

(No Model.)

3 Sheets—Sheet 1.

G. Y. SMITH & E. A. CHARLES.
STUMP EXTRACTOR.

No. 349,008.

Patented Sept. 14, 1886.

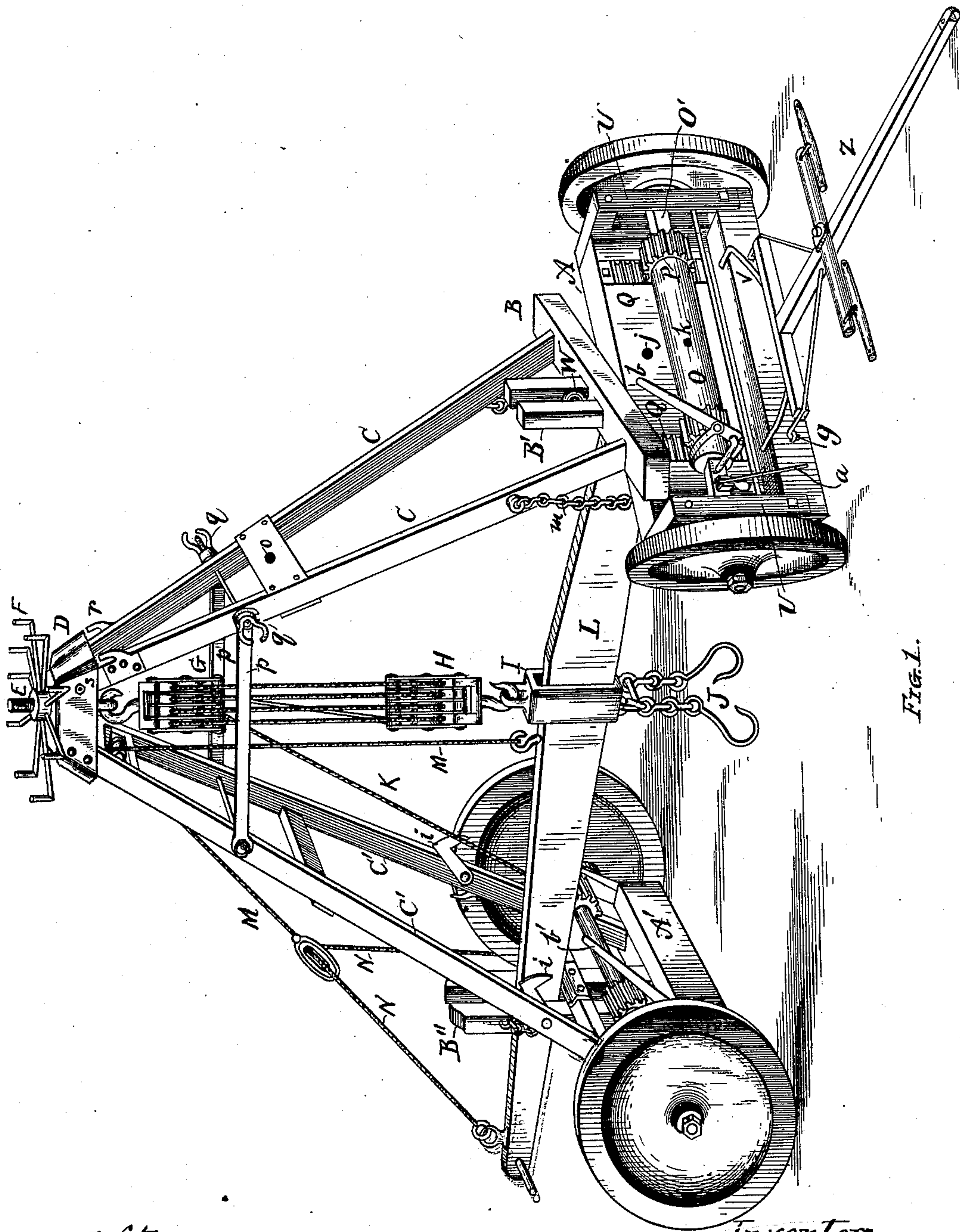


Fig. 1.

Witnesses:
J. B. Halpenny.
Harry T. Jones.

Inventors
George Y. Smith
Edgar A. Charles
by West & Bond Attys

(No Model.)

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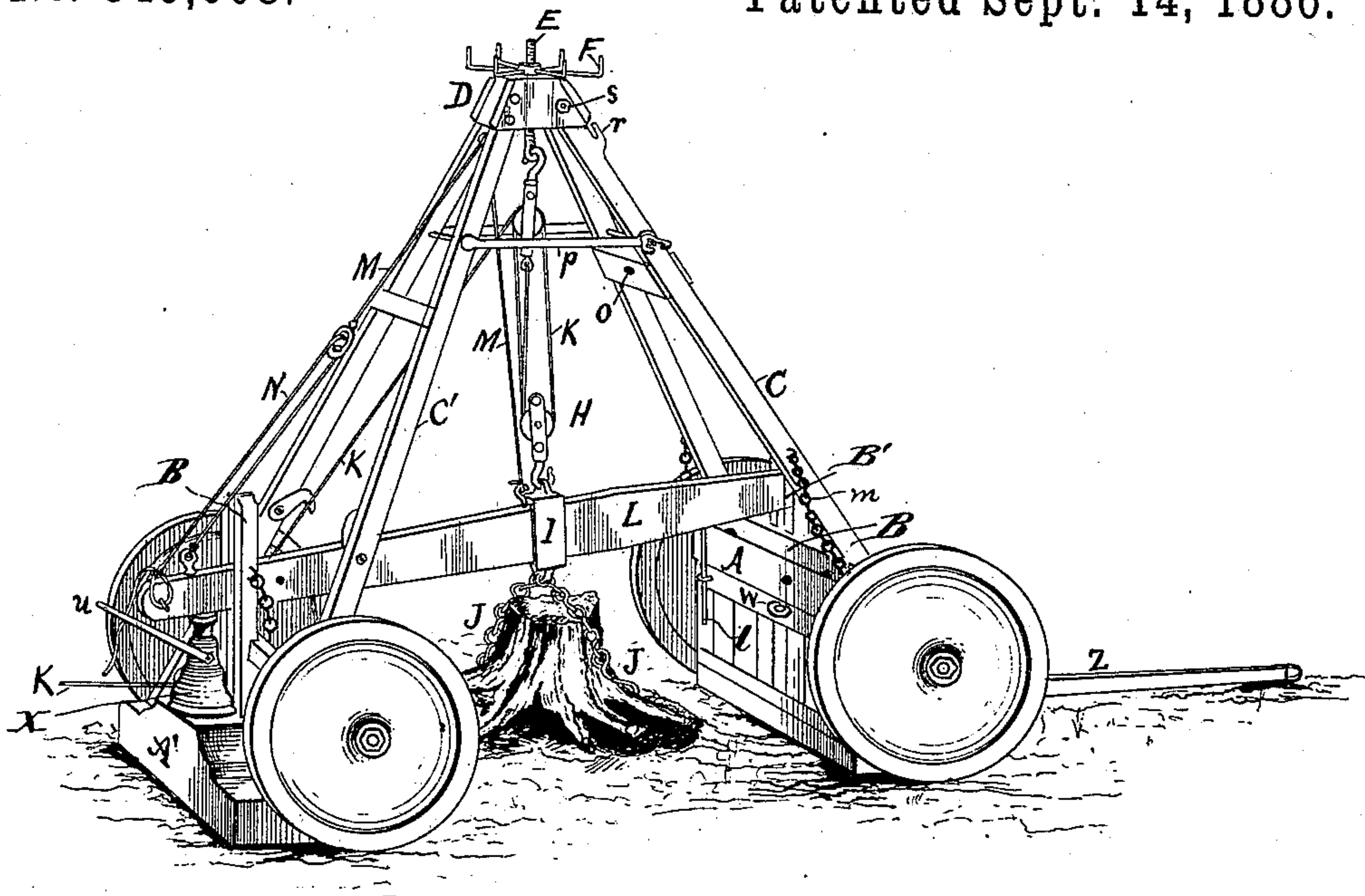


FIG. 2.

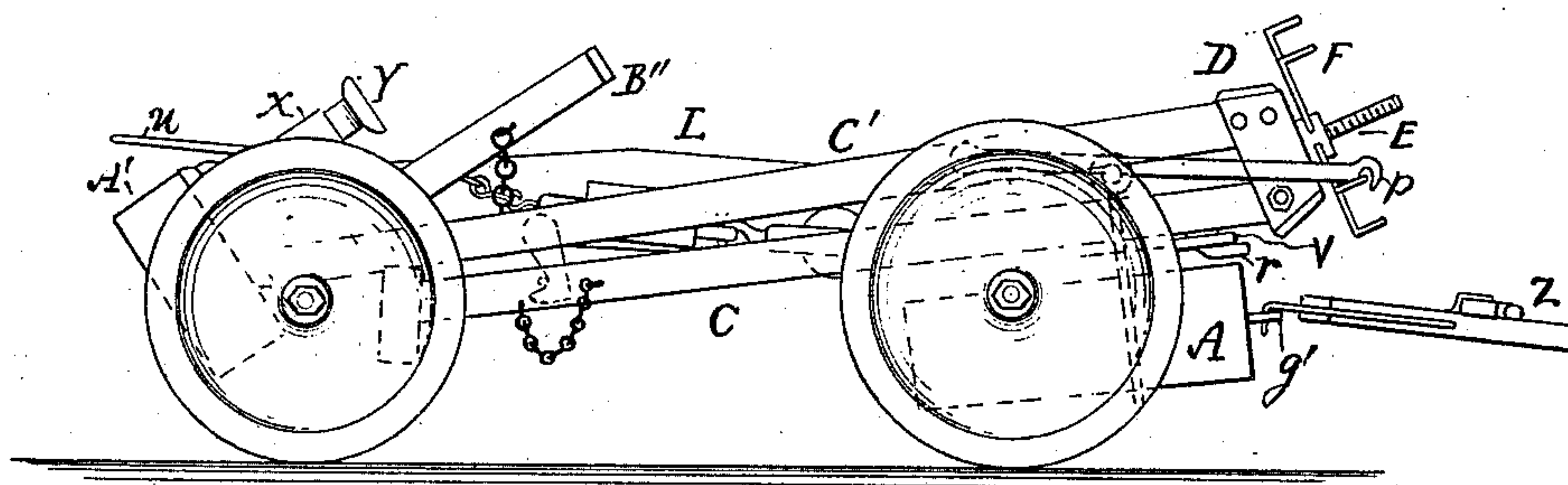


FIG. 3.

Witnesses:
J. B. Halpenny.
Harry S. Jones

Inventors:
George Y. Smith
Edgar A. Charles
by West & Bond attys

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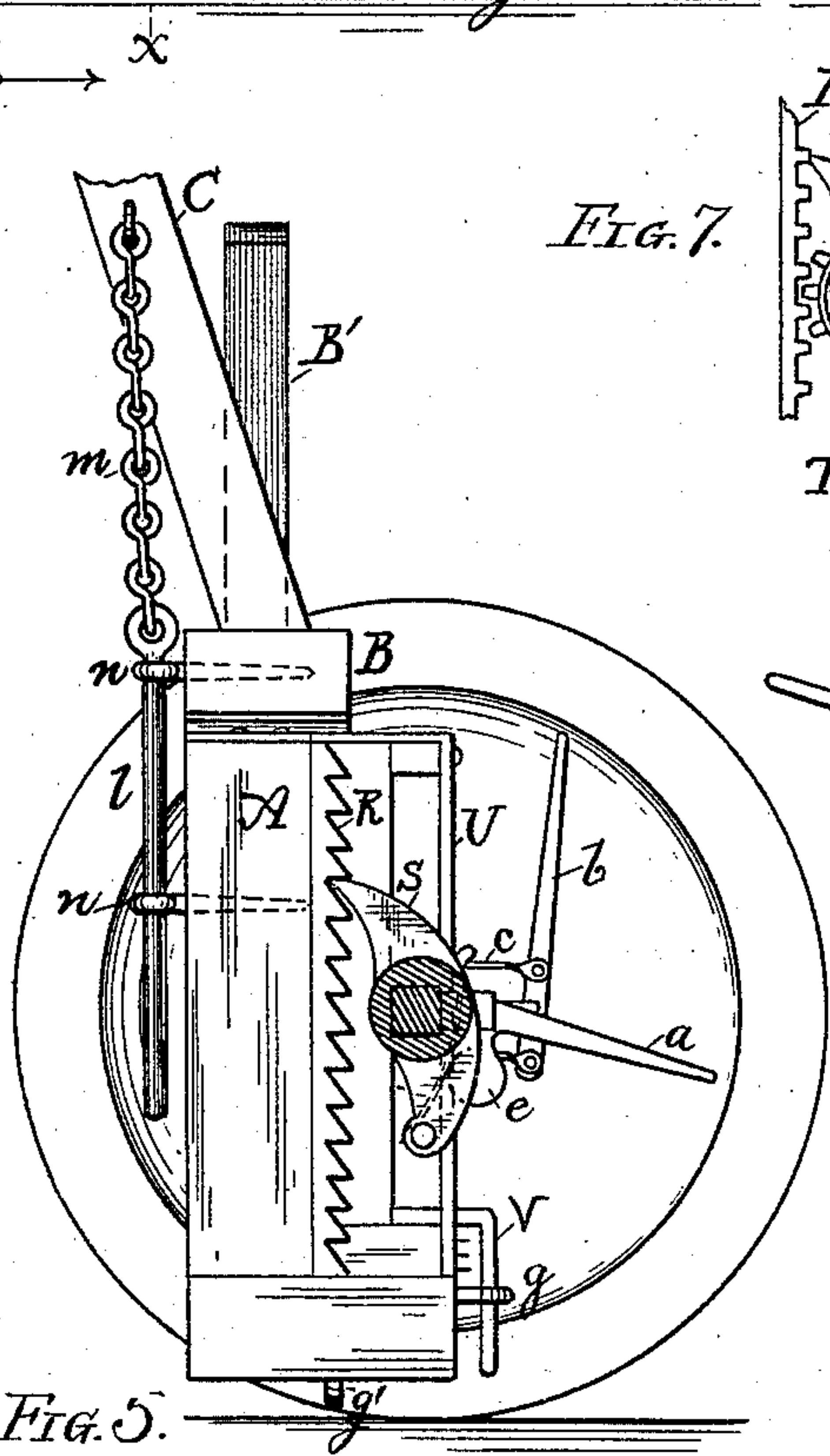
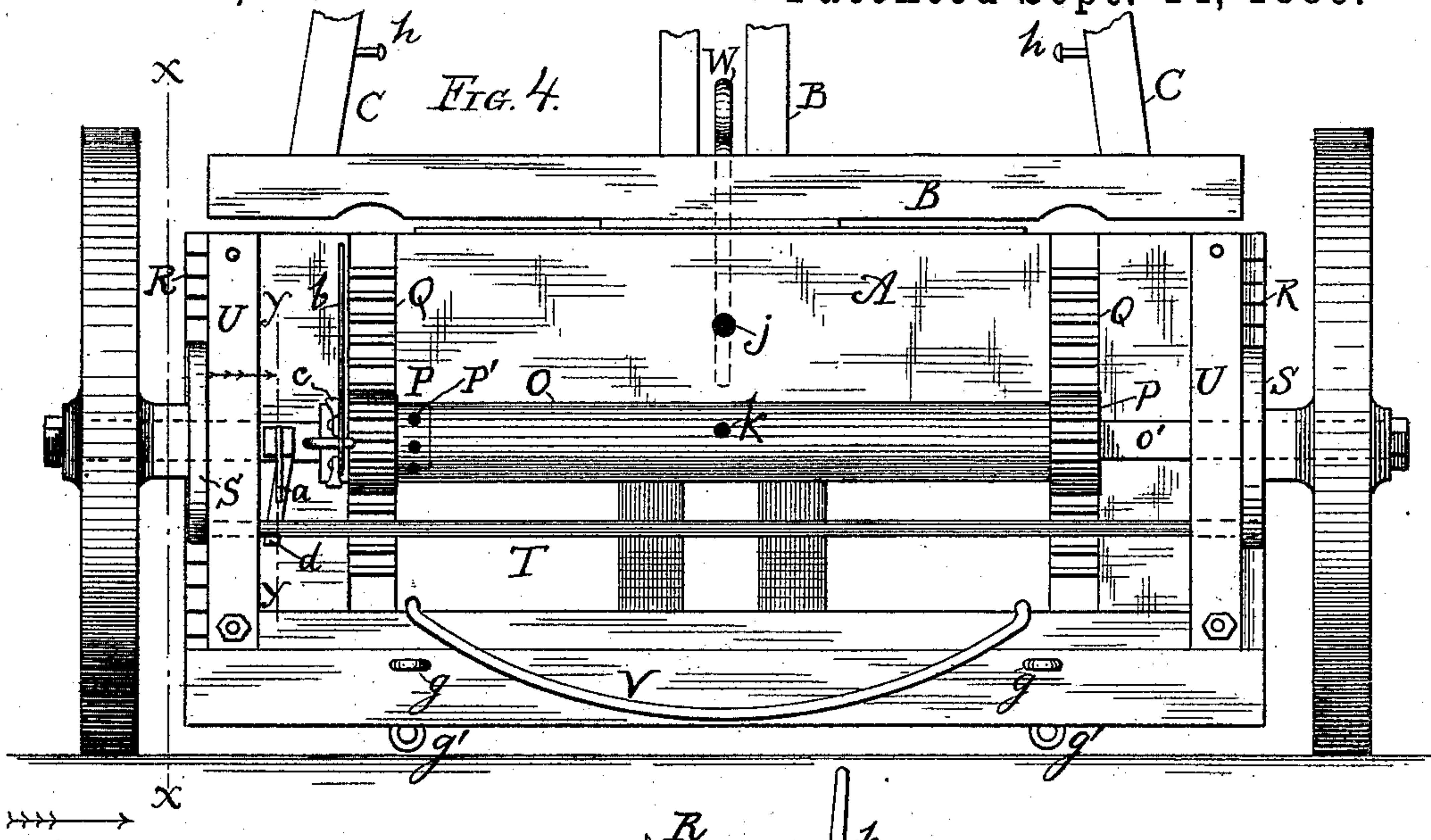


FIG. 5.

Witnesses:

J. B. Halpenny.

Harry T. Jones

FIG. 7.

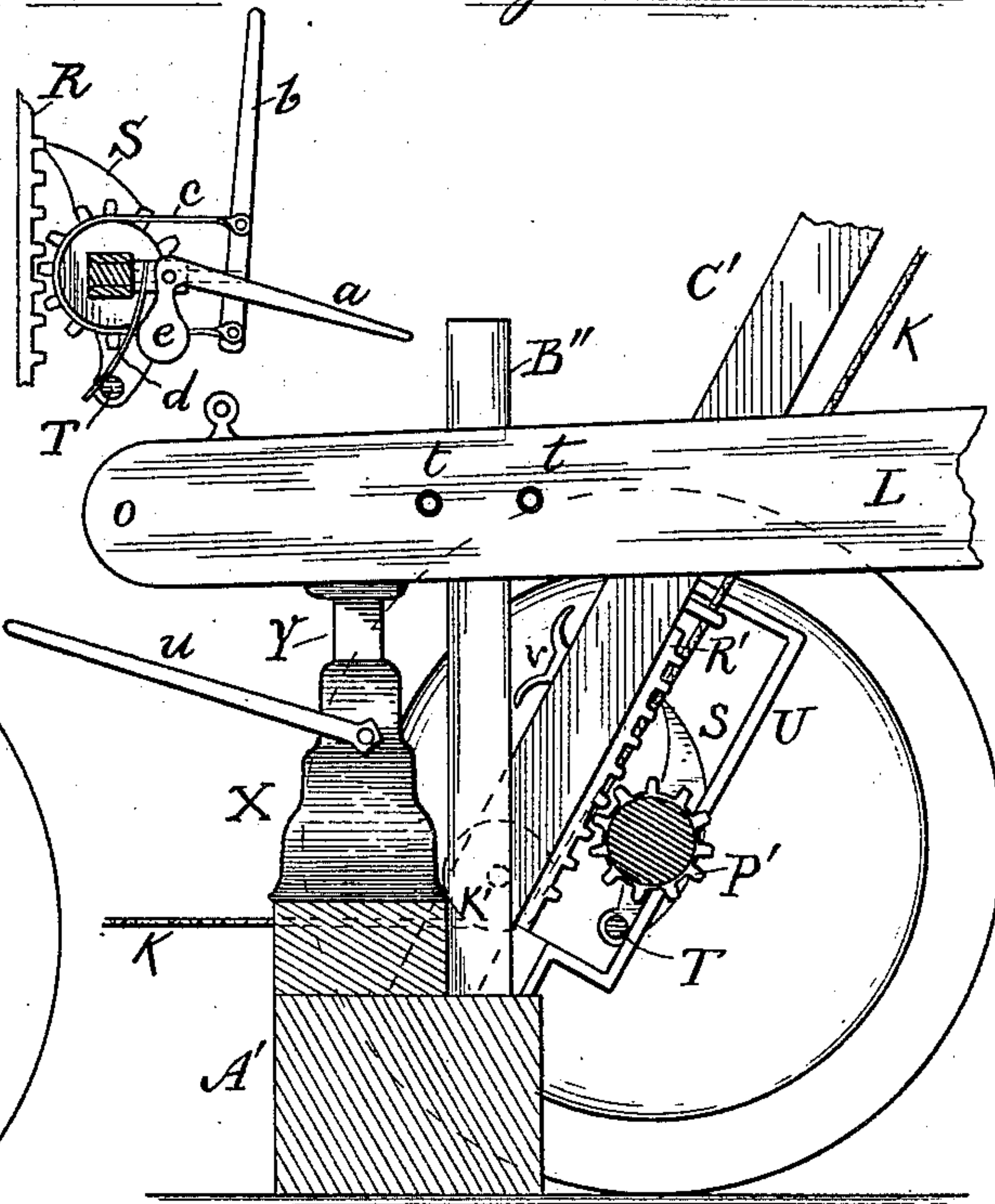


FIG. 6.

Inventors:

George Y. Smith
Edgar A. Charles
by
West & Bond - Attys

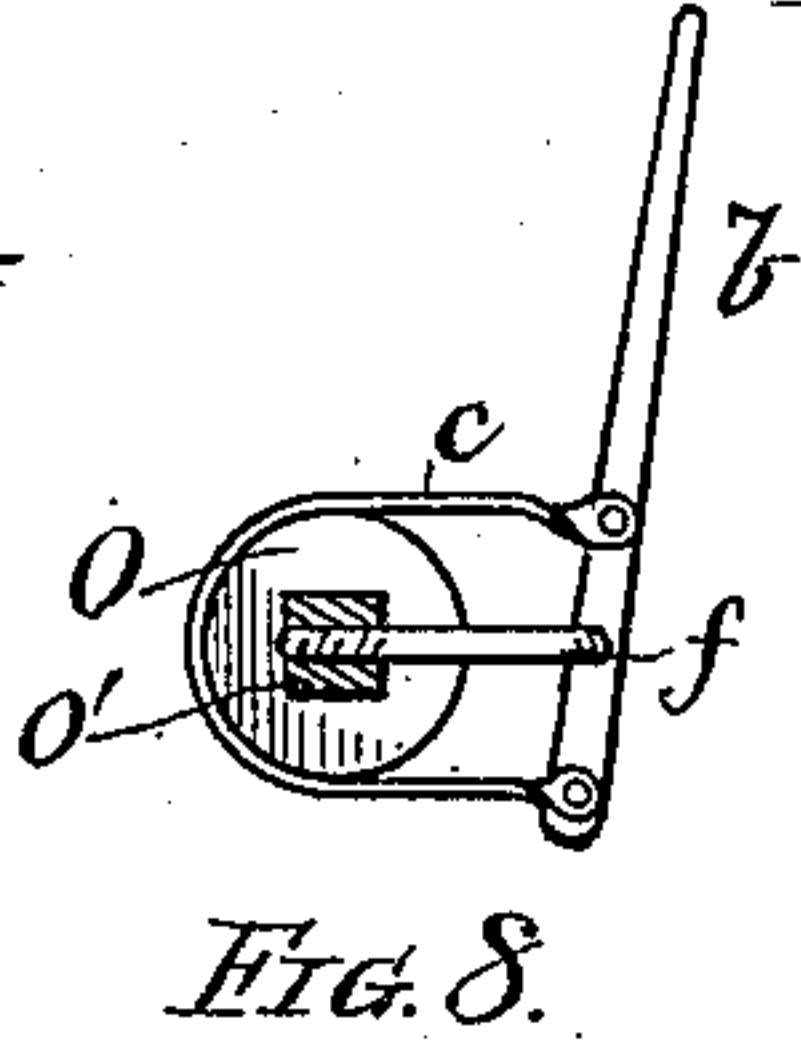


FIG. 8.

UNITED STATES PATENT OFFICE.

GEORGE YOUNG SMITH AND EDGAR A. CHARLES, OF CEDAR RAPIDS, IOWA.

STUMP-EXTRACTOR.

SPECIFICATION forming part of Letters Patent No. 349,008, dated September 14, 1886.

Application filed January 11, 1886. Serial No. 188,185. (No model.)

To all whom it may concern:

Be it known that we, GEORGE YOUNG SMITH and EDGAR A. CHARLES, residing at Cedar Rapids, in the county of Linn and State of Iowa, and citizens of the United States, have invented a new and useful Improvement in Stump-Extractors, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective front view; Fig. 2, a perspective rear view; Fig. 3, a view of the machine folded for traveling; Fig. 4, a front view of the forward support; Fig. 5, a section on line *x x* of Fig. 4; Fig. 6, a similar section of the rear support; Fig. 7, a cross section at line *y y* of Fig. 4; Fig. 8, a detail of the brake.

The object of this invention is to provide a strong and efficient portable machine for pulling or extracting stumps, which shall have sufficient power to pull green stumps without waiting for them to become partially decayed; and its nature consists in the several parts and combinations of parts hereinafter described and claimed as new.

In the drawings, A indicates the front, and A' the rear support; B, the bolster; B' B'', guide-posts; C C', the inclined or pyramidal frame; D, the cap-plate; E, adjusting or lifting screw; F, nut provided with handles for operating the screw E; G H, tackle-blocks; I, lifting-block, through which the main lifting-lever passes; J, grappling-hooks and chain; K, lifting or pulling rope; L, lifting-lever; M, secondary rope for handling the lifting-lever; N, rope for manipulating the rope M; O, roller on the axle-bar O'; P, pinions; P', holes for hand lever or bar; Q R, racks; S, pawls or detents; T, rod connecting the pawls S; U, holding and guide plates for the axles O'; V, sway-bar; W, king-bolt; X Y, hydraulic lifting-jack; Z, draft-pole or tongue; *a*, hand-lever for operating the pawls S; *b b'*, brake-levers; *c*, brake-band; *d*, spring; *e*, a depending portion of the lever *a*, for operating against the rod T; *f*, pivot-support for the brake-lever *b*; *g g'*, eyes for attaching the draft-pole; *h*, projecting pin; *i*, hooks for holding the upper frame together when folded; *j k*, holes for inserting the king-bolt when the front support is turned; *l*, locking-pins; *m*, chains or cords; *n*, eyes used in connection with the locking-pins *l*, to prevent the turning of the front frame

away from the bolster B; *o*, holes in the upper frame for the insertion of the king-bolt when the frame is folded; *p*, braces; *q*, lock-nuts; *r*, hooks which pass under the sway-bar V when the machine is folded; *s*, pivot in the cap D for the section C of the upper frame; *t*, holes through the lever L for the insertion of pins; *u*, pump-handle for operating the hydraulic jack; *v*, belaying-pin; *w*, eye or opening to receive a hook on the front end of the lever L.

The front and rear supports are made of timbers or frame-work sufficiently strong to support the machine in operation. They are most conveniently made in the form shown, which gives them a broad firm base where they rest upon the ground without giving them great weight. They are both connected with the axles O' by means of the end timbers and overlying plates U, which form slots by which the bases or supporting-frames have a movement on the axle, so that they can be raised or lowered. The axles are provided with carrying-wheels, which rotate upon the spindles at the ends, while the axle is flattened or made square where it passes beneath the plates U, so that it does not revolve. The axle is provided with a roller, O, the ends of which are provided with pinions P, which mesh into the racks Q. The weight of the bases is sufficient to drop them from a higher position to a rest upon the ground, while they may be raised by rotating the cylindrical roller or section O by a bar or lever inserted in the holes P'. (Shown at Fig. 4.) When the base A is turned into a nearly horizontal position, it may be moved on the axle by depressing the bar T and pushing it by hand into any desired position.

When the machine is in operation, the bases rest upon the ground and not upon the wheels. When it is desired to move the machine from stump to stump in the field, they are partially raised, as shown in Fig. 4; but when folded for traveling the bases are turned into the position shown in Fig. 3, as will be hereinafter more fully described. Both front and rear bases are raised by substantially the same devices, and therefore a description of one will be sufficient for both. The ends of the base-frames are provided with racks or teeth R, with which the detents or pawls S engage, so that the bases may be held in any desired ele-

vation for field traveling, the elevation being greater or less, according to the roughness of the field. When the machine is in position to have the bases rest upon the ground, the lever *a*, Figs. 5 and 7, is depressed. The pendent portion *c* of this lever comes in contact with the cross rod or bar *T*, depressing the lower ends of the detent and freeing them from the teeth *R*, so that the base will then drop to the ground; but in order to prevent a sudden or injurious dropping, the machine is provided with a brake, *c*, which passes around one end of the axle-roller *O*, and is connected with the hand-lever *h*, which lever is supported upon and pivoted to a bracket, *f*, Fig. 8, which is attached to the axle and carried out sufficiently far for the lower end of the lever to be elevated, and thus shorten the lower end of the band-brake by wrapping it around the roller while the upper end is stretched out, so that any desired tension can be given to this band-brake to let the base down as accurately and easily as desired. The spring *d* presses against the cross-bar *T* and causes the detents *S* to engage with the teeth *R* when the pressure is removed from the lever *a*. As shown, the lever *a* is near one end, or much nearer one detent than the other; but it can be moved over nearer the middle, if desired, by a slight change in the manner of attaching it. By these arrangements the bases are easily raised and lowered, as may be desired when in use. The front base, *A*, is provided with eyes *g*, to which the draft-pole may be attached when the machine is to be moved without folding. When the machine is folded, the base is turned into a nearly horizontal position, and the draft-pole is then attached to the eyes *g'*, as shown in Fig. 3. The elevated part is composed of the frames *C C'*. The front frame, *C*, is attached at its lower end to a bolster, *B*, which bolster is connected for traveling with the base by the king-bolt *W*, as shown in Figs. 1 and 4, and in order to prevent the base from turning in use so as not to give the frame a proper support it is provided with locking-pins *l*, which pass through eyes or eyebolts *n*, one of which is attached to the bolster and one or more of which is attached to the base, as shown in Fig. 5. These pins are connected to the frame by the safety-chains *m*, which prevents them from being mislaid or lost. The front frame, *C*, is pivoted at *s* to the head-block *D*, so that this frame, with the bolster, may be folded back against the rear frame, *C'*, when the machine is folded up. The front frame is provided with a cross-bar, through which there is a hole, *o*, for the king-bolt *W* to pass through when the machine is folded. The base *A* is also provided with a hole, *j*, and the roller *O* with a hole, *k*, which holes *o*, *j*, and *k* are in line when the machine is in the position shown in Fig. 3 and the king-bolt *W* passes through all three of them. Side braces or bars, *p*, are also provided to steady the frame, and they are pivoted at one end to one of the frames and hooked

at the other end onto the other one, where they are locked, or may be locked, by the nuts *q*. These braces are placed sufficiently high to be out of the way in lifting stumps with long tap-roots, and are one of the means used to prevent the frame spreading when in use. The rear frame, *C'*, is connected directly with the rear base without the intervention of a bolster, and with this exception they are substantially alike. The guide-bars *B''* are attached directly to the rear base, while those, *B'*, at the front end, are attached to the bolster. The rear base is also provided with a permanently-attached hydraulic lifting-jack, *N Y*, which is provided with a pump, the handle *u* of which only is shown. This lifting-jack and its pump are or may be of the ordinary construction of such jack. The lifting-lever *L* is a large heavy lever having its vertical dimensions increased near the middle or at the point of strain, and for giving it additional strength its under surface, or both the upper and under surfaces, may be provided with iron bars in the usual manner. The front end of the lever is provided with a hook which, in the position shown in Fig. 1, engages with the eye *w*. (Shown in Fig. 2.) Its rear end is provided with holes *t*, through which a pin is or may be placed in rear of the support-posts *B''*, and thus provide an additional security against the spreading of the machine. This lever passes through the block *I*, which block is provided at its lower end with the grappling-hooks *J*, which are of suitable size and strength to grapple with the main roots of a stump. If there are no prominent roots, holes may be bored in the stump and iron pins inserted for the purpose of properly attaching these hooks. The block *I* at its upper end is connected with the compound pulley or sheave *H*, which is connected by the rope *K* with an upper and similar one, *G*, which is supported upon the head-block *D* by means of the screw *E* and nut *F*. The rope *K*, which passes through these compound pulleys or sheaves, passes down to the rear base and around a pulley or roller, *K'*, (shown in dotted lines in Fig. 6,) and then off in a horizontal direction, so that a horse or the team transporting the machine may be used for pulling upon it. As the lever *L* by reason of its weight is difficult to handle, it is provided with a rope, *M*, which is attached to it, as shown in Fig. 1. The outer end of this rope is provided with a single pulley or sheave, through which the rope *N* passes, and by pulling upon this rope the lever *L* may be suspended, and when so suspended may be easily moved; and it may also be withdrawn from the block *I*, the opening through said block being large enough to permit of this operation, and the rope *M* being long enough to produce a sufficient swing to withdraw it. When it is desired to hold the lever in any desired position, the free end of the rope *N* is wound upon the belaying-pin *v*, (shown in Fig. 6,) and whenever it is desired to lock or hold the rope *K* its free end may be belayed upon the pin at the rear end of the lever

L, and when so locked or fastened any slack in the rope K may be taken up upon the screw E by revolving the nut F, the screw E being sufficiently long for this purpose.

5 In the operation of pulling stumps, the first starting of the stump is the most difficult part of the operation, and requires the greatest application of power. When the hooks are strained by the application of power to the rope K, the rope is then fastened, and the nut F turned so as to strain the hooks as far as possible. The hydraulic lifting-jack is then applied to the lever L, which starts the stump from its place. As the movement of the pump is limited, suitable keys or wedges are applied under the lever at the start, and if the limit of the pump is not sufficient to loosen the stump so that it can be further operated by the compound pulleys, the front end of the lever L is taken out of the eye *w* and laid upon the bolster, as shown in Fig. 2, in which position it may be blocked up, either upon the bolster or upon the lifting-jack, which has been previously let down. In this position a second operation of the lifting-jack is given to the lever, which will be sufficient to loosen the stump. The lever is then withdrawn, so as to make sufficient room for lifting the stump clear of the ground, in which position it may be carried to any desired place upon the machine by partially lifting the bases from the ground, as hereinbefore described, or it may be dropped, and when the bases are elevated the machine may be drawn and set for another stump without folding the upper frame; and in traveling, in order to prevent a spreading strain upon the upper frame, the lever L is hooked into the eye *w* and pins inserted in the holes *t*, when the lever will operate as a reach for the two base-trucks.

When the machine is to be folded for traveling, as shown in Fig. 3, the king-bolt is withdrawn and the braces *p* are unhooked. The lever L is also withdrawn, and the front section of the frame is folded back against the rear section, which is then lowered upon the front base in the position shown in said Fig. 3. The two frames are held together by the hooks *i* and the pins *h*, the pins being shown in Fig. 4 and the hooks and pins by dotted lines in Fig. 3. The turning of the frame tips the rear base, so that it is freed from the ground and carried upon the supporting-wheels. The front base is tipped into a horizontal position and moved so that the hole *k* will be in line or register with the hole *j*. It is then pushed back under the machine until the hooks *r* pass beneath the sway-bar V, in which position the hole *o* will also register with the holes *j k*, when the king-bolt is passed through them, and the machine is ready for transportation, the lever L being laid on top in any convenient manner, and the draft-pole being connected with the hooks or eyes *g'*, the team is easily attached to it. The movement of the base A without moving the wheels will of itself bring the holes *j k* in line.

It will be understood that after the stump is loosened from its position the lever L is withdrawn. A further lifting of the stump is had by pulling upon the rope K without the aid of the lever. By this construction and arrangement of the parts a strong and powerful machine is provided, which can be used for pulling green stumps, as well as those partly decayed, and it may also be used for lifting stones too heavy to be otherwise handled; and by placing the bases upon movable planks or otherwise, so that a sidewise movement can be given, it may be used for laying heavy stones in farm or other walls capable of being spanned by the machine; and it may also be used for transporting stumps or stones after they have been lifted from one position to another, if desired, by partly elevating the bases, and as the block I is movable along the length of the lever L it may be moved into different positions, so as to give said lever more or less leverage, as may be required.

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

1. The combination of the base-frame, means for raising and lowering the said frame, a hydraulic lifting-jack carried by the frame and moving therewith, and the lever to be acted on by the jack, substantially as described.

2. The combination of the base-frame, means for raising and lowering said frame, a hydraulic lifting-jack carried by the frame and moving therewith, the lever to be acted on by the jack, the block through which the lever passes, and the grappling-hooks connected with the block, substantially as described.

3. The combination of the hydraulic jack with the lever L, block I, grappling-hooks J, tackle G H, and cable K, substantially as set forth.

4. The combination, with the frame C C', of the cap-plate D, the screw passing through the plate, the rotary nut F, the upper and lower tackle-blocks, G H, the cable K, the block I, suspended from the lower tackle-block, the lever L, passing through the suspended block, and the grappling-hooks connected with the latter, substantially as described.

5. The combination of the lever L with the hydraulic jack X Y, blocks and tackle G H, cable K, block I, and screw E, substantially as set forth.

6. The combination of the adjustable bases A A' with the lever L and hydraulic jack X Y, substantially as specified.

7. The combination of the wheeled axle O', the rotating sleeve O on the axle, the base vertically movable on and guided by the axle, the racks Q on said base, and the pinions P on the sleeve for raising and lowering the base on the axle, substantially as described.

8. The combination of the wheeled axle, the vertically-movable base having notches or racks R, rack-and-pinion mechanism for raising and lowering the base, the detents S, adapted to the said notches or racks, and the

rocking rod T, connecting the detents, substantially as described.

9. The combination of the wheeled axle, the vertically-movable base having notches or racks R, rack-and-pinion mechanism for raising and lowering the base, the detents S, adapted to said notches or racks, the rocking rod T, connecting the detents, and the lever a, having the pendent arm c to act on the rod, substantially as described.

10. The combination of the lever a, having the pendent portion c, with the spring d, the rod T, detents S, and notches or racks R, substantially as specified.

11. The combination of the plates U with the base A, forming axle-slots, whereby the base is permitted to rest upon the ground when the device is in operation, to relieve the wheels from all weight or strain, substantially as described.

12. The combination of the pins l and eyes n with the base A and bolster B, substantially as and for the purpose specified.

13. The combination of the wheeled axle, base A', arranged on the axle and adapted to turn to an approximately horizontal position, the rear frame, C', the folding front frame, C, and the cap D, connecting the upper ends of the two frames, and to which the folding frame is pivoted, substantially as described.

14. The combination, with the rear frame, C', the head-block D, the folding front frame, C, pivoted to the head-block, the screw E, the rotating nut, the tackle-blocks G II, and cable K, substantially as described.

15. The combination of the front and rear frames, C C', the head-block D, connecting the upper ends thereof, the screw E, passing through the head-block, the upper tackle-block, G, suspended from the screw, the lower tackle-block, H, the connecting-cable K, and the grappling-hooks J, substantially as described.

16. The combination of the head-block D, frame C, bolster B, bases A A', and guides B'' with the lever L, having the holes t, whereby the lever may be made to operate as a reach and to prevent spreading, substantially as described.

17. The combination of the frame C', folding frame C, provided with the hole o, in combination with the sleeve O, having the hole k, and the base A, having the hole j, with the king-bolt W, substantially as specified.

18. The combination of the frame C' and hinged frame C, having the hooks or projections r, with the guide or sway bar V, substantially as specified.

19. The combination of the frame C' and hinged frame C with the pins h and hooks i, substantially as set forth.

20. The combination of the frames C C', the tackle mechanism suspended from the upper ends of the frame, the lever L, the block I on the lever, connected with the tackle mechanism, and the cables M and N, connected, respectively, with the lever for manipulating the same, substantially as described.

21. The combination, with the wheeled axle, the frame, the tackle-blocks G and H, suspended from the frame, and the cable K, of the lever L and the block I, connected with the lower tackle-block and mounted on the lever, substantially as described.

22. The combination and arrangement of the bases A A', frames C C', head-block D, and screw E with the lever L, movable block I, pulleys G II, rope K, and roller K', whereby horse or other power may be applied to aid in or complete the lifting, substantially as set forth.

GEORGE YOUNG SMITH.
EDGAR A. CHARLES.

Witnesses:

ALLAN McDUFF,
WM. BEYER.