

No. 606,641.

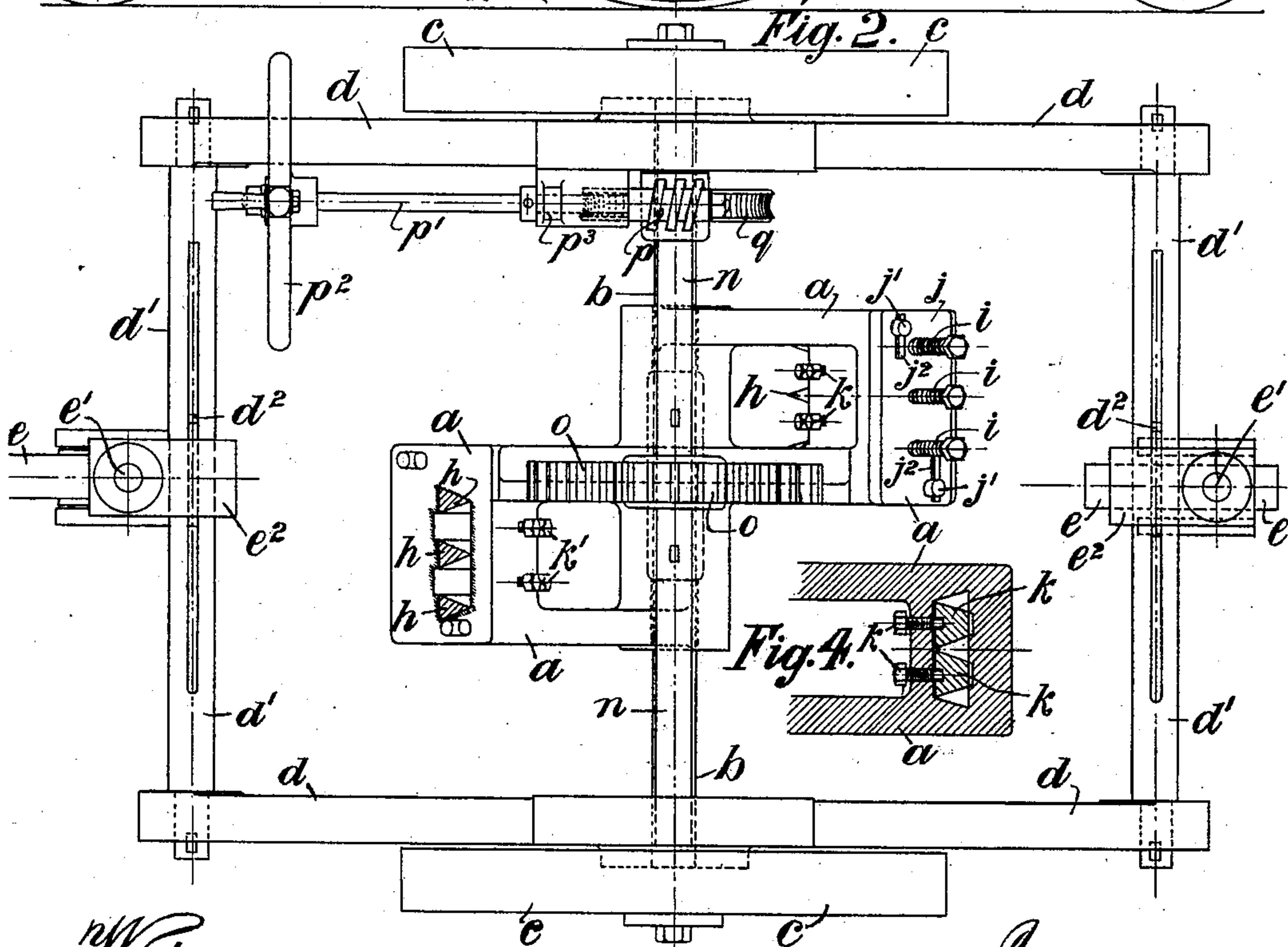
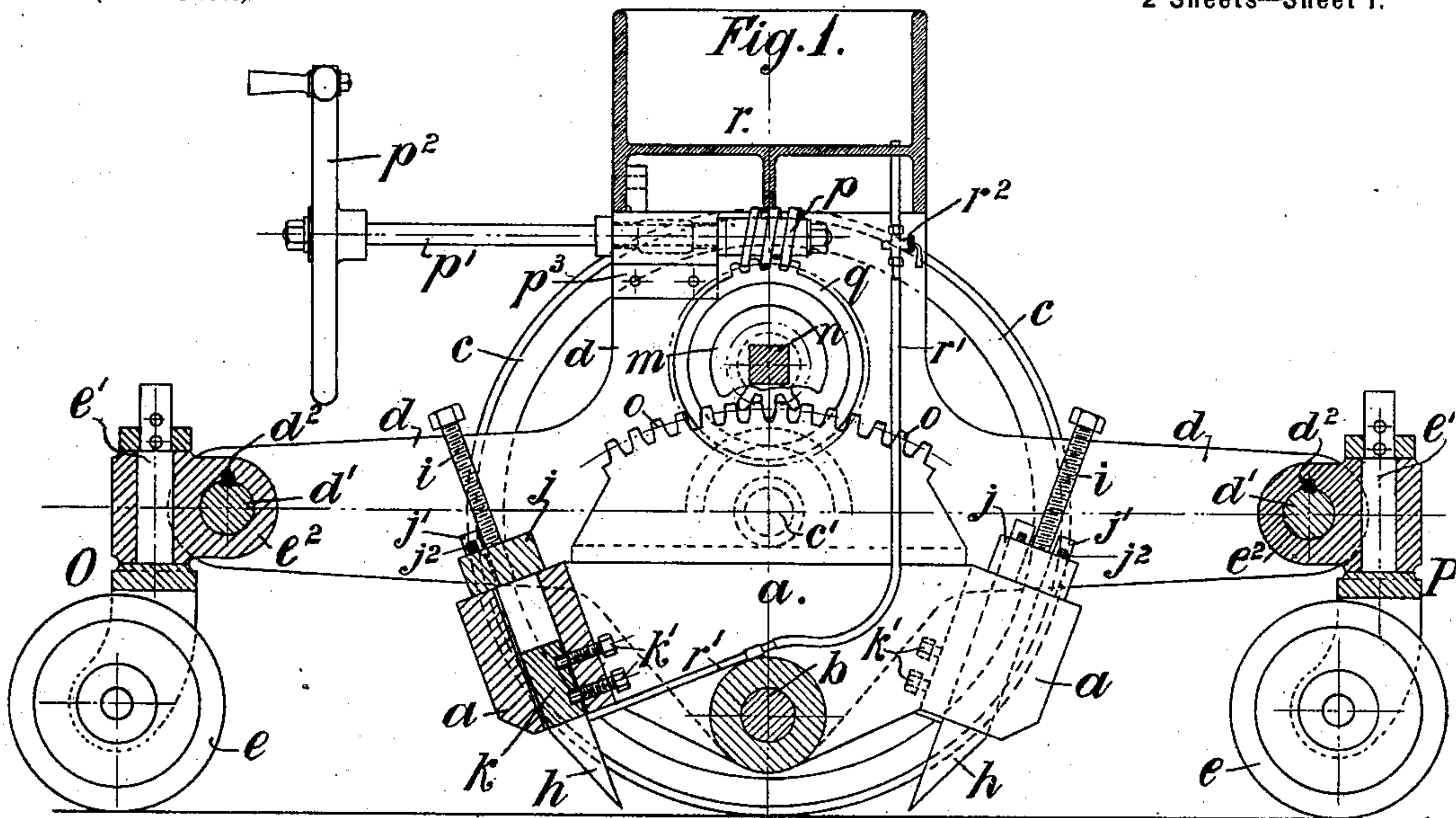
Patented July 5, 1898.

R. & B. BOMFORD & H. EVERSHED.
APPARATUS FOR SCARIFYING AND BREAKING ROADS.

(Application filed Dec. 21, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.

C. M. Bolton

Edmund

Inventors.
Raymond Bomford
Benjamin Bomford
Henry Evershed

By Richard R.
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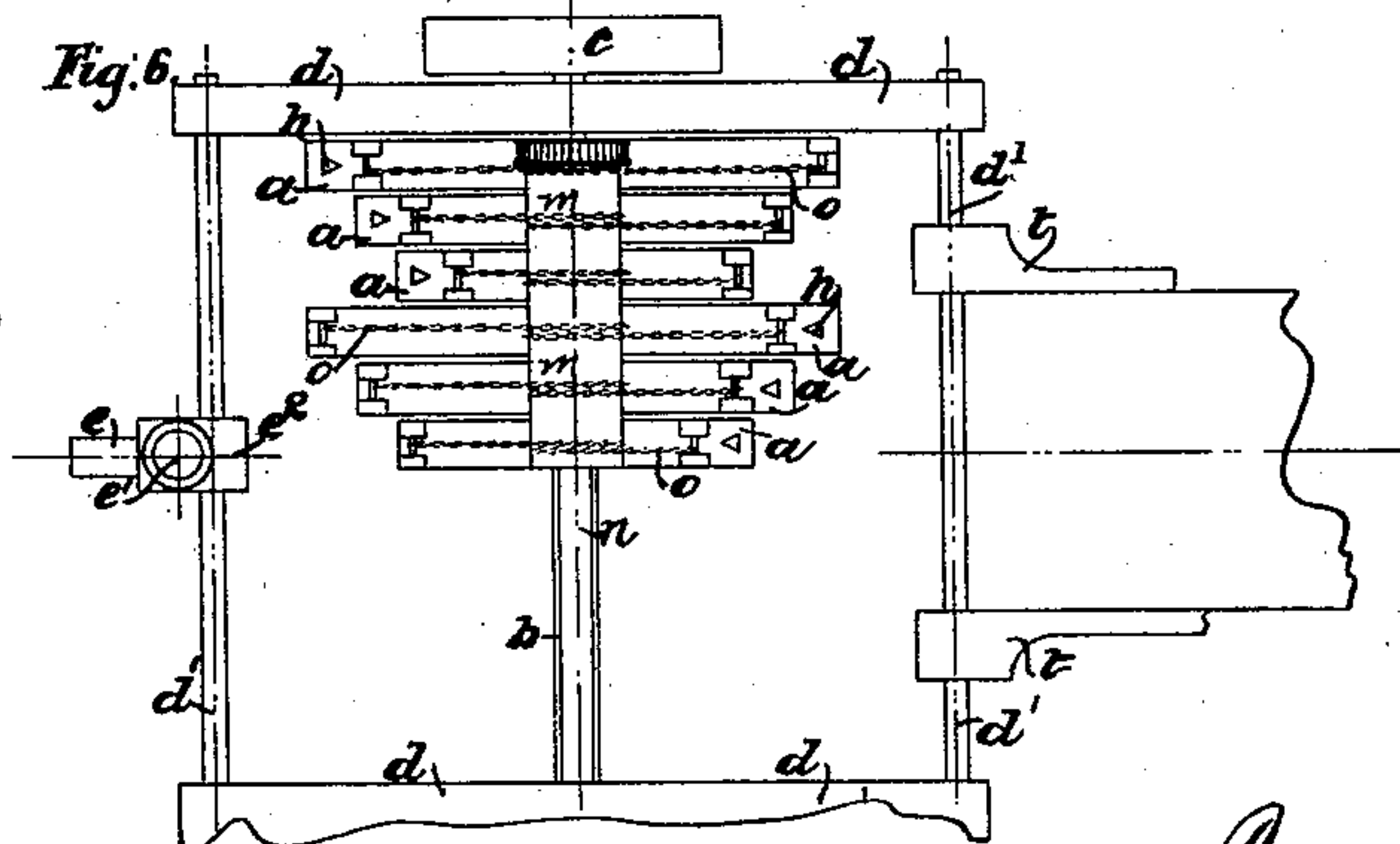
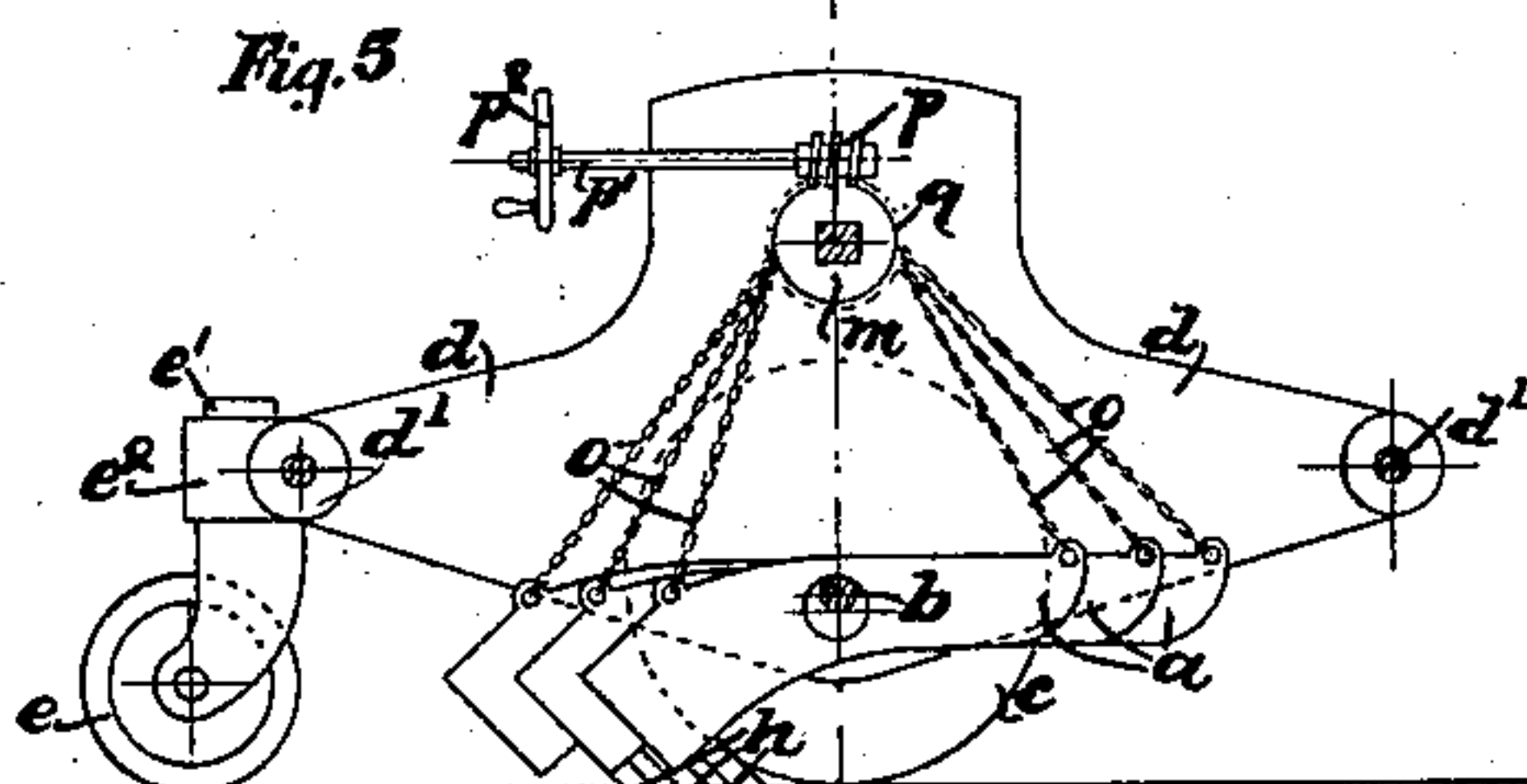
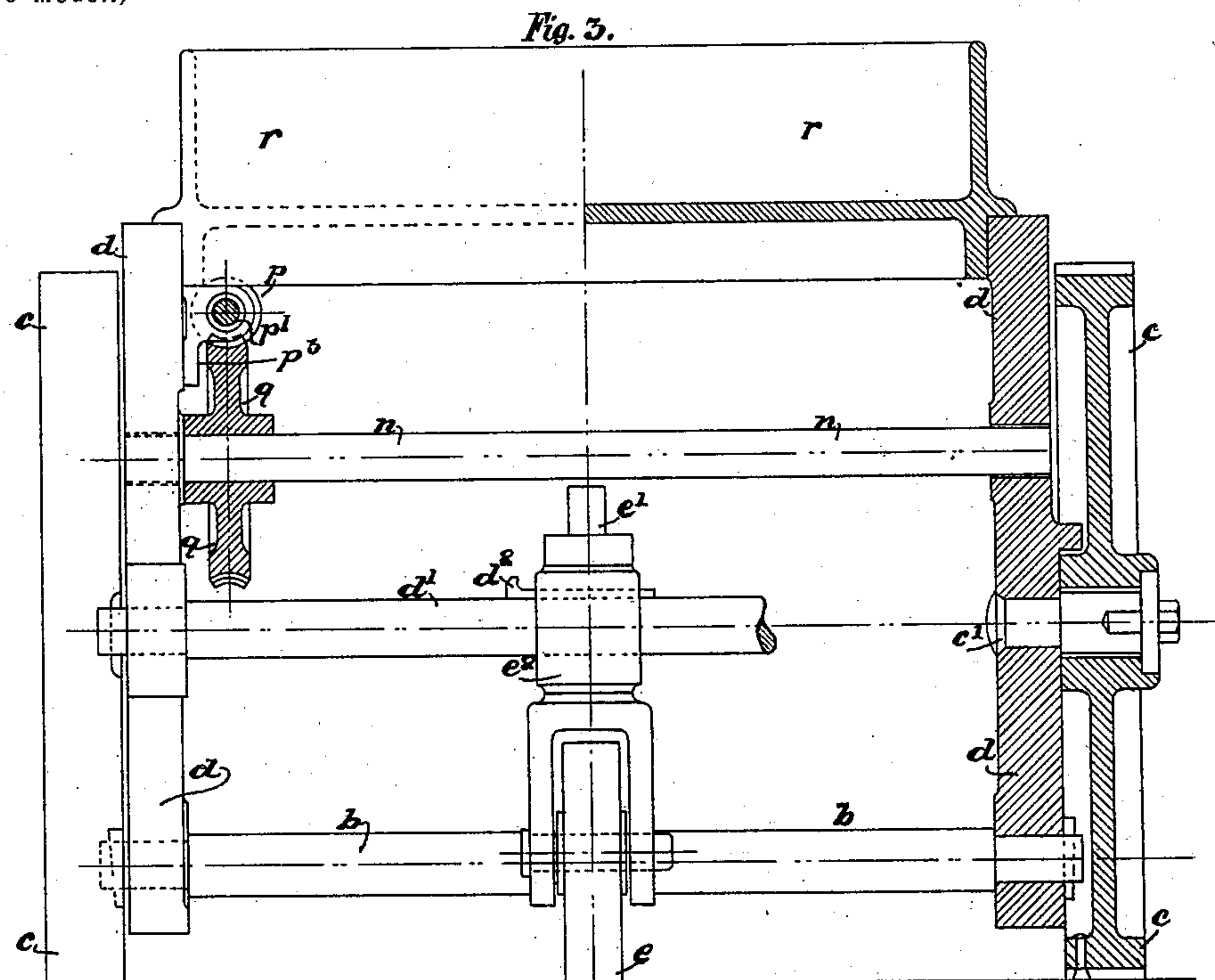
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UNITED STATES PATENT OFFICE.

RAYMOND BOMFORD, OF SALFORD PRIORS, BENJAMIN BOMFORD, OF HARRINGTON, AND HENRY EVERSHED, OF SALFORD PRIORS, ENGLAND, ASSIGNORS TO THE ROAD BREAKING COMPANY, (VOYSEY AND HOSACKS PATENTS,) LIMITED, OF LONDON, ENGLAND.

APPARATUS FOR SCARIFYING AND BREAKING ROADS.

SPECIFICATION forming part of Letters Patent No. 606,641, dated July 5, 1898.

Application filed December 21, 1897. Serial No. 662,902. (No model.) Patented in England August 9, 1893, No. 15,214.

To all whom it may concern:

Be it known that we, RAYMOND BOMFORD, farmer, of Bevington Hall, Salford Priors, in the county of Warwick, BENJAMIN BOMFORD, farmer, of Hartington Lodge, Harrington, in the county of Worcester, and HENRY EVERSHED, farm manager, of Salford Priors, in the county of Warwick, England, subjects of the Queen of Great Britain and Ireland, have invented certain new and useful Improvements in Apparatus for Scarifying and Breaking Roads, (for which we have obtained Letters Patent in Great Britain, No. 15,214, dated August 9, 1893;) and we 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.

Our machine consists of a road-scarifier or machine for breaking up roads or other hard surfaces, the parts of the said scarifier or machine being constructed and combined and used substantially in the manner herein described.

Our new or improved road-scarifier is principally useful for breaking up roads, in most cases preparatory to laying down stones or macadam for repairing the said roads; but the said scarifier may also be used for breaking up other hard surfaces.

Our new or improved road-scarifier or machine consists, essentially, of a heavy block of iron made in one or more pieces, carrying at opposite sides a set of, say, four tines or cutters, chisel-pointed, for operating upon the road to be scarified or broken up. The two sets of tines are inclined in opposite directions, one set of the tines being used for operating on the road when the scarifier is traveling in one direction and the other set of tines being used for operating on the road when the scarifier is traveling in the opposite direction. The block carrying the two sets of tines is mounted upon an axle, which in some cases is that of the traveling wheels of the machine, and mounted upon the said axle the said block can swivel and turn, so

that one set of tines can be raised from the road out of action and the other set of tines lowered into action for operating on the road. Mounted upon the upper part of the swiveling tine-block is a horizontal frame extending considerably beyond the parts of the block carrying the tines. To one or other end of this frame the traction-engine, road-roller, or other motive-power engine is connected for drawing or moving the scarifier along the road in either direction. The tines are capable of adjustment vertically in the swiveling block, so that their acting ends can be made to project the required distance from the bottom of the block for operating at the desired depth upon the road or of being raised above the surface of the road in order that the traveling wheels of the machine may rest upon the road for the traveling of the said machine when the tines are out of action. When either set of tines is in its acting or lowered position, the whole weight of the machine is borne by the tines, and their action in breaking up the road is made very effectual. A tank for containing water may be combined with the tine-block for supplying water to the said tines for keeping them cool.

In order to bring the scarifier into action, the sets of tines on the block are adjusted and the block is turned on its axle, so as to lower into action that set of tines which is to operate on the road. After the machine has been drawn along and broken up the road in one direction the position of the tine-block is reversed, so as to bring the other set of tines into action and raise out of action the first-named set, and the machine is drawn or pushed in the opposite direction along the road. The machine, when the tines are fixed out of action, travels upon the wheels, as before described.

In the drawings hereto annexed is illustrated an example of apparatus provided with improvements according to this invention.

Figure 1 is a sectional elevation, Fig. 2 is a plan, and Fig. 3 a transverse end section, of the machine. Fig. 4 is a detail in sectional

plan of the tools and means for adjusting same. Figs. 5 and 6 show a modification of the invention.

Referring to the drawings, more particularly to Figs. 1 to 4, *a* is the block, consisting of a heavy casting mounted upon the shaft *b*, in which the tools are carried.

c are the traveling wheels, mounted in the same vertical plane as the shaft *b*.

d is the horizontal frame, supported mainly by the journals *c'* of the wheels *c* on the shaft *b* and also by fore and aft wheels *e*. These wheels *e* are of the swiveling type in the apparatus shown in the drawings, having their supporting-spindles *e'* carried by the block *e²* on the connecting-bars *d'* at and on the ends of the frame, they being adapted to be adjusted laterally on said shafts by a key or feather *d²*, fitting in a corresponding way in the block *e²*. These wheels, however, may in some cases be dispensed with.

The tools are designated *h* and are adjustable in and carried by the casing or block *a* at either end thereof and are disposed, as shown, in an angular position. The means of adjustment consists of screws *i*, held by and working in blocks *j*, and the blocks *k*, which are used and disposed between the tools *h* and adjusted and pressed against same by the screw-stud *k'*. The blocks *j* are held in position on the end of the casing *b* by pins and cotters *j' j²*. The tools *h* are preferably of triangular section, as shown, and fit within apertures in the casing *a*, as shown, while the pressing-surfaces of the blocks *k* are made of corresponding form to the sides of the tool. To adjust the tools up to the work, say after they have been worn, the screw-studs *k'* are slackened and the studs *i* screwed through the block *j*, pressing the tools *h* thereby downward. When the right position of the tools has been obtained, the screw-studs *k'* are screwed up, thereby pressing the blocks *k* up against the tools *h* and jamming them in position and preventing them from being moved, they being prevented from being pressed upward by the screws *i*.

The block *a* is oscillated in one direction or the other, according to which set of tools it is required to use, by the tooth-wheel *m*, mounted on the shaft *n*, carried in the frame *d*, working in connection with toothed rack *o* on the casting *a* on the shaft *n*, itself being operated—that is, rotated—by a worm *p*, carried by and worked from the shaft *p'*, held by brackets *p²*, by the hand-wheel *p³*, and a worm-wheel *q*, fastened on the shaft *n*. Thus by turning this wheel *p³* in one direction or the other the block *a* will be moved or oscillated upon its shaft *b* and one or other set of tools brought down into contact with the road or surface it is intended to scarify or break up.

r is a vessel in the upper part of the frame *d*, adapted to contain water, having pipes *r'* from same, with taps *r²* thereon, by which water can be supplied to the points of the

tools and keep them cool. In some cases a part of this vessel may be divided off to hold tools, &c., appertaining to the machine in work.

The machine is adapted to be propelled from either end by coupling it up with the locomotive road-roller direct or by an indirect method, as a plowing or equivalent engines and wire rope or other suitable power.

When the apparatus is adapted to be directly connected with and propelled by a locomotive-engine, it is coupled up thereto by the brackets *l* on the road-roller or engine, through which the shaft *d'* passes.

In operation, assuming the apparatus is to be propelled in the direction O P, the casting *a* is oscillated, so as to bring the then rear or trailing tools onto the surface of the ground to be broken, and being inserted at the required depth the apparatus may be propelled or set in motion, or the insertion of the tools may be effected after the apparatus has been started.

In the modification shown in Figs. 5 and 6 each tool is carried in a separate block or piece *a*, all the blocks being mounted upon the shaft *b*. They are operated—that is, lowered onto and raised from the surface of the ground which they are to break—by pitch or other suitable chains *o*, working over sprocket-wheels *m* or on shaft *n*, the said shaft *n* being operated as above described.

In half of the blocks or pieces *a*—i. e., those on the one side—the tools are arranged on the “aft” side of the axis, while in the other blocks or pieces on the other side of the machine the tools are carried on the opposite—i. e., forward—side of the axis. Thus at one time all the tools on the one side of the axis will be up when the others are down, according to the direction in which the machine is being propelled.

The machine is so arranged and constructed, as shown by the drawings, that the blocks or pieces *a*, with their tools *h*, are capable of being moved or adjusted transversely across the machine between the frames, this adjustment being effected by making the pinion *m*, in the case of the apparatus shown in Figs. 1 to 3, or the sprocket-wheel *m*, in the case of the apparatus shown in Figs. 5 and 6, to slide laterally on the said shaft *n*, which is rectangular, as shown. By this arrangement four cuts can be taken in the road with the engine traveling in the same line or track during each of and all the cuts—that is to say, one cut, the first, say, is taken by the engine traveling forward, the second by its traveling backward, the third forward again, and the last backward.

The improvements above described have been set forth as applied in connection with road-breaking apparatus separate from and adapted to be pulled or pushed by a locomotive road-roller or traction-engine; but it is to be stated that the actual breaking parts of it may be applied directly to the rear part

or tender or tank of a locomotive road-roller or traction-engine and form practically part thereof.

What is claimed in respect of the herein-described invention is—

1. A machine for breaking up roads or other analogous hard surfaces, and adapted to break said surfaces when being propelled in either direction, comprising a tool-holder mounted upon a transverse axis, and adapted to oscillate thereon, and having tools mounted therein on the opposite side of the axis, and adapted to be raised from and lowered onto the surface to be broken, alternately; and means, by which said tool-holder is oscillated about its axis; substantially as set forth.

2. A machine for breaking up roads or other analogous hard surfaces, and adapted to break said surfaces when being moved in either direction, comprising a tool-holder mounted upon a transverse axis, and adapted to oscillate thereon, and having tools mounted therein on opposite sides of the axis, and a hand-actuated worm and worm-wheel driven thereby, for oscillating said tool-holder, and to raise and lower the tools on the opposite ends, alternately, off and onto the surface to be broken, whereby said tool-holder can be readily moved by hand, and cannot move of itself after being set; substantially as set forth.

3. A machine for breaking up roads, or other analogous hard surfaces, and adapted to break said surfaces when being propelled in either direction, comprising a tool-holder, mounted upon a transverse axis in a carrier-frame, separate from the propelling-engine, said tool-holder having tools secured in opposite ends of said casting or block, and means for oscillating said tool-holder about its axis, and to alternately raise or lower one or other of the said sets of tools onto and off the road; and road-wheels, on which said frame carrying the tool-holder is mounted and runs; substantially as described.

4. In a machine for breaking up roads or other analogous hard surfaces, an oscillating tool-holder *a*, supported on and adapted to oscillate about an axis *b*, and having a plural-

ity of tools *h* carried on each end, on opposite sides of said axis; these sets of tools being adapted to be alternately lowered onto, and raised off, the surface to be broken.

5. In a machine for breaking up roads, or other analogous hard surfaces, an oscillating tool-holder *a*, supported on and adapted to oscillate about an axis *b*, and having a plurality of tools *h* carried on each end, on opposite sides of said axis, these sets of tools being adapted to be alternately lowered onto, and raised off, the surface to be broken; and a mechanism for oscillating said holder *a*, comprising hand-actuated worm *p*, and driven worm-wheel *q*.

6. In a machine for breaking up roads, or other analogous hard surfaces, an oscillating tool-holder *a*, the supporting-shaft *b*, about which the said holder is adapted to oscillate, and sets of tools *h*, disposed and supported in *a* on opposite sides of the shaft *b*, and disposed in echelon.

7. The oscillating tool-holder *a*, with tools *h* arranged in sets at the opposite ends of same, and in echelon, and the tooth-quadrant *o*, by which the oscillations are effected.

8. In a machine for breaking up macadam roads or other analogous hard surfaces, the combination of the tool-holder *a*, shaft *b* supporting *a*, frame *d* carrying the shaft *b*, road-wheels *c* supporting the frame *d*, and worm and worm-wheels *p q*, pinion *m*, quadrant *o* on *a*, and the shaft *n*; said tool-holder being adapted to be moved and adjusted laterally along its supporting-shaft *b*: as set forth.

In testimony whereof we hereunto affix our signatures in presence of witnesses.

RAYMOND BOMFORD.
BENJAMIN BOMFORD.
HENRY EVERSLED.

Witnesses to the signatures of Raymond Bomford and Henry Evershed:

GEORGE FREDERICK LODDER,
PERCY TALBOT COOKLEY.

Witnesses to the signature of Benjamin Bomford:

HELEN KENDRICK,
WM. DAVIS.