

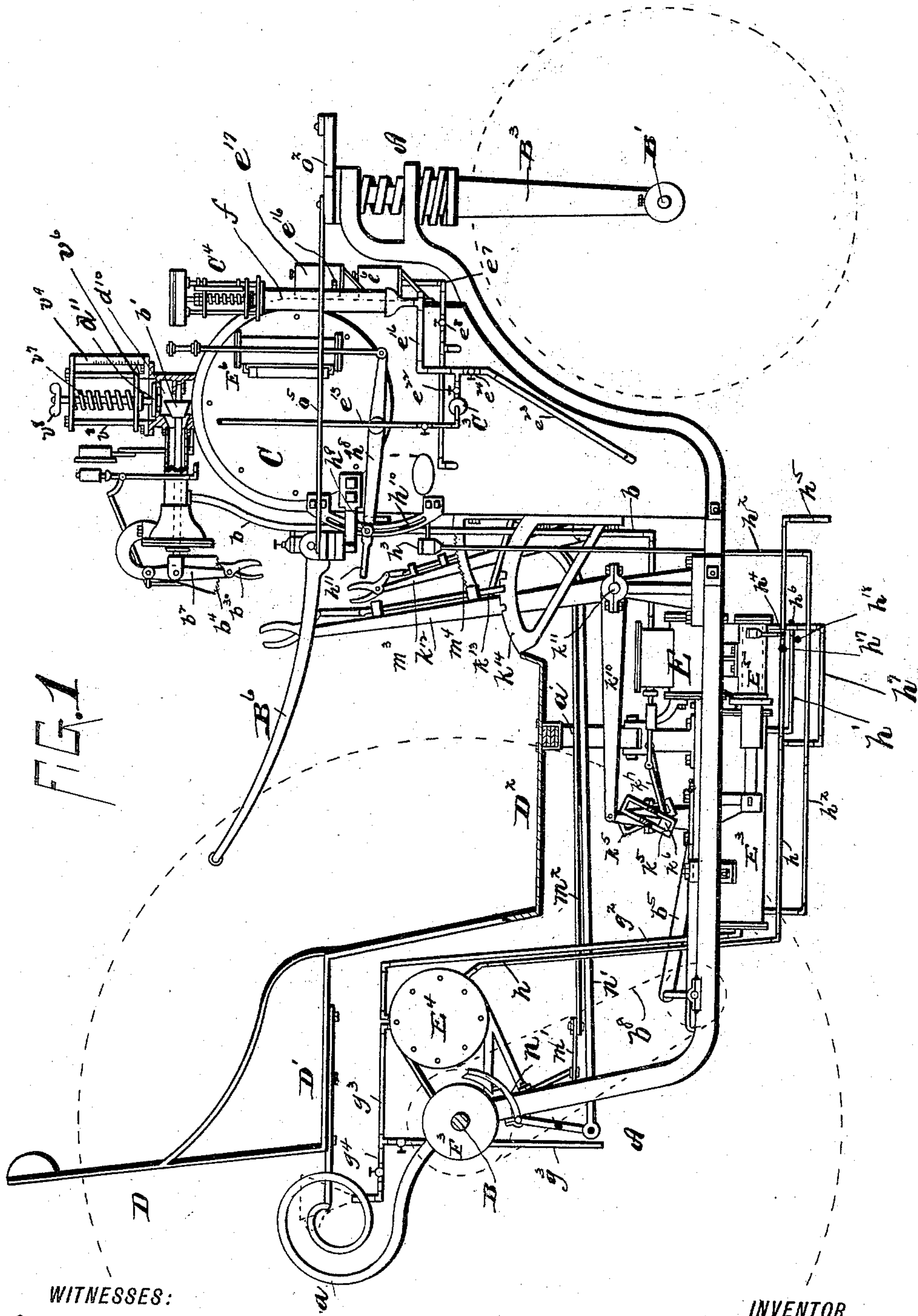
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8 Sheets—Sheet 1.

G. J. SAURBREY.
STEAM PROPELLED VEHICLE.

No. 488,224.

Patented Dec. 20, 1892.



WITNESSES:

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Isol. Apple.

INVENTOR

George J. Sawbrey

BY *State of Indiana*

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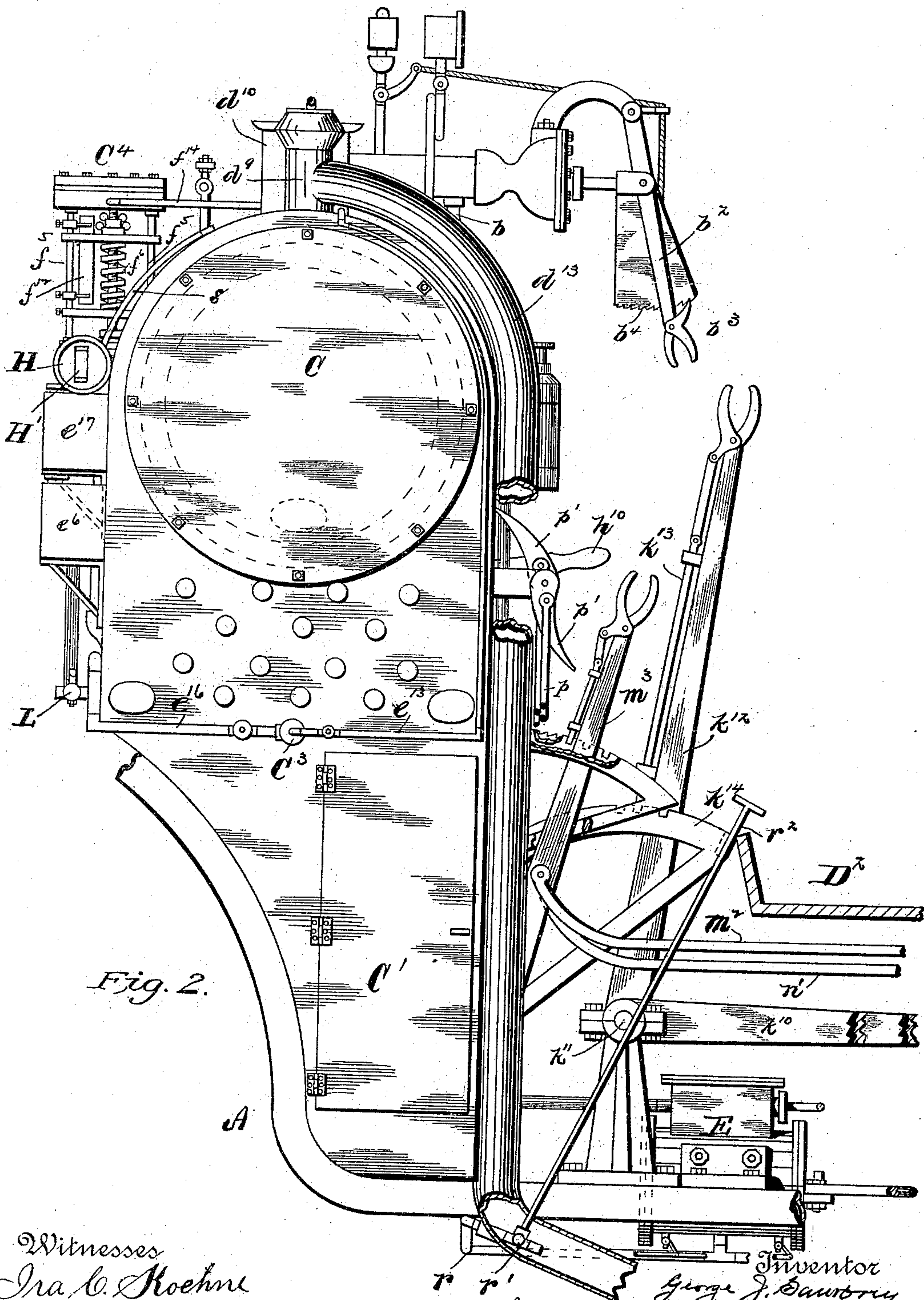
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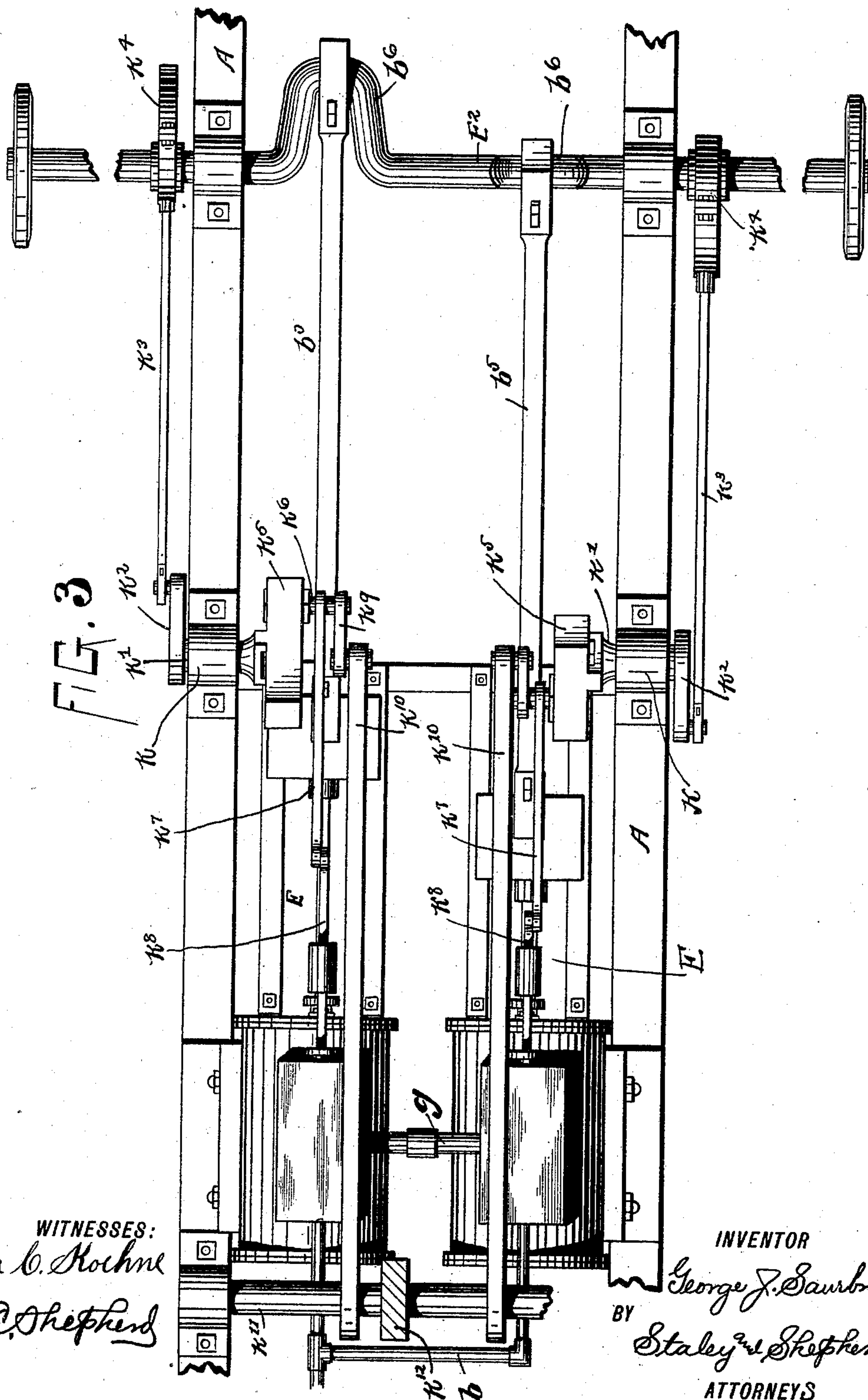
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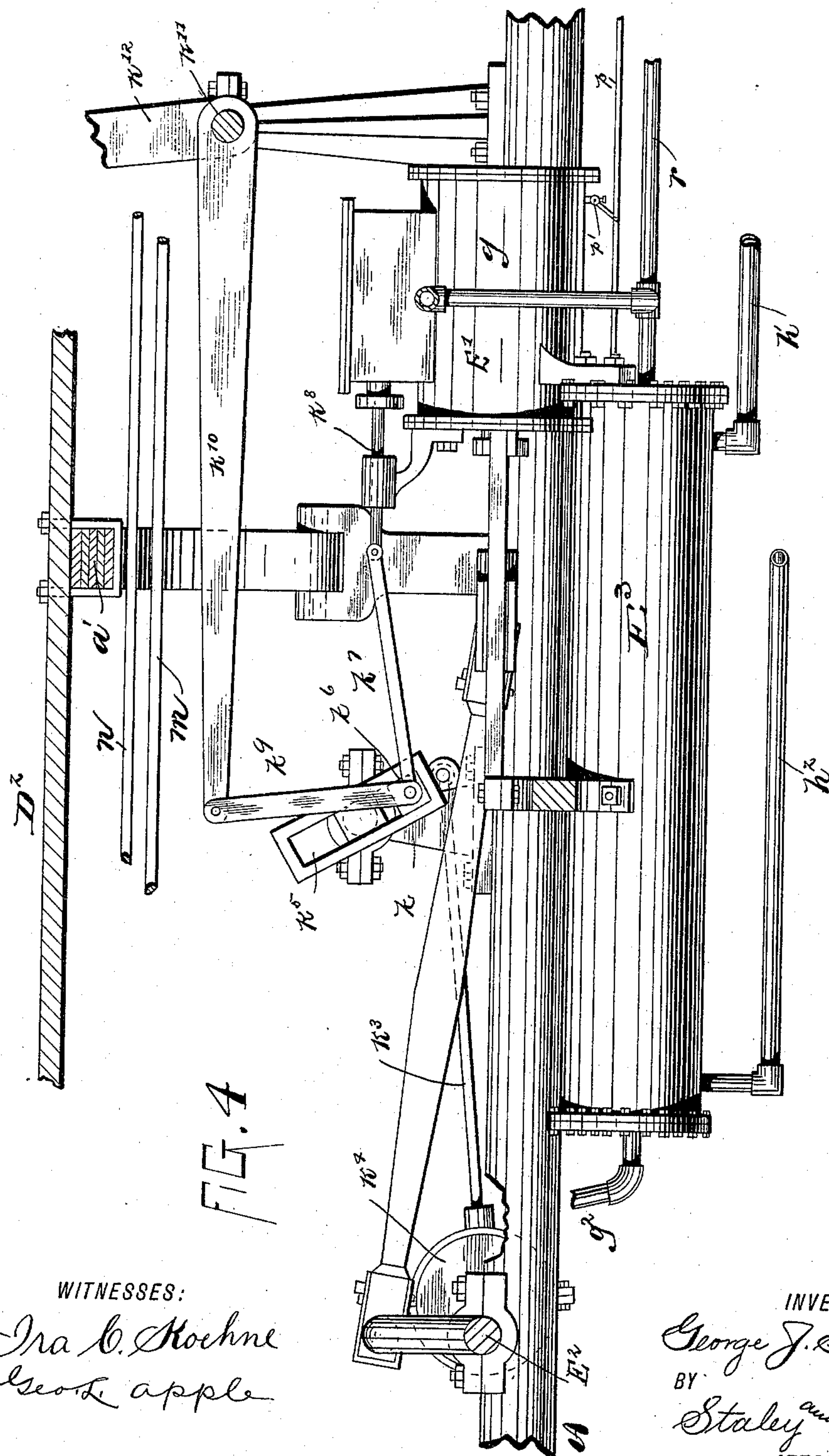
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WITNESSES:

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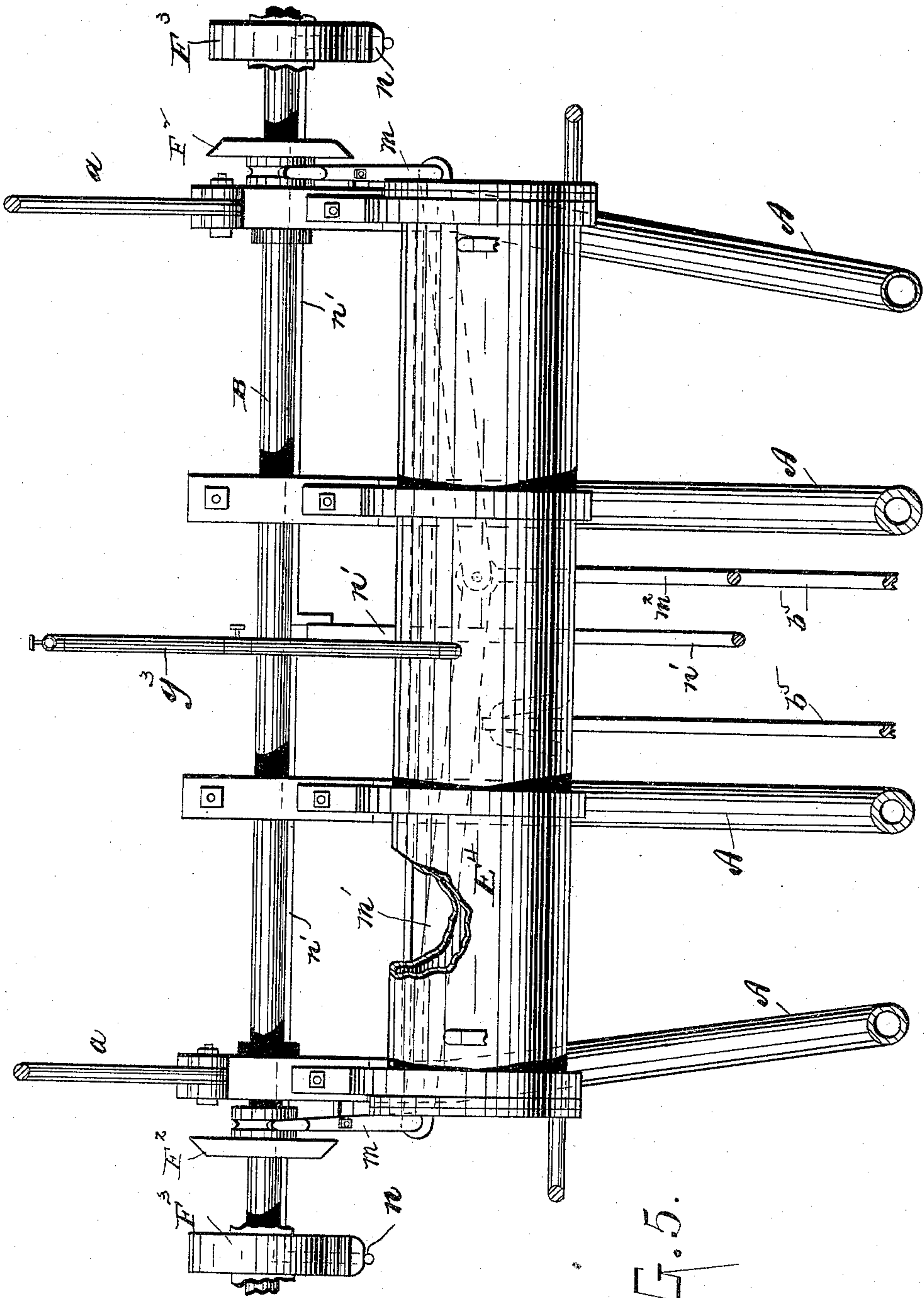
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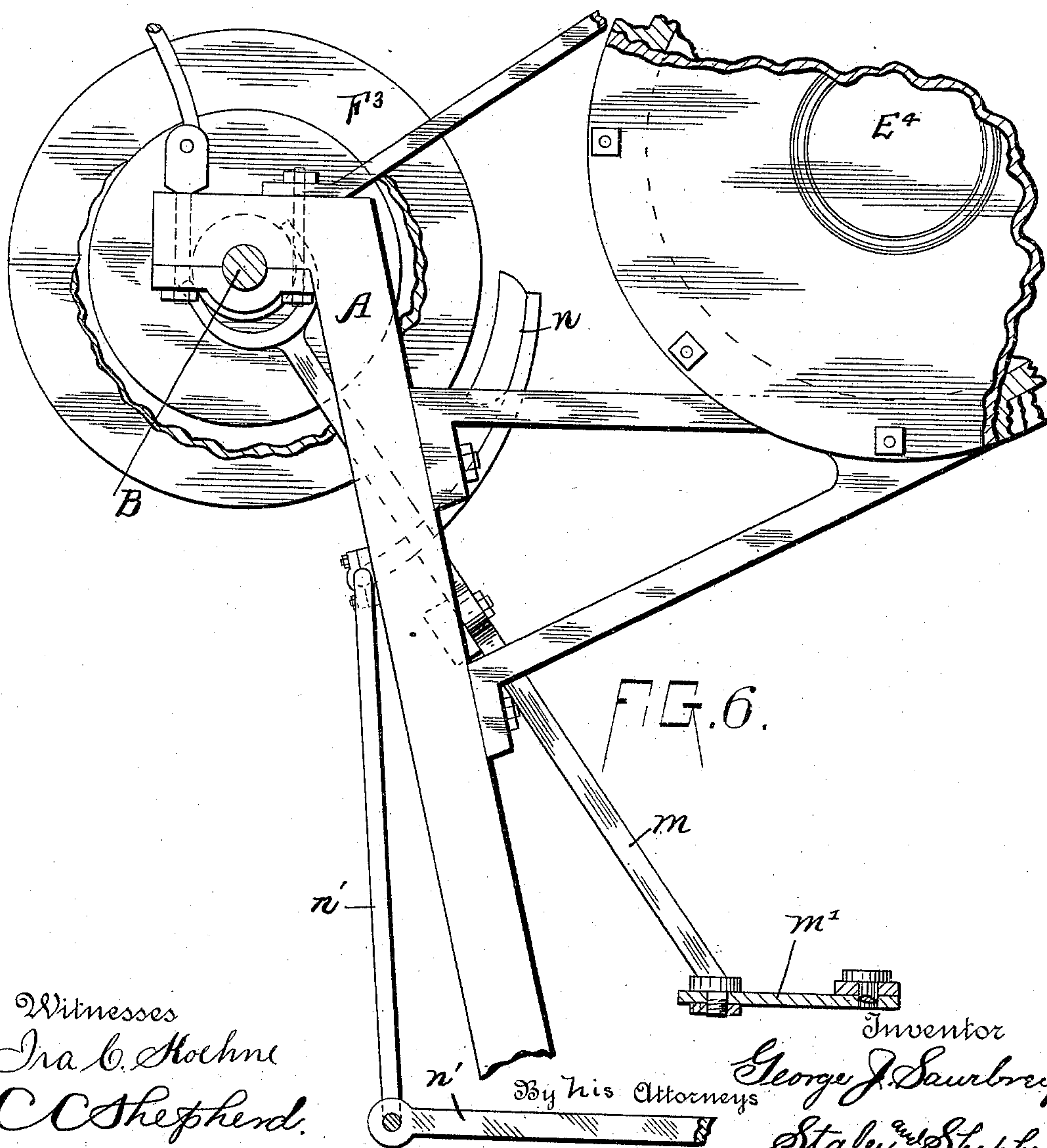
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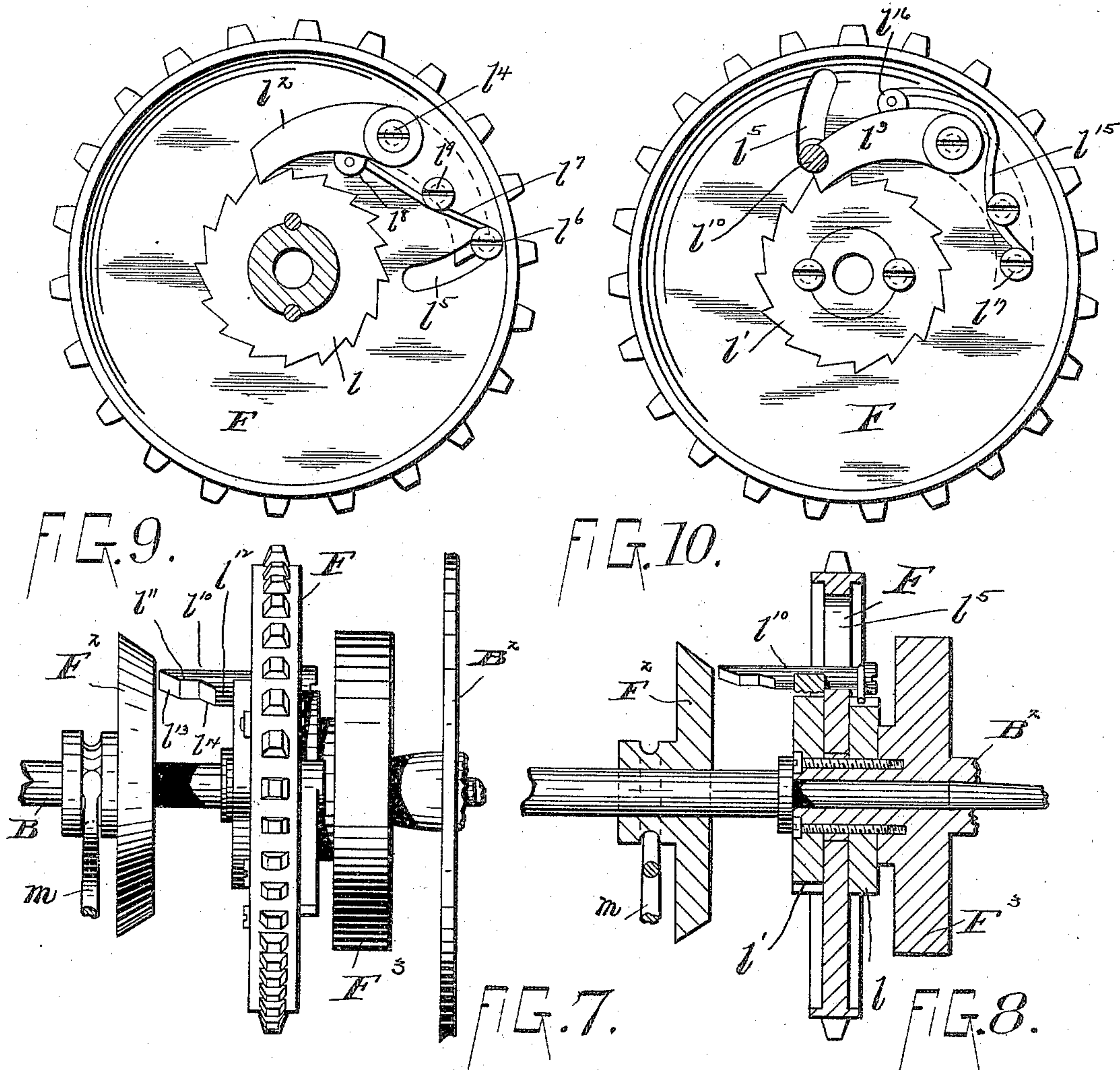
(No Model.)

8 Sheets—Sheet 7.

G. J. SAURBREY.
STEAM PROPELLED VEHICLE.

No. 488,224.

Patented Dec. 20, 1892.



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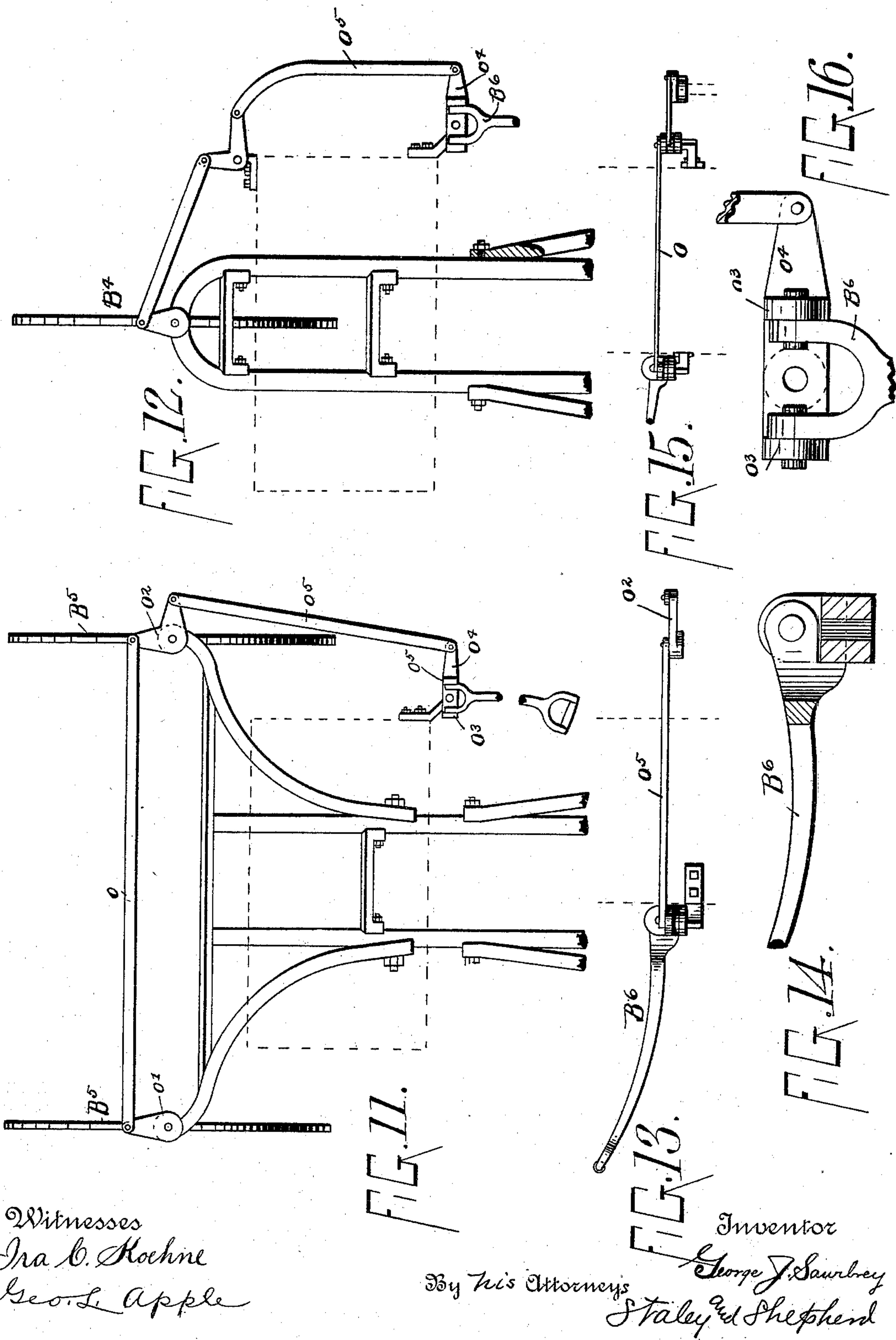
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8 Sheets—Sheet 8.

G. J. SAURBREY.
STEAM PROPELLED VEHICLE.

No. 488,224.

Patented Dec. 20, 1892.



UNITED STATES PATENT OFFICE.

GEORGE J. SAURBREY, OF COLUMBUS, OHIO.

STEAM-PROPELLED VEHICLE.

SPECIFICATION forming part of Letters Patent No. 488,224, dated December 20, 1892.

Application filed May 21, 1891. Serial No. 393,659. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. SAURBREY, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Steam-Propelled Vehicles, of which the following is a specification.

My invention relates to improvements in steam propelled vehicles and the object of my invention is to provide a vehicle of this character with mechanism carried by said vehicle, which shall furnish the means of producing the motive power, with suitable devices for controlling the same so that the vehicle may be propelled either forward or backward; all of the operating parts and the controlling devices being so arranged that the operator has complete control of all of said parts at all times. I attain these objects by the constructions shown in the accompanying drawings in which

Figure 1 is a side elevation, partly in section, of my improved vehicle; some of the parts being omitted for perspicuity. Fig. 2 is a partial side elevation of the front portion of the same taken from the opposite side of Fig. 1. Fig. 3 is a plan view of the propelling engines. Fig. 4 is a partial side elevation of the same showing the arrangement of the shifting mechanism for changing the direction of the engines. Fig. 5 is an elevation of the rear supporting axle, and a portion of the main frame. Fig. 6 is a partial side elevation of the same. Figs. 7 to 10, inclusive, are detailed views of the shifting or reversing mechanism and the compensating gear to permit the driving-wheels to operate independently in changing direction when traveling either backward or forward. Figs. 11 to 16, inclusive, are detailed views of the guiding-mechanism showing the same arranged for either one or two steering-wheels, as desired.

Like parts are represented by similar letters of reference in the several views.

In the said drawings, A A represent the main frame, B, the main axle, and B', the axle or spindle for the front carrying-wheels; the wheels being represented in dotted lines; two wheels being preferably used at the rear and connected to the main axle in the manner hereinafter more fully specified, so as to receive the motion imparted to said axle from the pro-

PELLING engines, as will hereinafter more fully appear. One or more steering-wheels may be used in front; the description and drawings being especially adapted to a three wheeled vehicle with one front or steering-wheel.

C represents the boiler and C', the fire-box.

Arranged above the main frame and supported therefrom, preferably by suitable spring a a', is an auxiliary frame D D, forming the seat D', and the foot-board D².

The propelling mechanism consists preferably of two engines E and E', arranged side by side in the main frame A A, immediately below the foot-board D², and supplied with steam from the boiler through a suitable connecting-pipe b, controlled by a throttle-valve b', operated by a pivoted hand-lever b², preferably provided with a thumb-latch b³, engaging in a notched segment b⁴. The engines E and E', may be of any suitable and desirable constructions. I have illustrated two slide valve engines, each connected directly by a suitable pitman rod b⁵, to the engine-shaft E², having quartering-cranks b⁶ b⁷, as shown in Fig. 3. The power to drive the carrying-wheels is transmitted from the engine-shaft E², preferably through the medium of suitable sprocket-chains, as illustrated at b⁸, in dotted lines in Fig. 1; said sprocket-chains being adapted to engage with sprocket-wheels F, on the main axle B, from which the motion is imparted to the carrying or driving-wheels in the manner hereinafter more fully specified.

The boiler C, is of the sectional type and consists preferably of a plain cylindrical shell d, having arranged therein a suitable number of tubes or smoke-flues d', extending through the same.

Located at the bottom of the fire-box C', below the water-tubes d', I place an oil-lamp C², consisting of a series of burners e, arranged in the usual manner with wick tubes and wicks which extend into a common reservoir e'.

As beforestated, the engines are preferably of the common slide valve type, means being provided for changing the direction of the engines by changing the throw of the valve. This I preferably accomplish as follows:—Supported in suitable bearings k k, on the main frame, are rock-shafts k', each provided with a crank k², connected by a suitable con-

necting-rod k^3 , to an eccentric k^4 , on the engine crank-shaft. Each of the rock-shafts k^2 , carries on its inner end an open slotted frame k^5 , adapted to oscillate at each revolution of the crank-shaft. Located in each of these oscillating frames and adapted to slide therein, is a crank-pin k^6 , to which is connected by a suitable connecting-rod k^7 , a valve-stem k^8 , of each engine slide valve. Each of the wrists k^6 , is connected by a link k^9 , to an extended arm k^{10} , secured to a rock-shaft k^{11} , journaled in the main frame A A. To this rock-shaft a lever k^{12} , is secured; the other end of which is projected upwardly in front of the foot-board; said lever being provided with a suitable latch k^{13} , adapted to engage in a notched segment k^{14} , on the front of the fire-box C'. Three notches are preferably provided in said segment adapted to hold the lever in three different positions. A movement of said lever produces a corresponding movement of the wrist-pin k^6 , in the open slotted oscillating frame k^5 . When the lever is in the first notch the wrists are at the bottom of the respective frames and the valves are in position to move the engines in a forward direction. When located in the second notch the wrists are located at the center of oscillation of said frames and the valves therefore will be centrally located over the ports so as to exclude steam from either cylinder. When in the third notch the wrists are at the tops of the respective frames and the slide valves are in position to run the engines in a backward direction; means being thus furnished by which the engines may be readily reversed or placed on the dead center, as desired. The wrist k^6 , is formed square at its inner end and adapted to fit snugly within the slotted frame k^5 , so as to move in said frame. The outer portion is formed to fit the connecting-rod k^7 , and permit said rod to oscillate thereon. A pivoted connection is also formed between the connecting-rod k^7 , and the valve-stem k^8 , to permit the said connecting-rod to change direction to compensate for the oscillation of the slotted frame and permit the shifting of the wrist from one end of said frame to the other.

To provide for an independent movement of the carrying and driving-wheels in changing direction, which will permit one wheel to travel faster than the other when necessary, in turning corners, or when one wheel has to travel over the arc of a circle greater than the other, and also to provide for reversing the engines and at the same time reversing the direction of the carrying-wheels, and further to provide for disconnecting the engines entirely from said carrying or driving-wheels, I employ a novel arrangement of compensating and connecting gear, shown in detail in Figs. 7 and 10, inclusive, and which is described as follows:— The sprocket-wheels F, which are connected directly to the engine-shafts by suitable chains, as before described, are journaled loosely on the extended hubs of the respective carrying-wheels B², which wheels

are journaled loosely on the main axle B, and each have secured rigidly thereto on opposite sides of the sprocket-wheels F, ratchet-wheels l and l' , the teeth of which are arranged in opposite directions. Pivoted pawls l^2 l^3 , attached to opposite sides of the sprocket-wheels F, and extending in opposite directions from the pivotal center l^4 , are adapted to engage alternately with the respective ratchet-wheels l l' , and thus propel the carrying-wheels in either direction, depending upon which pawl and ratchet are in engagement, and permit the wheels to turn freely in the opposite direction. The respective pawls l^2 l^3 , are connected together so as to be moved simultaneously; one pawl being thrown out of engagement as the other pawl is thrown into engagement; the connection being formed through a curved slotted opening l^5 , through which extends a stud or projection l^6 , on one of the pawls, which is connected by a resilient or yielding connecting rod l^7 , to a lug or ear l^8 , on the other pawl; a stop-pin or stud l^9 , being located adjacent to the yielding connection l^7 , and adapted to contact therewith in the manner and for the purpose hereinafter more fully specified. Projecting laterally on the pawl l^3 , is an operating finger l^{10} , the outer end of which is provided with two bearing-faces l^{11} l^{12} , arranged at different distances from the center of revolution of the ratchet-wheel, and each having a beveled approach l^{13} l^{14} . Located on the axle B, adjacent to the sprocket-wheel F, and adapted to be moved laterally thereon, is a beveled-faced operating wheel or disk F², the outer periphery of which is adapted, as the disk is moved laterally, to come in contact with the respective beveled approaches l^{13} l^{14} , and thus move the respective pawls to and from the respective ratchet-wheels and hold the same in different positions of adjustment as the outer peripheries of said disk rest in contact with the respective bearing-faces l^{11} l^{12} , of the projecting finger.

Means are provided for shifting the disk-wheel F², for each driving device, through the medium of pivoted shifting levers m , bifurcated at one end and adapted to engage in the curved hub of the disk-wheel F², in a well known manner, and each connected at its other end by a link connection m' , to a connecting-rod m^2 , which extends forwardly and is pivoted to an operating lever m^3 , provided with a suitable thumb-latch and segment m^4 , and arranged in front of the foot-board in convenient reach of the operator.

In the operation of the device, as the disk-wheel F², is moved inwardly against the projecting finger, the pawl l^3 , is moved outwardly until the disk-wheel rests on the bearing-face l^{11} , which movement has carried the pawl l^3 , out of engagement with the ratchet l' . The outward movement of the pawl l^3 , by reason of the connecting-link l^7 , between the pawls, causes a corresponding inward movement of the pawl l^2 , which, when the disk-wheel has

arrived at the first bearing-face, is sufficient to bring the respective pawls at an equal distance from the respective ratchet-wheels and both out of engagement therewith. A further movement of the disk-wheel F^2 , produces a further outward movement of the pawl l^3 , and a corresponding inward movement of the pawl l^2 , until the disk-wheel has arrived in contact with the bearing-face l^{12} , when the pawl l^2 , is in engagement with the ratchet l , and the pawl l^3 , is moved to its extreme outward position, as illustrated by dotted lines in Fig. 9. Just prior to the completion of the engagement of the pawl l^2 , with the ratchet-wheel l , the connecting-link l^7 , comes in contact with the stud l^9 , deflecting said link slightly, and forming a spring which will permit the pawl l^2 , to yield sufficiently to allow the ratchet l , to turn in a backward direction, but hold said pawl firmly in contact with said ratchet and cause the ratchet to turn with the sprocket-wheel when turned in the opposite direction. A spring l^{15} , connected at one end to a suitable lug or ear l^{16} , and at the other to a stud l^{17} , on the sprocket-wheel F , is adapted to return the pawls to their normal positions, as shown in Fig. 10, when the disk-wheel F^2 , is moved out of engagement with the projecting finger l^{10} .

It will be seen that by the constructions thus described, the operator may, by a movement of the hand-lever m^3 , throw both pawls out of engagement, thus leaving the sprocket-wheels free to revolve independent of the carrying-wheels, or cause either set of pawls to engage with their corresponding ratchets to cause the wheels to be propelled positively in either direction, as desired, while they may be free to turn in the opposite direction. The arrangement of the pawls and ratchet-wheels permit the wheels to turn independent in turning corners or in changing direction, no matter which set of ratchets may be in engagement or whether the carrying-wheels be moving in a forward or backward direction.

A suitable brake-wheel or wheels F^3 , is preferably provided on the carrying-wheels B^2 , adapted to be engaged by a brake-shoe n , operated through a suitable connecting-rod n' , to a hand-lever n^2 , in front of the foot-board along side of the lever m^3 , which controls the engaging pawls. This arrangement furnishes the means for readily stopping the vehicle without stopping the engines, by simply disconnecting the pawls and applying the brake.

It will be seen by the constructions thus described that simple means are furnished for running the vehicle in either a forward or backward direction, or permitting the engines to run independent of the vehicle for pumping or for other purposes.

To provide for readily guiding the vehicle, the front carrying-wheels are supported in steering forks B^3 , connected by suitable connections to a steering-lever B^4 , preferably pivoted to the main frame in proximity to the boiler C , which lever extends to within convenient reach of the operator.

In Figs. 11 to 16, inclusive, these connections are shown in detail, both for a single steering-wheel B^4 , and a double steering-wheel B^5 ; a connecting-rod o , being adapted to connect the respective steering-forks through the medium of suitable cranks and bell crank-arms o' o^2 , when two wheels are employed. The steering-wheel B^4 , is preferably bifurcated at its front end and pivoted to projecting ears o^3 , on an oscillating lever o^4 , to permit said lever to be moved vertically to accommodate itself to the position of the operator, and at the same time to produce the proper movement of the lever o^4 , to operate the steering-wheels; said lever being connected to the steering-wheel through a suitable link connection o^5 , as shown.

It is obvious that the invention herein described admits of various modifications in its mechanical details. I do not therefore limit myself to the exact constructions described and shown, but

I claim as my invention:

1. The combination with the carrying-wheels and a propelling motor, of an intermediate revolving wheel connected to and revolving with said motor, means for changing the direction of revolution of said motor, and ratchet connections adapted to alternately engage and disengage to connect said intermediate wheel to the driving-wheel to cause the driving-wheel to move positively with the intermediate wheel in the direction of rotation, and permit it to turn independent of said wheel in the other direction, substantially as specified.

2. The combination with a motor and driving-wheel, of an intermediate wheel revolving with said motor, ratchet-wheels having teeth extending in opposite directions connected to said driving-wheel, and oppositely engaging pawls for the respective ratchets, said pawls being connected together and adapted to be moved simultaneously to and from the respective ratchets, substantially as specified.

3. The combination with a reversible motor and a driving-wheel, of an intermediate connecting-wheel revolving with said motor, oppositely arranged ratchets on each side of said intermediate wheel connected with said driving-wheel, pivoted pawls on said intermediate wheel adapted to engage alternately with the respective ratchets, and a spring connection between the respective pawls, substantially as specified.

4. The combination with a reversible driving motor and a driving-wheel, of an intermediate connecting-wheel revolving with said motor, oppositely arranged ratchets on each side of said ratchet-wheel, pivoted pawls on opposite sides of said intermediate wheel adapted to engage with the respective ratchets, an intermediate connection between the pawls to cause them to move simultaneously in different directions with reference to the ratchet-wheels, means for forcing said pawls

positively in one direction, and a spring for returning them to their normal positions when released, substantially as specified.

5 5. The combination with an intermediate connecting-wheel and a driving-wheel, of oppositely arranged ratchets connected to said driving-wheel, pivoted pawls on said intermediate wheel adapted to engage alternately with the respective ratchets, said pawls being
10 connected together so as to move simultaneously in opposite directions, an operating pro-

jection having bearing-faces, and a sliding disk-wheel to contact with said operating projection to move said pawls simultaneously out of and into engagement with the respective 15 ratchet-wheels, substantially as specified.

In testimony whereof I have hereunto set my hand this 11th day of May, A. D. 1891.

GEORGE J. SAURBREY.

Witnesses:

C. C. SHEPHERD,
BARTON GRIFFITH.