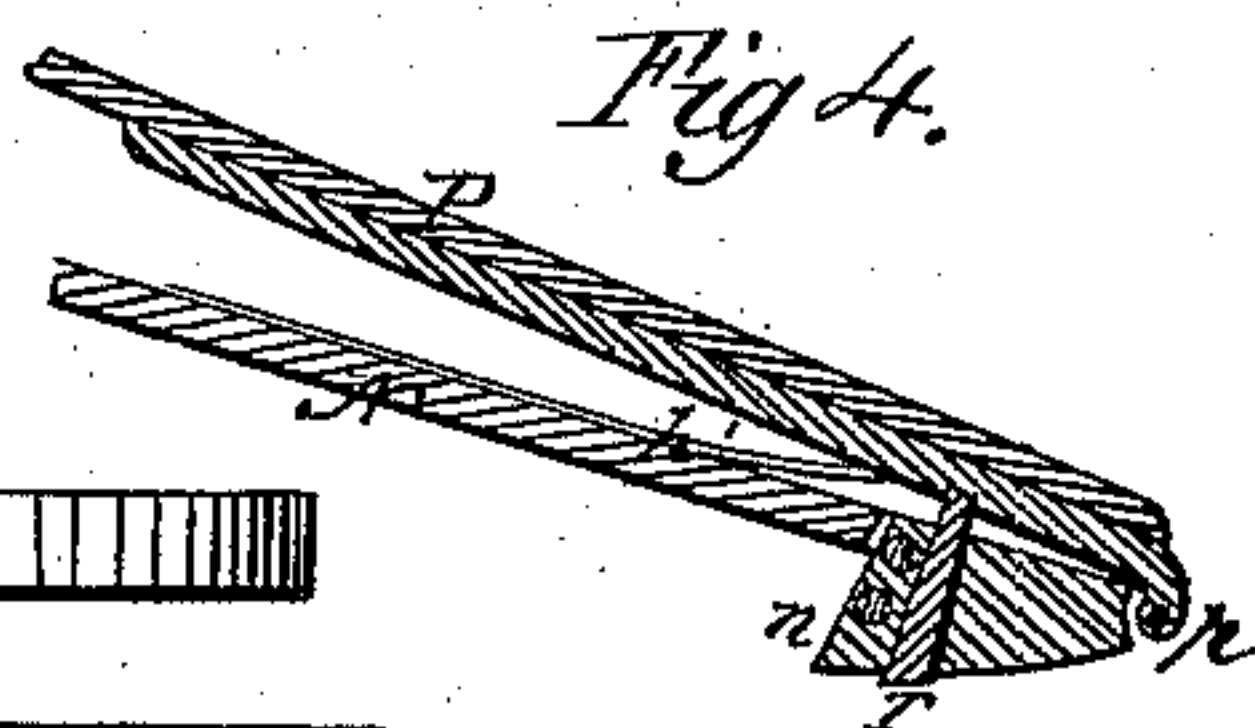
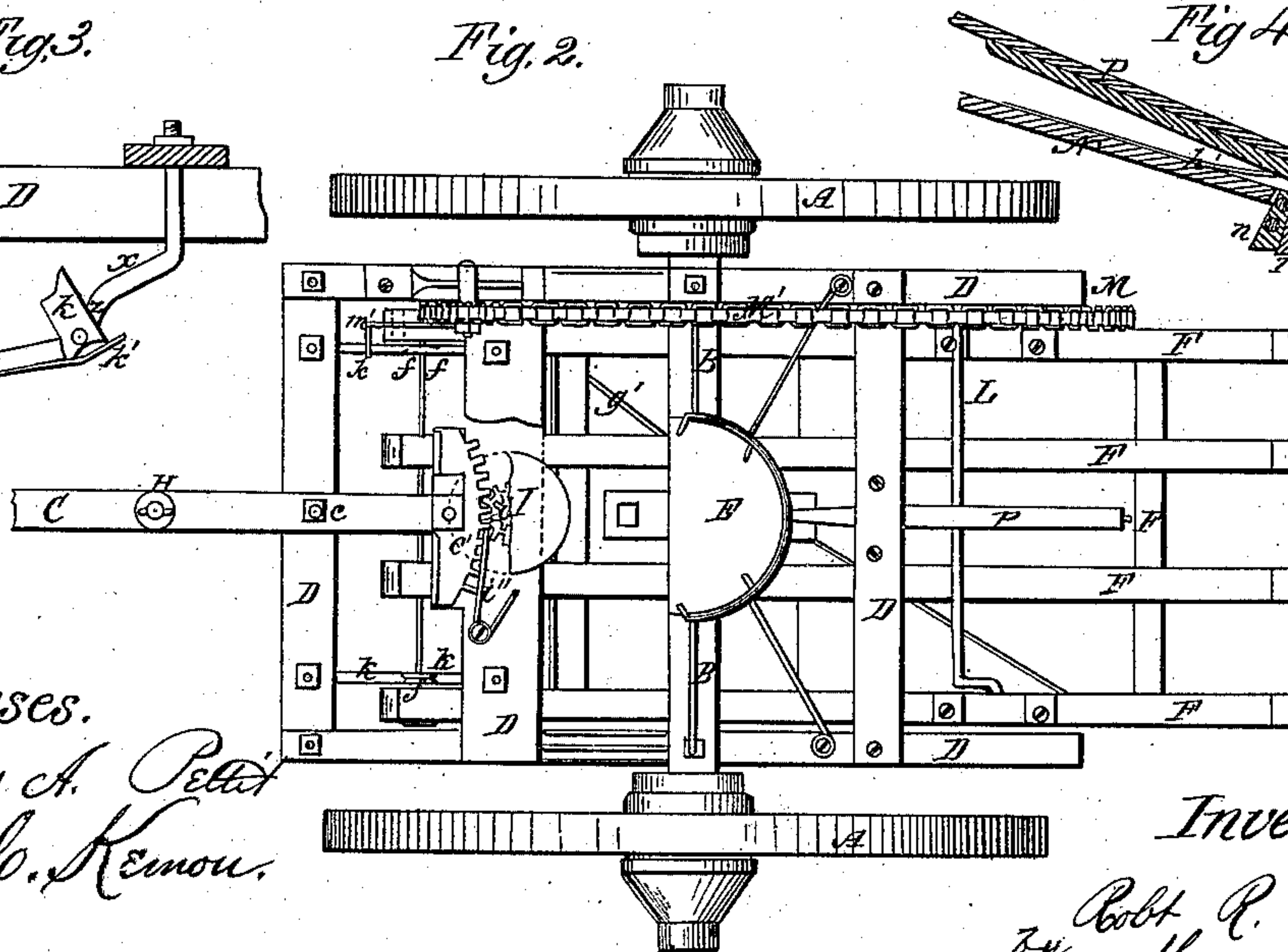
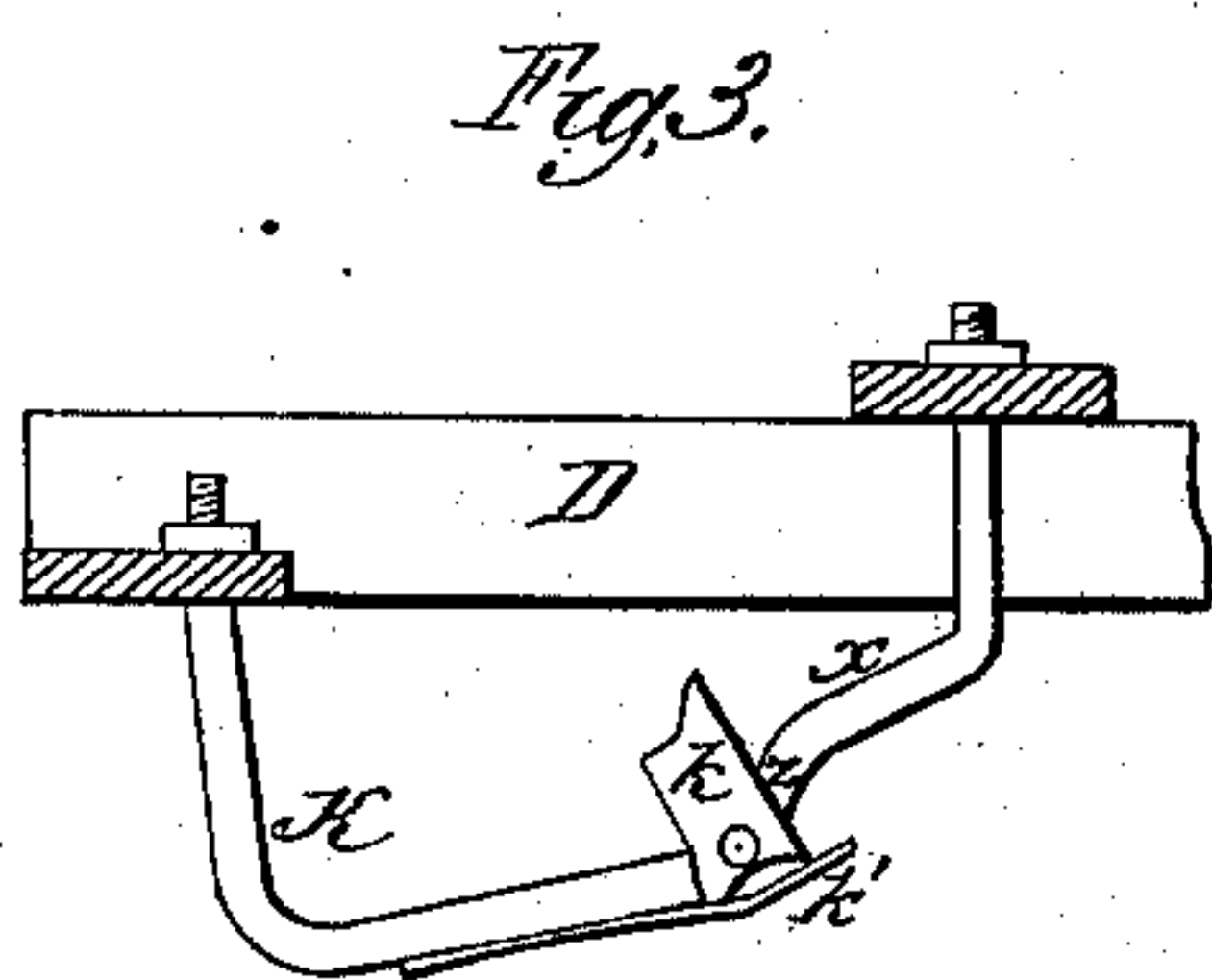
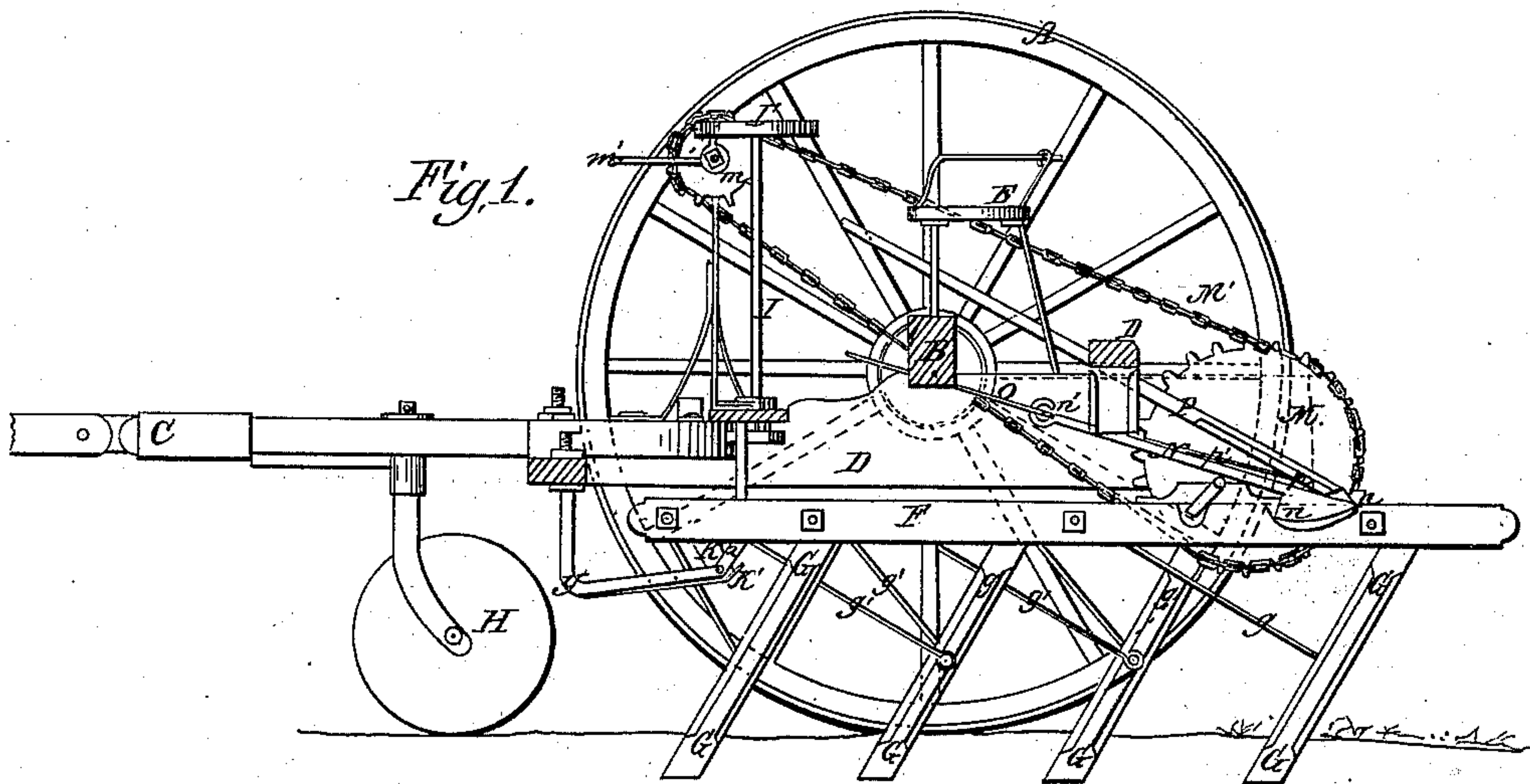


*R. R. Graves.*

*Wheel Plow.*

*No. 66,583.*

*Patented Jul. 9, 1867.*



*Witnesses.*  
*Charles A. Pettit*  
*John C. Kemou.*

*Inventor.*  
*Robt. R. Graves*  
*by Munn & Co.*



# United States Patent Office.

ROBERT R. GRAVES, OF MONTGOMERY, ALABAMA.

*Letters Patent No. 66,583, dated July 9, 1867.*

## IMPROVEMENT IN GANG-PLOUGH.

*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, ROBERT R. GRAVES, of the city and county of Montgomery, and State of Alabama, have invented a new and useful Improvement in Gang-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, forming part of this specification, and in which—

Figure 1 is a side elevation of my invention.

Figure 2 is a top view of the same.

Figure 3 represents the rail K and its attachments.

Figure 4 represents a longitudinal section of the arm N and lever P and their connecting apparatus.

Similar letters of reference indicate corresponding parts in the two figures.

In this invention the dip of the plough is regulated, and means are provided by which upon encountering an obstacle the ploughs may be withdrawn without backing the team. Ordinarily in ploughing, when the plough points come in contact with a rock, the root of a tree, or other obstacle in the ground, the plough cannot be raised vertically to clear the obstruction, but the team has to be backed so as to allow the plough to be drawn back and then raised. My invention is designed principally to obviate this difficulty by a new, simple, and durable arrangement. It is also designed to regulate the elevation and direction of the ploughs, to adjust them to any soil, and to insure the catching of the forward plough under the soil in such a direction as to cause all the ploughs to enter the ground properly. In connection with these new devices there is also a novel arrangement for changing the lateral direction of the gang.

In order that others skilled in the art to which my invention appertains may be enabled to make and use the same, I will proceed to describe it in detail.

In the drawings, A A represent the wheels; B the axle; C the draw-beam; D D parts of the frame, and E the driver's seat; F F F is a movable frame, to which by standards *g g* the ploughs G G are attached, being steadied and strengthened by braces *g' g'*, running from the standards to the frame. The draw-beam has a caster, H, under it, and is pivoted at *c* to the forward cross-beam of the frame, so as to swing horizontally upon the pivot. Its rear end has a segment spur-wheel, *c'*, gearing with another spur-wheel, *i*, upon the lower end of the vertical shaft I. *i'* is a ratchet or pinion on the shaft I, and *i''* is a pawl attached to the frame F, to keep the shaft I from turning when it is not desirable to change the direction of the instrument. A hand-wheel or crank, I', is fixed to the upper end of the shaft I. It is evident that by turning this hand-wheel or crank the direction of the draw-beam will be changed at pleasure, and consequently the direction in which the gang-plough will move will be also changed. The forward end of the frame F F has trucks *f f*, which run on longitudinal rails K K. *k k* are arms hinged at their lower extremities to the rails K K, and held in place by springs *k' k'*. It will be observed that the upper end of the arms *k k* are notched transversely. The use of these arms will be hereafter explained. The rear end of the movable frame F F rests upon a shaft, L, running across the instrument and bearing in the frame D D. This shaft is bent, forming cranks at both its ends, and bears on the handles of the cranks, the whole shaft thus forming a double crank, its central arm carrying the frame F F. As this shaft is caused to revolve, it alternately elevates and depresses the rear end of the frame F F and the ploughs attached to it, the frame sliding longitudinally on the rails K K, to accommodate itself to the motion of the crank-shaft. Attached to the right end of the shaft L, just where it enters its bearings, is the wheel M, having cogs, and bearing the endless chain M'. This chain runs forward over another cog-wheel *m*, worked by a crank, *m'*, by the hand of the driver, by which the ploughs may be elevated or depressed at pleasure. The rails K K, it will be observed, are of peculiar shape, being horizontal from their forward end to the point where the arms *k k* are attached, when they rise with a steep incline, *z*, for a short distance, then becoming at *x* nearly horizontal, and finally terminate in almost a perpendicular direction. This is done to regulate the direction of the ploughs. When the rear end of the frame F is depressed, its forward end rests upon the lower portion of the rails K K. When the rear end is elevated to its highest point, the forward end rests upon the horizontal portion *x* of the rails K K. When about half elevated the forward end rests upon the top of the arms *k k*, the trucks *f f* falling into the notches upon the upper end of these arms. Now imagine the rear end of frame F depressed, the trucks *f f* resting on the lower horizontal portion of the rails K K at about Z, and



proceed to gradually turn the shaft L so as to elevate the rear end of the frame. As you do so, the trucks *f f* will run back along the rail till they arrive at the foot of the incline *z*. Now observe the position of the frame F F and ploughs attached to it. It is evident that the rear end of the frame has been raised through nearly one-half the distance it is capable of being elevated, while its forward end has not been raised at all. The rear ploughs will therefore be now out of the ground or nearly so, while the forward plough will hardly be perceptibly lifted. The direction of the forward plough will, however, have been changed by the operation, and it will now be more nearly perpendicular than it was before.

Suppose all this to have been done before starting, while the ploughs are all out of the ground. Now upon putting the instrument in operation, the forward plough will immediately catch in the soil and enter the ground in the proper manner, and then as the team moves along, all the rear ploughs will follow the forward one and enter the ground in their turn, by a simple revolution of the crank *m'*, so as to depress them to the proper point. It is evident that I have here the means for elevating and depressing all the ploughs in such a manner that the points of all shall be in the ground or out of the ground, or so that the point of the forward plough shall be in the ground while those of the rear ploughs shall be nearly or quite out of the ground. Without some additional arrangement, a difficulty would here arise, however, in practical operation. For there being nothing to prevent the shaft L from turning by the application of force, it would follow that whenever the ploughs caught in the ground the frame would be forced back, the crank turned a quarter round or more, and the ploughs half raised or wholly raised from the ground so as to become inoperative. To meet this difficulty I have provided the attachment shown particularly in fig. , consisting of the rod N, having the hook or shoulder *n* on its rear end, and hinged at *n'* to the plate O, which passes through the axle and is secured to it by a bolt, in connection with the lever P, the rear end of which is hinged to the rear end of rod N at *p*. *p'* is a spring attached to rod N and operating upward against lever P. The forward end of lever P comes up to the driver's seat so as to be easily handled by him. The lever pivots either over the axle B, or on a pin in lugs attached to a cross-beam of the frame D D. When the crank-shaft L is elevated or depressed, the shoulder upon the under side of the rod N may, by depressing the rear end of the rod, be made to catch the crank-shaft and hold it firmly in that position, the whole draught of the ploughs thus coming almost directly upon the rod N. The shaft L may be held in this position as long as is desirable, and then released by depressing the forward end of the lever P. It is evident here that the angle made by the shoulder upon the rod N must be considerably sharp, forming a sort of barb or hook to hold the shaft L safely. If it were not less than a right angle it might slip off of the shaft. But if less than a right angle, so as to hold the shaft firmly, a new difficulty arises: with the great draught upon it above described, it will be almost impossible to disengage the shoulder from the shaft. There must then be some means of increasing or diminishing at pleasure the angle made by the shoulder with its rod N, so as either to hold or to release the shaft L. This is accomplished by means of the arm *r*, working in a slot in the rod N and shoulder, and pivoted at its upper end to the rod N, behind which, in the same slot, works a key or second arm, *r'*, fixed to the lever P, and moving up and down in the slot. The arm *r'* being wedge-shaped, its point attached to the lever and its head downward, whenever it is raised its head throws the lower end of the arm *r* forward making the angle referred to sharper, and whenever it is depressed it allows the lower end of the arm *r* to recede again, making the angle more obtuse. Now by being attached to the lever P it will be raised whenever the rear end of the rod N is depressed, and will be lowered whenever that rod is elevated. Thus to make the angle obtuse and cause it to release the shaft L, simply depress the forward end of the lever P; this is all that is needed.

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

1. The combination of the draw-beam C, having the segment spur-wheel *e'*, with the vertical shaft I having the spur-wheel *i*, substantially as and for the purpose described.
2. The combination of the movable frame F F with the shaft L, wheel M, endless chain M', and wheel *m*, worked by the crank *m'*, substantially as and for the purpose specified.
3. The combination of the rails K K, springs *k' k'*, arms *k k*, trucks *f f*, and frame F F, substantially as and for the purpose described.
4. The combination of the rod N, spring *p'*, lever P, and arms *r* and *r'*, substantially as and for the purpose specified.

To the above specification of my improvement I have signed my hand this 29th day of May, 1867.

ROBERT R. GRAVES.

Witnesses:

CHARLES A. PETTIT,

SOLON C. KEMON.