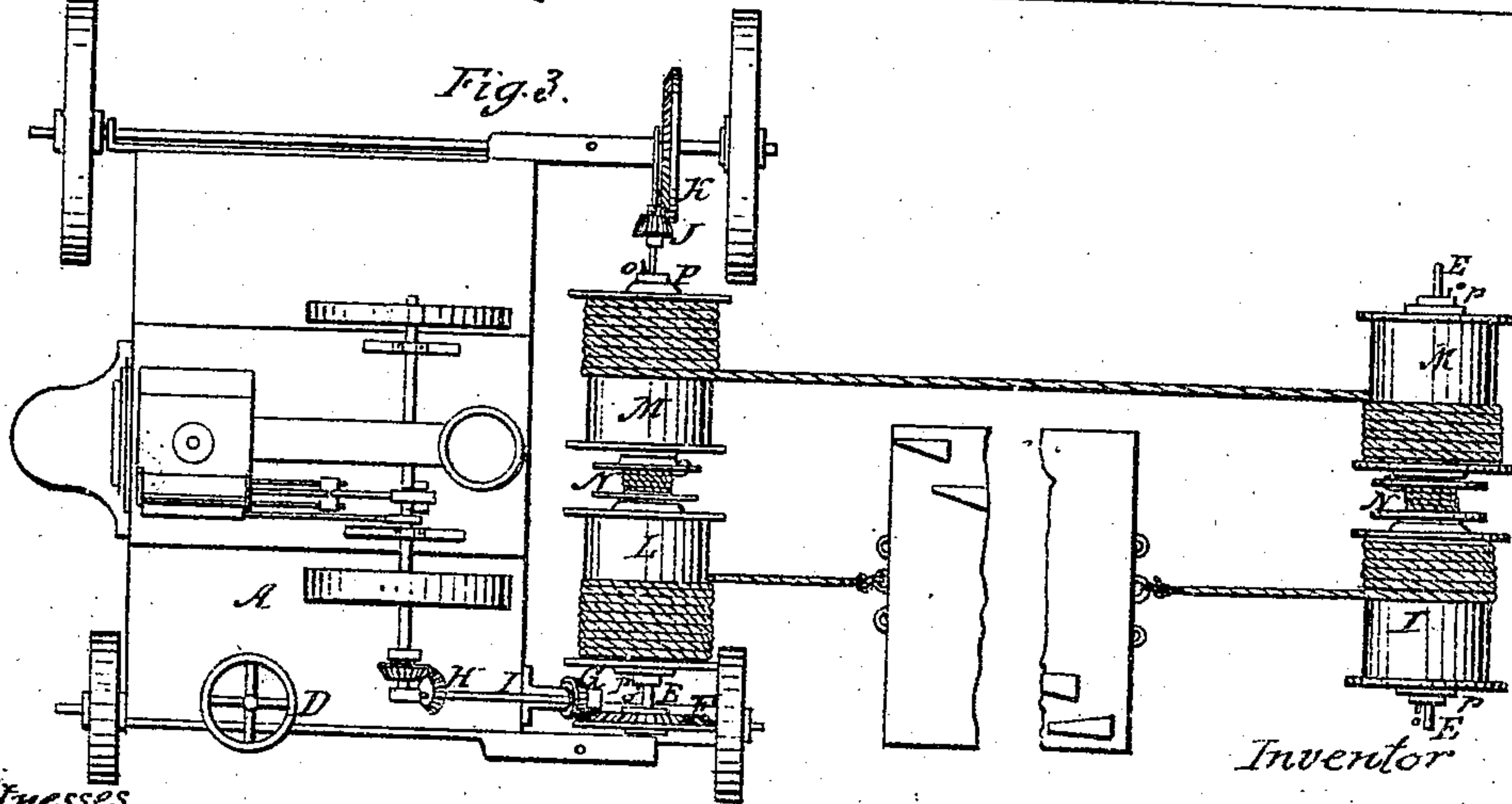
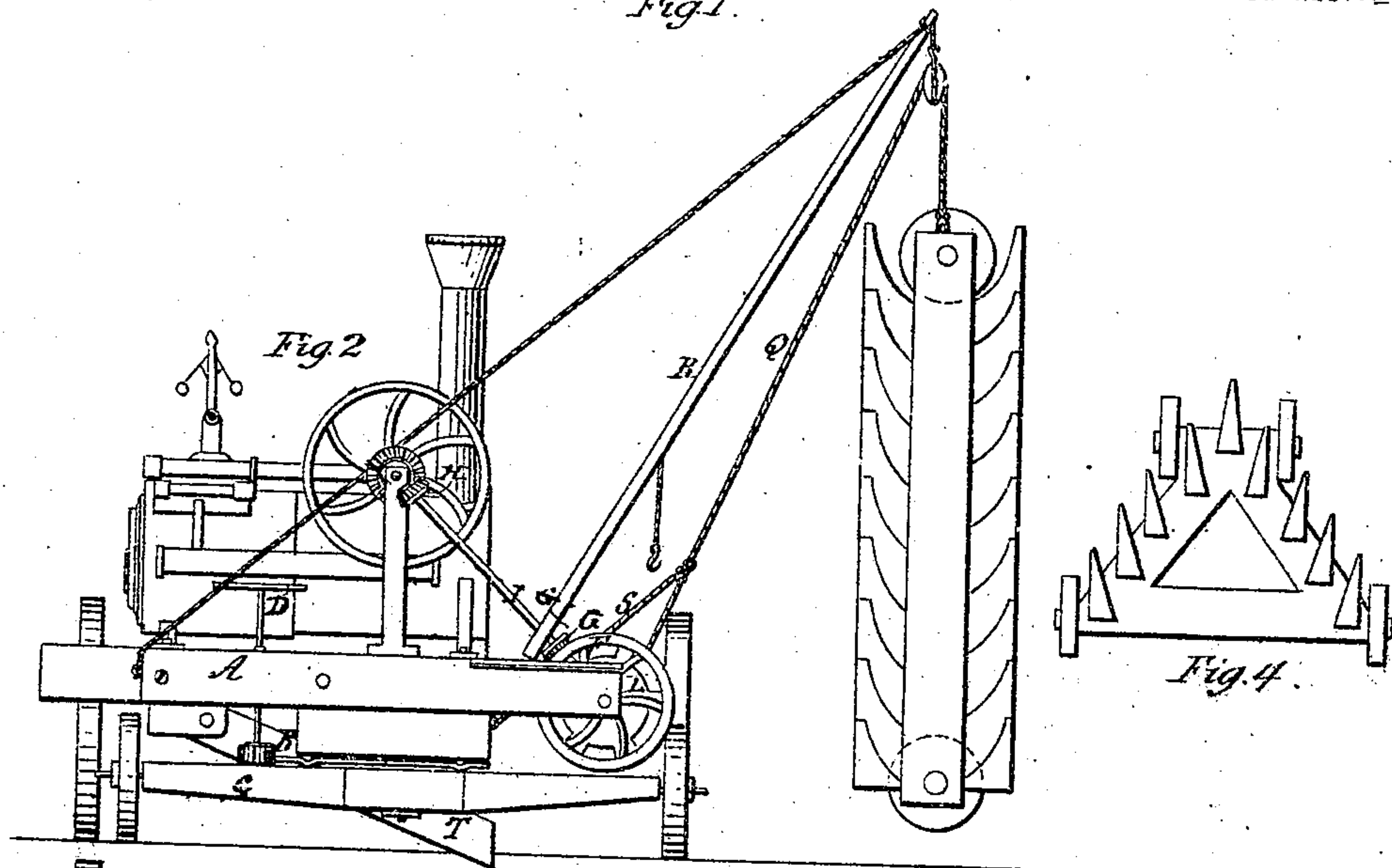
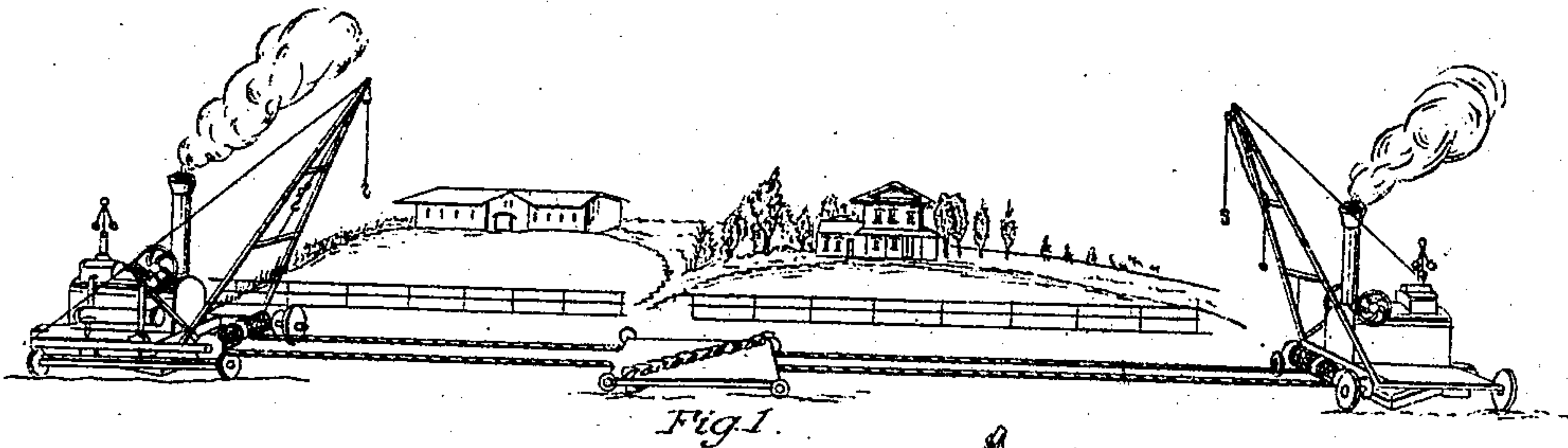


## Steam-Plow.

Patented Aug. 27. 1867



Witnesses

Philip Sawyer  
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# United States Patent Office.

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Letters Patent No. 68,310, dated August 27, 1867.

## IMPROVEMENT IN STEAM-PLOUGHS.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, HALBERT E. PAINE, of Milwaukee, in the county of Milwaukee, and State of Wisconsin, have invented new and useful improvements in Steam-Ploughs; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of a field, with my invention in position and operation.

Figure 2 is a front elevation of one of the engine-carriages, with its engine, and shows the gang-plough suspended, for transportation or reversal.

Figure 3 exhibits the mode of operation, with a plan of one of the engines and carriages.

Figure 4 is a plan of a gang-plough of a modified form.

My invention consists in the construction and operation of the winding apparatus, by which the ploughs are moved in the furrows; the construction and operation of the apparatus for transporting and reversing the gang of ploughs; the arrangement of the ploughs in the respective gangs; the mode of anchoring the engine-carriages; and the combination and arrangement by which the engine-carriages are moved on the field, and to and from it. In my method two engines are used, located at opposite sides of the field, as shown in fig. 1. These engines co-operate in propelling the gang of ploughs; and they are so arranged as to propel their own carriages along the edges of the field to gain new ground for the ploughs, and also to and from the field, and to transport the gang of ploughs in either case. The gang of ploughs, in its transportation either along the edges of the field or to and from the field, is suspended from a light derrick which is mounted upon the engine-carriage, as shown in figs. 1 and 2.

That others may fully understand the construction and operation of my invention, I will particularly describe it.

A is the carriage, upon which is mounted the engine which furnishes the motive power. This carriage is provided with one stationary and one swinging axle, so that its direction may be changed at pleasure. The swinging axle is retained in the proper position by the rack and pinion B C, and operated by the hand-wheel D or by some other convenient mechanism. The bearing-wheels for the carriage A are provided with broad treads, so that they may not sink in soft ground, and while in use in the field temporary tracks may be employed for them to run upon. The wheels of the stationary axle are rigidly attached thereto. At one side of the frame of the carriage, and mounted in suitable bearings attached thereto, is the shaft E, which is connected with the engine by means of the gear-wheels F G H and the shaft I, or some other convenient device. The carriage is also propelled by power transmitted through this shaft by means of the gear-wheels J K, the latter of which is rigidly attached to the stationary axle of the carriage, as shown in fig. 3. The wheel K may be a part of the bearing-wheel, or separate therefrom. The pinion J is movable upon the shaft E, so as to be thrown into or out of gear with the wheel K, which movement may be effected by the application of any of the devices for similar purposes familiar to mechanics. Upon the shaft E are placed the winding-drums L M N. The drums L M may be loose upon the shaft, and in that case may be coupled therewith by any of the well-known forms of clutch, and thrown into and out of gear by a clutch-lever or rod, which operations are too simple and too well understood to require particular explanation; or the drums L M may be rigidly attached to the shaft. The drum N is rigidly secured to the shaft, and is only used in elevating the gang of ploughs for reversal and transportation, and in lowering them again to the ground. The construction of the gang of ploughs to be employed is not material to the operation of the other parts of my invention. The first "gang-plough" of my invention consists of a rectangular frame, to which are attached, in a diagonal line, the desired number of ploughs, of any pattern suitable to the soil and work, so disposed as to succeed each other in cutting and turning the soil in the proper manner. The ploughs are attached, in sets, to the upper and lower sides of the frame, as shown in figs. 1, 2, 3, so that, when the gang of ploughs has traversed the field in one direction, it may be reversed by turning "the other side up," and with the apparatus which I employ it is most convenient to reverse the gang of ploughs by raising the end nearest to the carriage, as shown in fig. 2, and, after new ground is gained, by lowering it so that this end is farthest from the carriage. I therefore construct this "gang" with the right-hand ploughs on one side and the left-hand ploughs on the other, so that the "points" are all turned towards the same end of the frame. The furrows are then all turned in ~~the~~ one direction, and, when the gang of ploughs is reversed in the



manner described, the ploughs are in proper position. The frame is provided with four wheels, of broad tread, one at each corner, to control the depth of the furrows. These wheels may be made adjustable by the elevation and depression of their axles, but it is more convenient and simple to use wheels of different sizes, the axles remaining equidistant from the two horizontal planes passing through the points of the two sets of ploughs. My other gang of ploughs is arranged in a triangular form, as shown in fig. 4. The ploughs are so arranged as to turn the furrows in two directions, the plough at the vertex of the triangle throwing half furrows outwards, and the others throwing whole furrows inwards, thereby "ridging" the field. In reversing this gang of ploughs it is only necessary to suspend it on the derrick, by attaching it to the fall-rope, without changing its horizontality, and to swing it around so that its front end shall be in the opposite direction. Four wheels control the depth of the furrow in this case as in the other. The draught, in the case of either gang of ploughs, may be regulated by providing a sufficient number of points of attachment at the front end of the plough-frame, so that the draught-line may be carried as far towards one side or the other as may be found necessary. The ploughs attached to the frames in either case may be of any pattern suitable to the soil and work. Any other arrangement of the ploughs may be used in conjunction with the other parts of my invention, as may also rotary and other spaders or diggers, and with any of these may be combined harrows, seeders, &c., in simultaneous operation. The ropes or chains (wire ropes being preferable) which are attached to the gang-plough are wound upon the drums L L, as shown in fig. 3, and a corresponding rope connects the drums M M passing over the one and under the other, and, in this respect, wind each in the reverse direction from the drag-rope passing over the drum L upon the same shaft, so that while the drag-rope is being wound upon one drum, L, the other rope is being unwound from the drum M of the same shaft. At the same time the drum L of the other shaft may either be made loose so as to permit the drag-rope wound upon that drum to be freely uncoiled, or be made fast to the shaft so as to pay out the drag-rope as it revolves. From this arrangement it will be evident that if the drum M, acted upon by its engine, revolves so as to wind its rope upon itself, that operation will unwind it from the opposite drum; and if, at the same time, the other engine, by its direct action upon the gang of ploughs, moves the drums in the same direction, the power of both engines will be exerted in the propulsion of the ploughs. While the ploughs are in operation, then, both engines may be running, and they will co-operate in the manner explained. When one side of the field has been reached the drag-ropes are uncoupled and secured to their respective drums; the rope attached to the drum N is then freed at its end and attached, by a hook or otherwise, to the ring at the end of the short fall-rope Q, which passes through a block at the top of the derrick R, and the fall-rope Q is attached to the front end of the plough-frame, and the engine again set in motion, suspending the ploughs as shown in fig. 2. When they are thus suspended the stop-rope S may be attached and the drum-rope detached, and the pinion J may then be placed in gear, and the engine set in motion to shift its position. When new ground is gained the pinion J is thrown out of gear, the ploughs lowered, the drag-ropes again attached, and the ploughs propelled to the opposite side of the field, when the same operations are repeated. It will sometimes happen that the weight of the engine and carriage resting on the bearing-wheels will not be sufficient to resist the tendency to move laterally towards the ploughs; I therefore provide an anchor, T, which consists of a stout frame hinged to the lower side of the carriage A, and so arranged that its free end may drop upon the ground and present a large bearing surface to resist any lateral motion of the engine and carriage. If it shall be desirable this may be constructed with a sharp scoop, to cut for it a bed as the carriage moves forward.

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

1. The device for operating a gang-plough, spader, or digger, with or without an accompanying harrow or seeder, by means of two stationary engines, located on opposite sides of the section to be ploughed, and connected by ropes passing around drums and wound upon and from them, in the manner and to the effect set forth.
2. The construction and combination of the drums L M, L M, actuated by separate engines, but connected and co-operating, in the manner set forth.
3. The arrangement on one shaft of the winding-drums L M and the hoisting-drum N, substantially in the manner and for the purpose set forth.
4. The arrangement, substantially as set forth and described, of the gear-wheels J and K and their shafts, so that power to move the engine from place to place may be transmitted to the bearing-wheels through the same mechanism which operates the ploughs.
5. The derrick R, with its fall-rope Q, constructed substantially as shown, and operating substantially in the manner and for the purpose set forth.
6. The anchor T, constructed and operating as set forth and described.
7. The rectangular gang of ploughs, used to plough without "ridging," and constructed and operating as shown and described.
8. The triangular gang of ploughs, used for "ridging," and constructed and operated as shown and described.

HALBERT E. PAINE.

Witnesses:

T. C. CONNOLLY,  
CHAS. H. KELLER