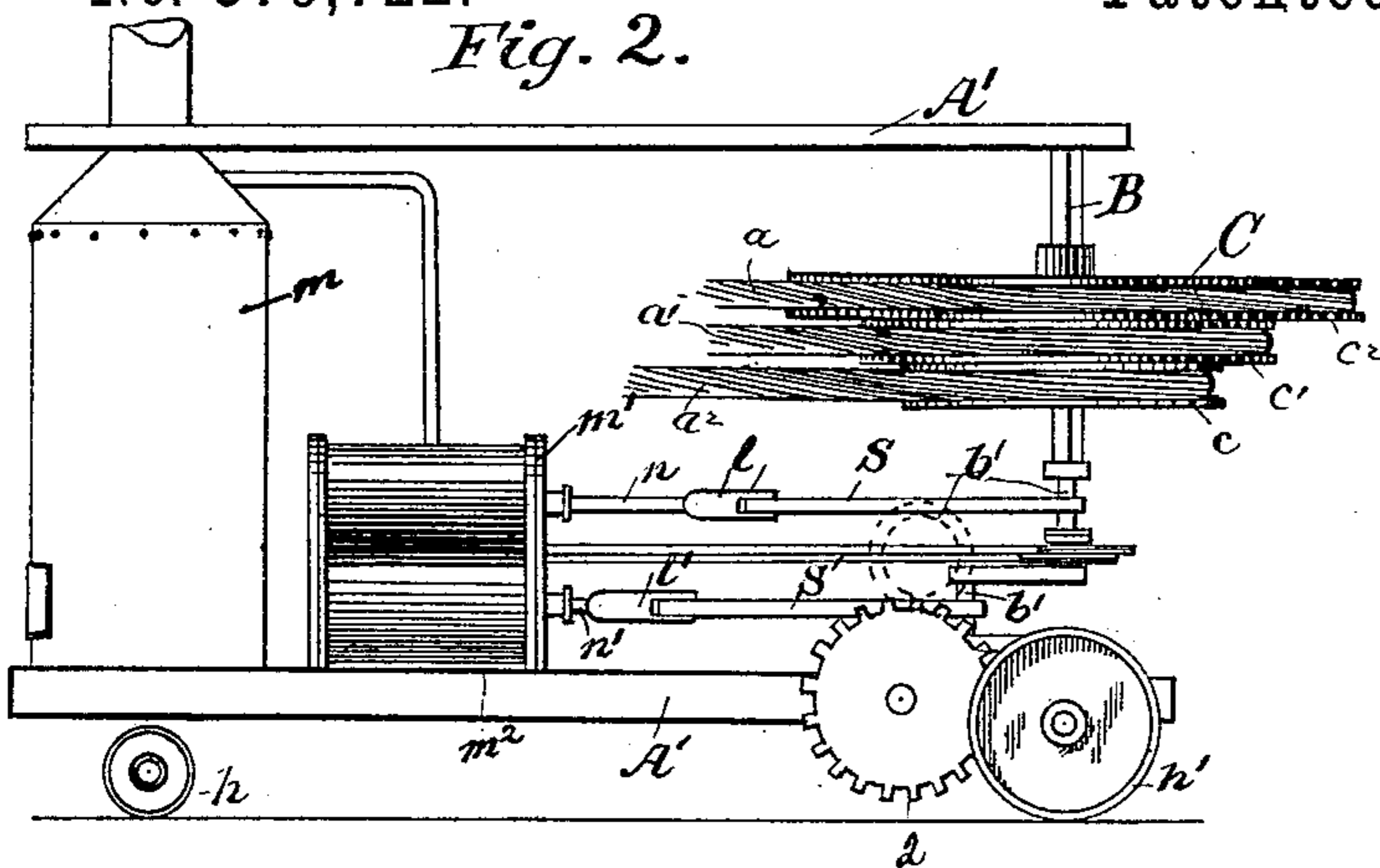


Fig. 4.

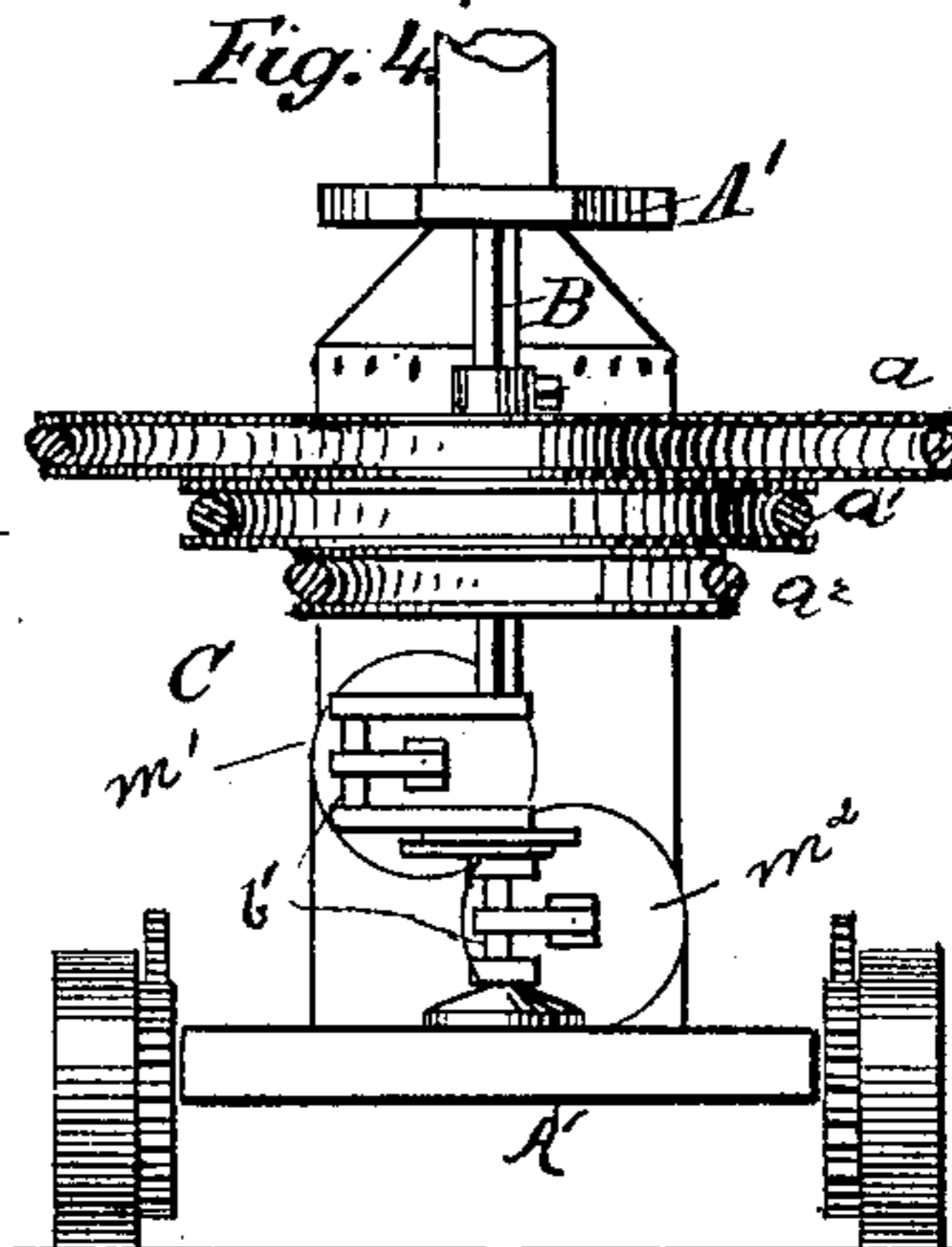


Fig. 3.

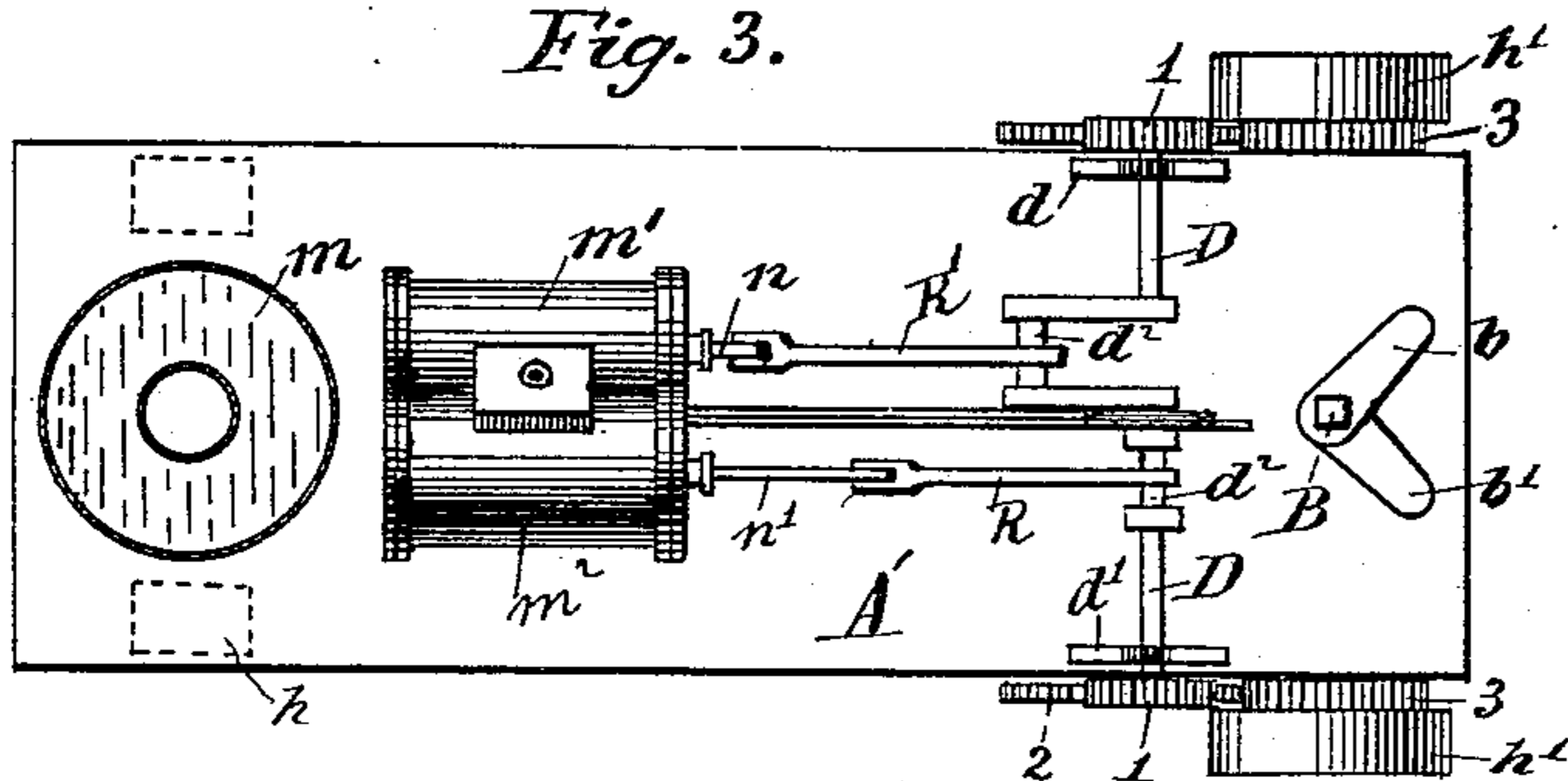


Fig. 7.

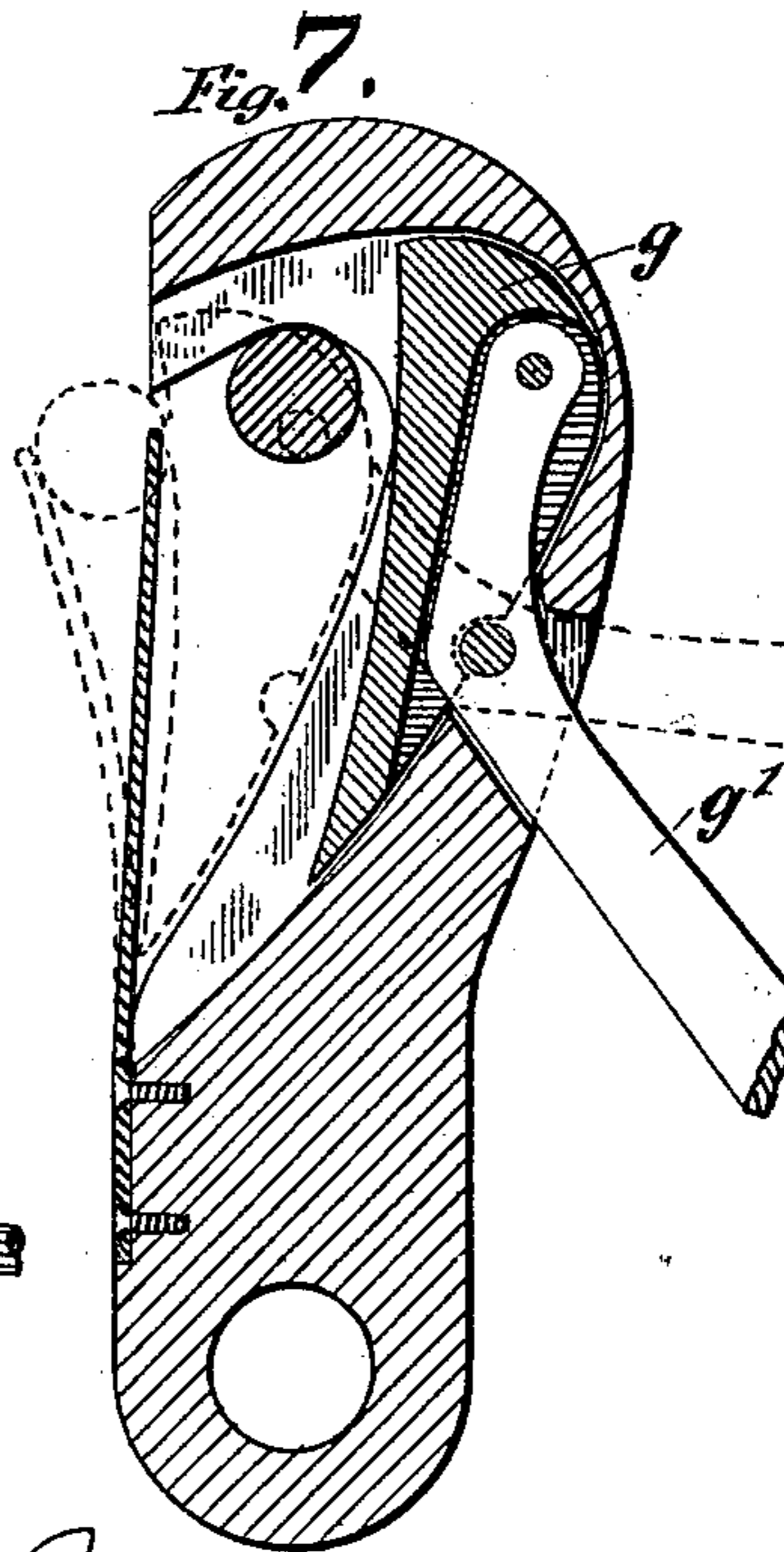
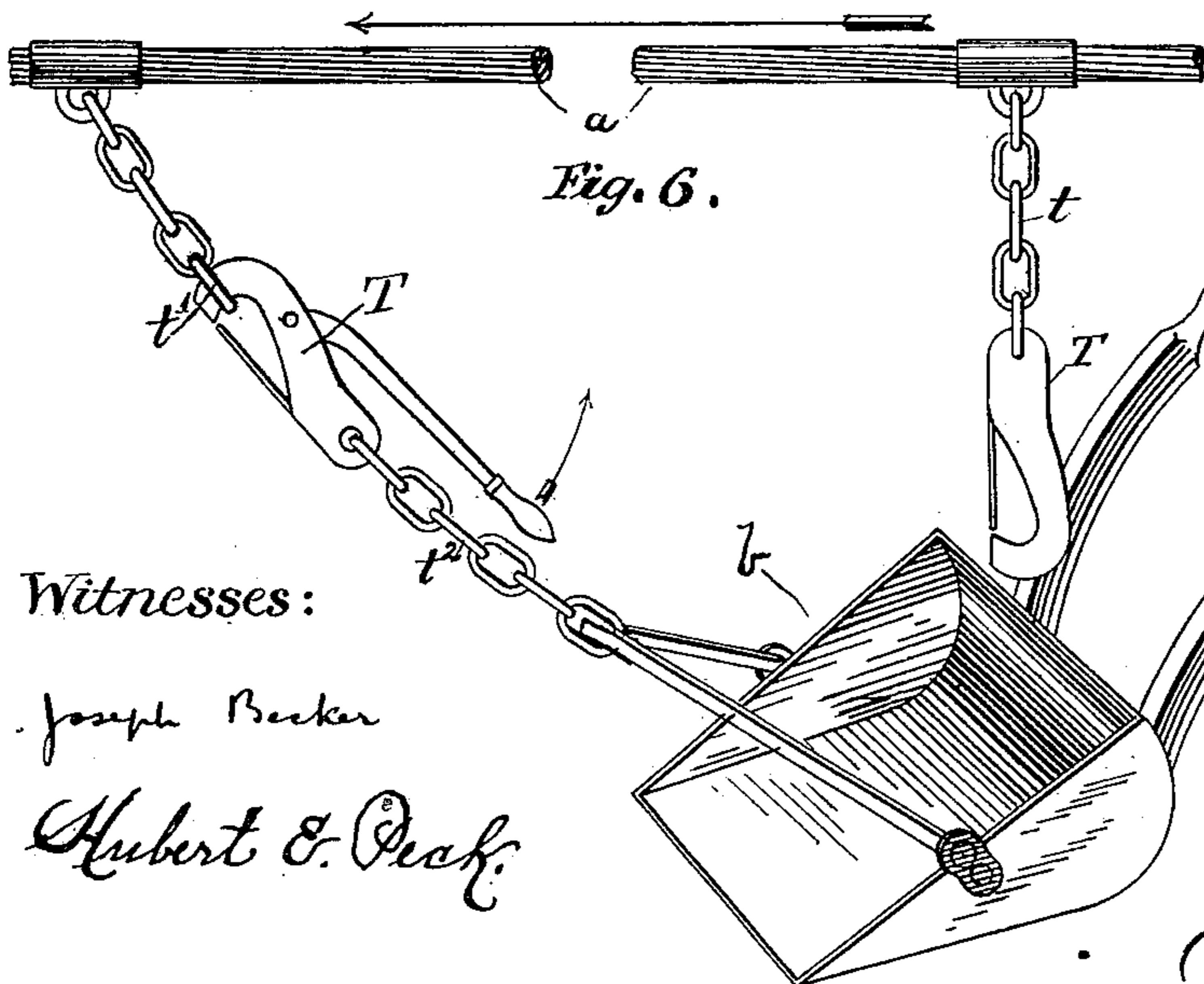


Fig. 6.



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UNITED STATES PATENT OFFICE.

MORTON ELLSWORTH PUGH, OF ST. JOSEPH, MISSOURI.

RAILROAD GRADING AND EXCAVATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 379,722, dated March 20, 1888.

Application filed November 17, 1887. Serial No. 255,455. (No model.)

To all whom it may concern:

Be it known that I, MORTON ELLSWORTH PUGH, of the city of St. Joseph, in the county of Buchanan and State of Missouri, have invented certain new and useful Improvements in Railroad Grading and Excavating Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to an improvement in grading and excavating apparatus.

The object of my invention is to provide a grading and excavating apparatus especially adapted for use in building railways or other roads, and which shall be extremely cheap in initial cost, easy to manipulate, readily repaired and transported, and yet shall be extremely effective in operation.

A further object is to provide a grading and excavating apparatus employing one or more endless cables adapted to revolve over the ground to be operated upon, and with which the digging and removing implements shall be detachably connected by means of hooks or the like, whereby the implements can be immediately detached from the cables without stopping the rotation of said cables; and a further object is to provide adjustable guide and operating pulleys, whereby the actuating-cables are rendered vertically adjustable.

With these ends in view my invention consists in certain novel features of construction and combinations of parts, more fully described hereinafter, and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a perspective view of my complete device as in operation; Fig. 2, a detail view of the driving power or engine in side elevation, the engine being adjusted to drive the cables; Fig. 3, a detail top plan view of the driving-engine, a portion of the supporting-frame being removed and the engine adjusted to drive the traction-wheels; Fig. 4, a detail end view of the driving-engine, showing more clearly the vertically-adjustable driving-pul-

leys; Fig. 5, a detail view of the frame carrying the vertically-adjustable pulleys which guide the cables in turning corners; Fig. 6, a detail view illustrating the manner in which the digging or removing implements are connected with the revolving actuating-cables, and Fig. 7 is a detail sectional view of the hook used to connect the digging or removing implements to the driving-cables.

Located at or near the boundary of the portion of ground to be operated upon is a portable driving-engine or other power, A, which is so placed in position as to be able to withstand considerable pulling strain. One or more endless revolving driving chains, cables, or the like, as $a' a^2$, pass around and are driven by pulleys mounted on a vertical shaft journaled in one end of the driving-engine, and the cables extend across that portion of the ground to be operated upon, and at every angle or turn in the same are placed guide-frames and pulleys W, and attached to the driving-cables are any suitable digging and removing implements, b , as will more fully appear hereinafter.

The power employed to drive the actuating-cables is preferably obtained from one or more suitable driving-engines, which are so constructed that the cylinders and piston-rods of the engine can be used to drive a vertical shaft to actuate the cables, or can be disconnected from the vertical shaft and connected with a horizontal shaft which drives the traction-wheels of the engine, and in this way convert the same into a portable or road engine at will. The machinery of the engine is carried by a suitable supporting-frame, A', which is supported in front by the wheels h and in the rear by the traction driving-wheels h' . A suitable boiler, m , is supported in the forward portion of the frame A', and communicates with and supplies steam to the horizontal steam-cylinders $m' m^2$, which drive piston-rods $n n'$ in the usual manner, and said piston-rods are adapted to drive the vertical cable-operating shaft B, or the horizontal traction-wheel driving-shaft D, as may be desired, through the medium of pitmen R R'.

The form and construction of the driving-engine will be fully described and claimed by me in an application to be filed as a division of the present case; hence the right and privi-

lege to file such a future application upon the engine herein shown is reserved to myself.

The vertical cable driving shaft B is preferably journaled in strong bearings in the upper 5 and lower portions of the extreme rear portion of the main frame A'; and mounted upon the vertical shaft B in vertical adjustment are the cable-driving pulleys $c' c^2 c^3$, adapted to revolve in a horizontal plane, and each pulley 10 is provided with a concaved periphery to more firmly hold the cables passing around and held by them. Each cable-driving pulley is of less diameter than its immediate predecessor in the vertical series, and the pulleys can be of any 15 number and they are preferably secured together and rendered vertically adjustable by means of a sleeve or flange and a set-screw, c , adapted to extend through the flange and engage a side of shaft B, which is preferably 20 squared.

It will be observed that the series of parallel driving-cables as they extend across the ground will be held apart from each other by reason of the driving-pulleys being of different 25 diameters, and also the endless cables will have to be of different lengths, so that they will be parallel and can be stretched taut, the cables driven by the largest pulley being upon the outside of the series and the cable driven 30 by the smallest pulley being the innermost cable of the series, as shown in Fig. 1.

Wherever it is necessary that the cables shall change their direction, as they extend across the surface of the ground, are placed guide-frames W, which support vertically-adjustable 35 spool-shaped pulleys u . These guide-frames consist of vertical uprights or posts w , which are preferably driven into the ground a suitable distance apart and strongly braced, 40 and are provided on their inner vertical sides with racks w'' , adapted to support in vertical adjustment a cross-piece, w' , which carries the depending spool-shaped pulleys u , which hold and guide the endless cables as they revolve. 45 The ends of the cross frame or piece w , which supports the guide-pulleys, engage the racks w'' , and are adjustably held in engagement with the same, preferably by means of sleeves or collars attached to the cross-piece and 50 loosely embracing the vertical posts, and the collars are provided with set-screws to clamp the same to the posts when the cross-piece has been adjusted to the desired position.

Rigidly secured to the cables, a suitable distance apart, are depending chains or the like, 55 t , which can be of any suitable length, and are provided at their free ends with links t' , which are adapted to receive hooks T, secured by means of chains or the like, t^2 , to the digging and removing implements. The digging 60 and removing implements are thus actuated by the cables and can be immediately detached from the same without stopping the revolution of the cable by means of the hooks 65 T, which are provided with a detaching-tongue, g , normally located in a slot in the hooking portion of the hooks and adapted to slide

across the holding-recess of the hook when it is desired to stop the implement, and thus 70 forcethe link t' from engagement with the hook.

The tongue g is operated by means of an operating or detaching lever, g' , which extends downward to be within easy reach of an operator, and the disconnection can be effected 75 by throwing upwardly the lever and thus force the tongue through the holding-recess, and can be returned to its normal position by drawing down the lever.

I do not claim the detaching-hook in the present application, but make it the sub- 80 ject of another pending application, Serial No. 254,983, filed November 12, 1887.

The driving power or engine during the excavating operation should be placed, as shown in Fig. 1, with its front portion within the 85 space bounded by the continuously-revolving cables, so that the cables as they revolve will pass around its rear end. Thus the digging and removing implements, after being once connected with the cables, can be allowed to 90 continuously revolve with them, if desired, as they can freely pass around the rear of the engine and between the upright posts of the guide-frames.

It has been found advantageous to connect 95 the digging implements—such as plows—to one of the cables, and to connect the removing implements—such as scrapers—to another and separate cable. Thus it will be readily seen that when the various parts are placed in po- 100 sition and the driving-power started to continuously revolve the cables the plows can be used to loosen the earth, and then the scrapers attached to another cable will remove the loosened earth and convey it to a spot to be 105 filled in, or simply dump it at one side, from whence it can be removed at will.

The operation of the apparatus will be clearly understood from the foregoing description and the drawings. 110

It is clearly evident that more than one source of driving-power can be used to actuate the cables where great force is needed, that the hooks can be attached to the cables instead of 115 to the digging or removing implements, and that numerous slight changes might be made in the form and arrangement of the parts described without departing from the spirit and scope of my invention.

Having thus fully described my invention, 120 what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination, in a grading and excavating apparatus, with a suitable driving-power, of one or more endless continuously- 125 revolving cables adapted to extend over the ground to be operated upon, one or more vertically-adjustable guide-pulleys carried by a suitable frame, and digging or removing implements connected with said cable and adapted 130 to revolve continuously with the same, substantially as described.

2. In a grading and excavating apparatus, the combination, with a suitable driving-power,

of one or more endless cables continuously revolving in the same direction, and digging or removing implements operated by said cables, each implement being connected to a cable by means of a hook provided with a detaching-tongue and lever, whereby the implement can be disconnected without stopping the rotation of said cable, substantially as described.

3. In a grading and excavating apparatus, the combination, with a suitable driving-power, of a vertical shaft carrying one or more horizontally-rotating driving-pulleys, one or more continuously-rotating endless cables driven by said pulleys, guide-pulleys carried by adjustable frames, whereby said cables are rendered vertically adjustable, and digging and removing implements detachably connected with said cables, substantially as described.

4. In a grading and excavating apparatus, the combination, with a suitable supporting-frame mounted upon wheels, a vertical crank-shaft journaled in one end of said frame and carrying one or more vertically-adjustable horizontally-rotating pulleys provided with grooved peripheries, and an engine carried by said frame and adapted to rotate said shaft, of one or more continuously-rotating endless cables driven by the pulleys upon the vertical shaft and extending over the ground to be operated upon, and digging or removing implements detachably connected with said cables, substantially as described.

5. In a grading and excavating apparatus, the combination, with a vertical shaft, a series of pulleys mounted upon said shaft in vertical adjustment, said pulleys being of different diameters, and a suitable power to drive the shaft and pulleys, of a series of endless cables continuously rotated by said pulleys, said cables being of different lengths and adapted to extend over the ground to be operated upon, and digging or removing implements detachably connected with said cables, substantially as described.

6. In a grading and excavating apparatus, the combination, with one or more cables revolving over the ground to be operated upon, suitable power to drive said cables, and digging or removing implements connected to said cables, of the herein-described guide-pulley frame, consisting of uprights provided with racks, a cross-piece vertically adjustable upon said racks, and spool-shaped pulleys carried by said cross-piece and adapted to guide said cables, substantially as described.

In testimony that I claim the foregoing as my own invention I affix my signature in presence of two witnesses.

MORTON ELLSWORTH PUGH.

Witnesses:

JOHN H. DICKEN,
WARREN BIGLER.