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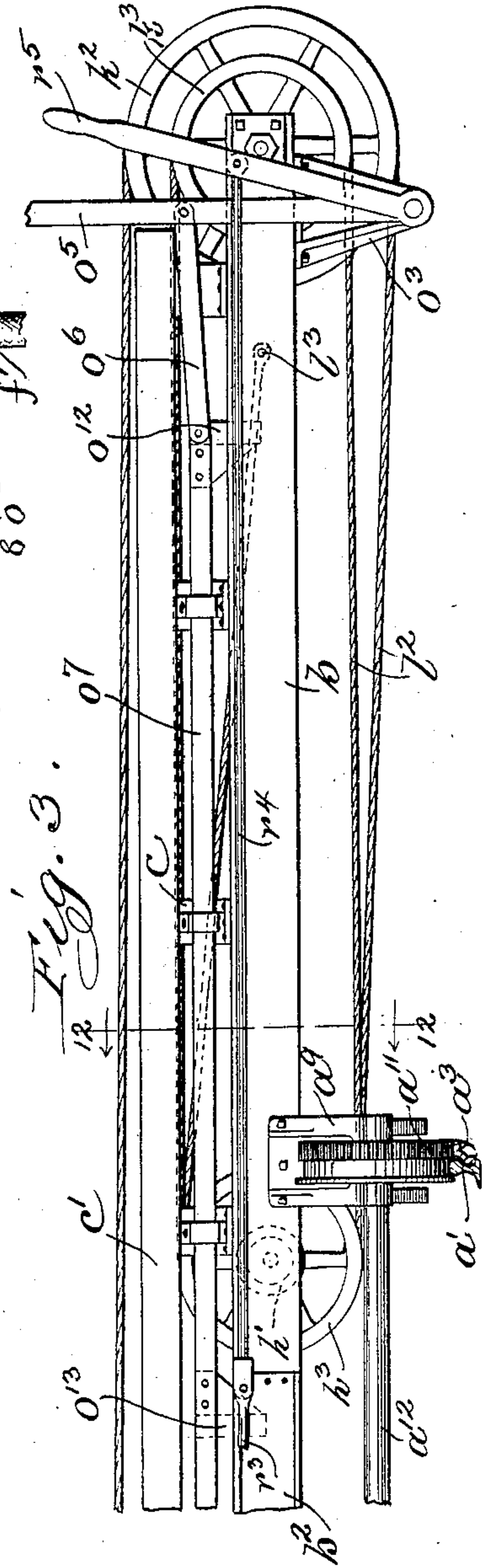
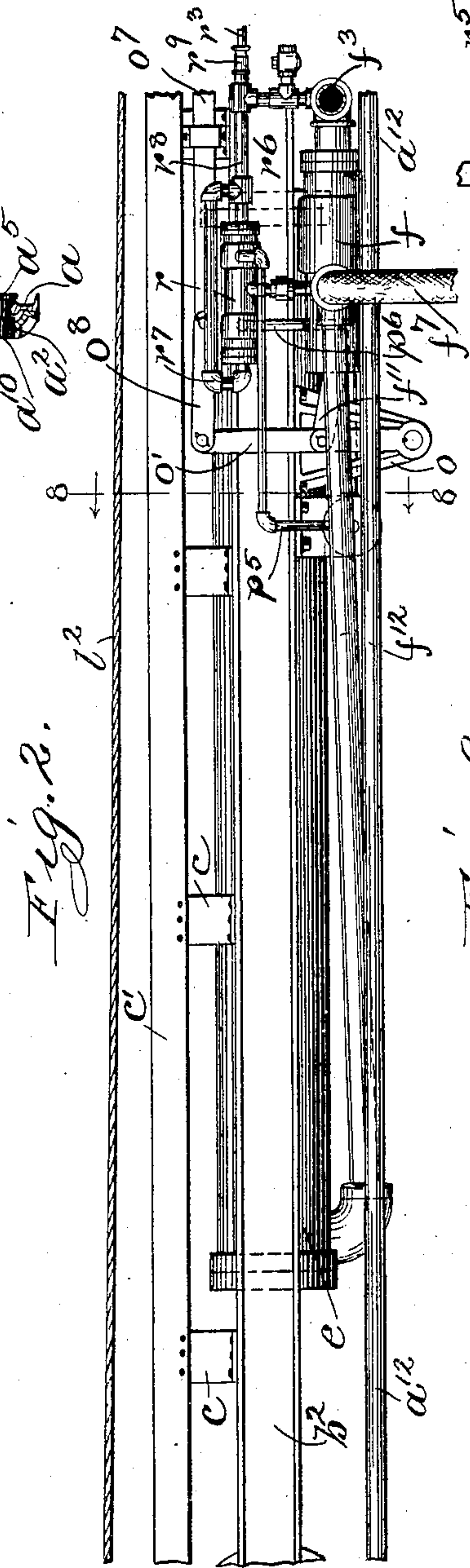
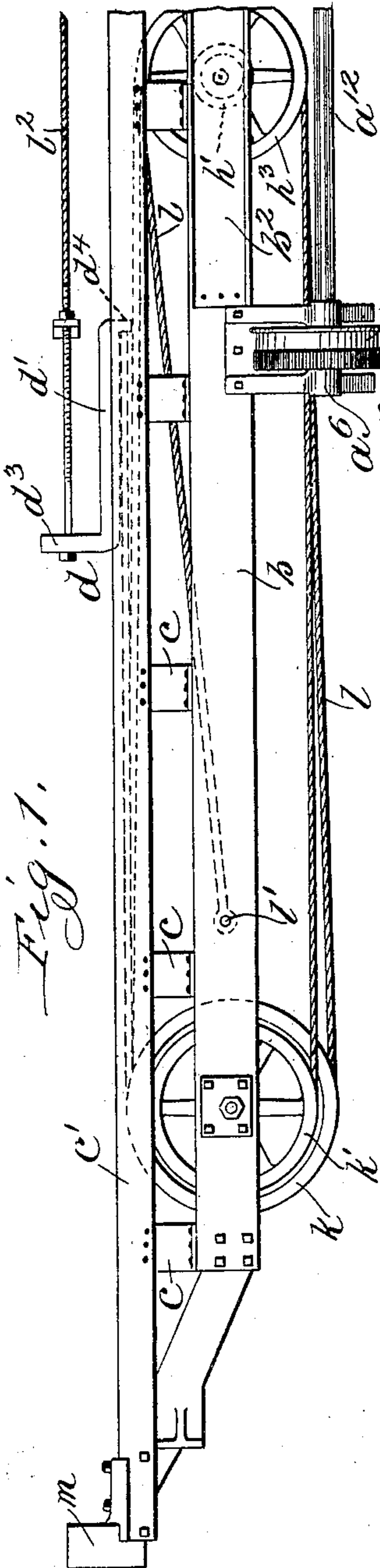
PATENTED SEPT. 8, 1908.

LA VERNE W. NOYES & D. R. SCHOLES.

DRAW BENCH.

APPLICATION FILED MAY 16, 1901.

4 SHEETS—SHEET 1.



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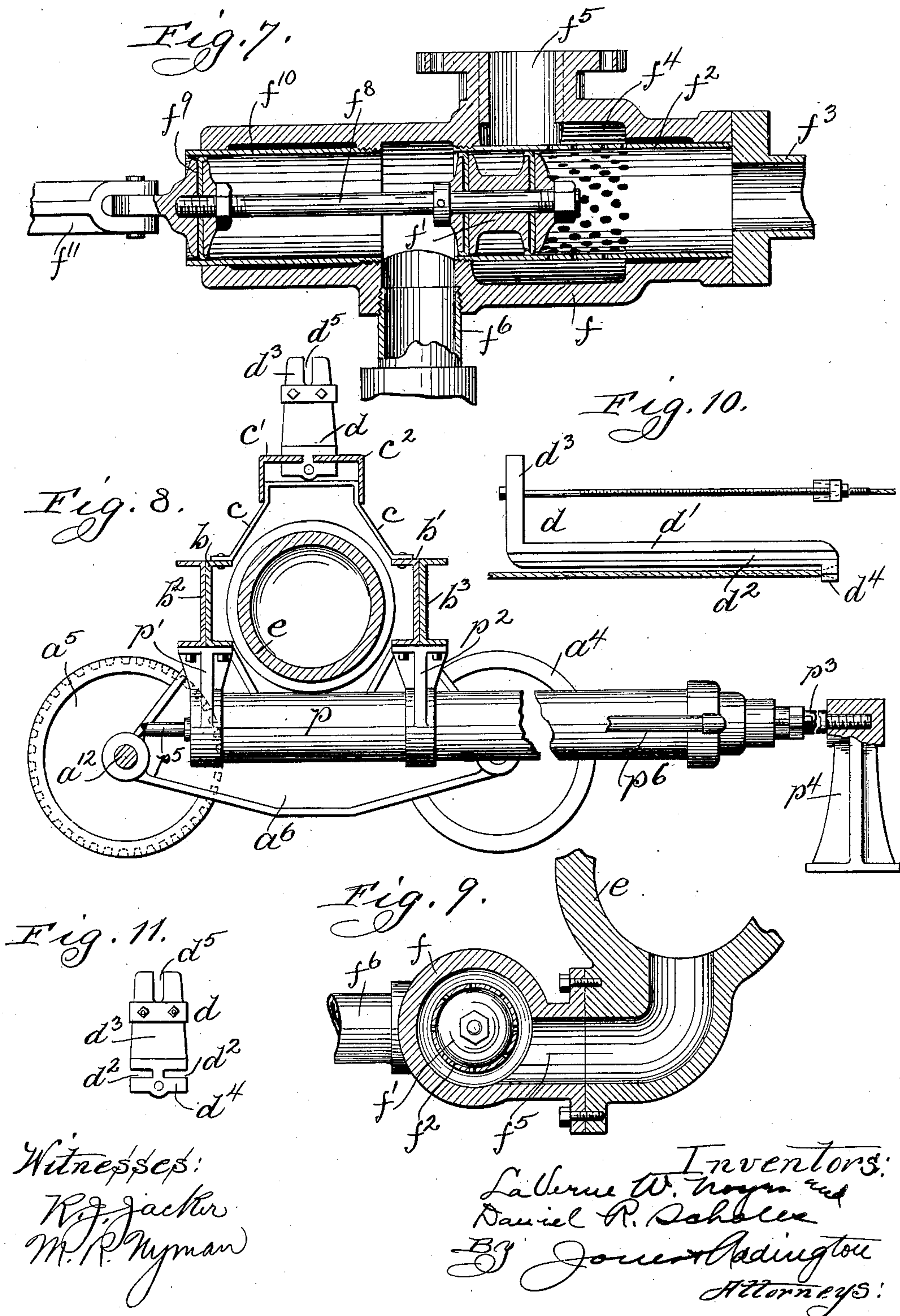
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4 SHEETS—SHEET 4.

Fig. 12.

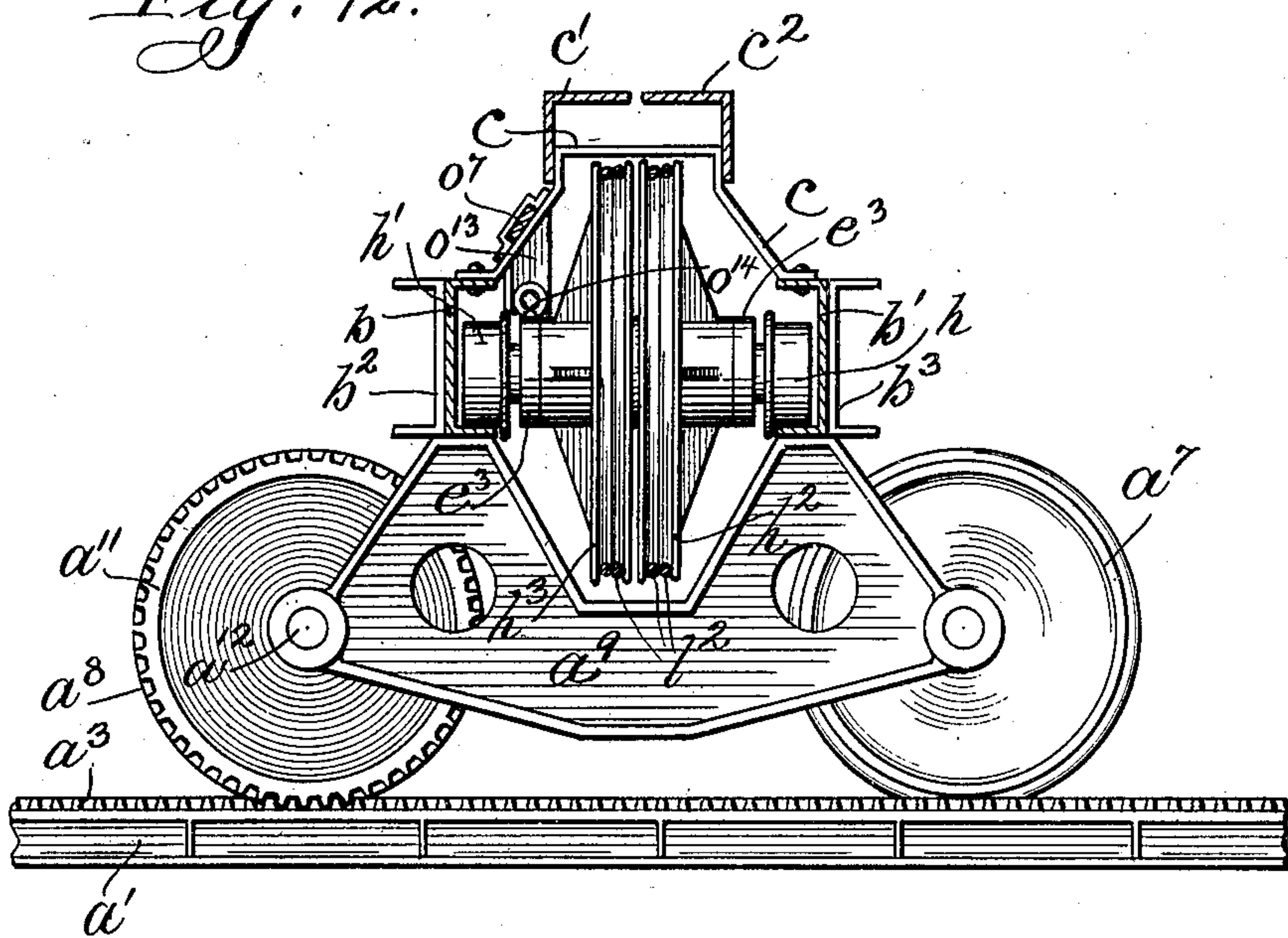
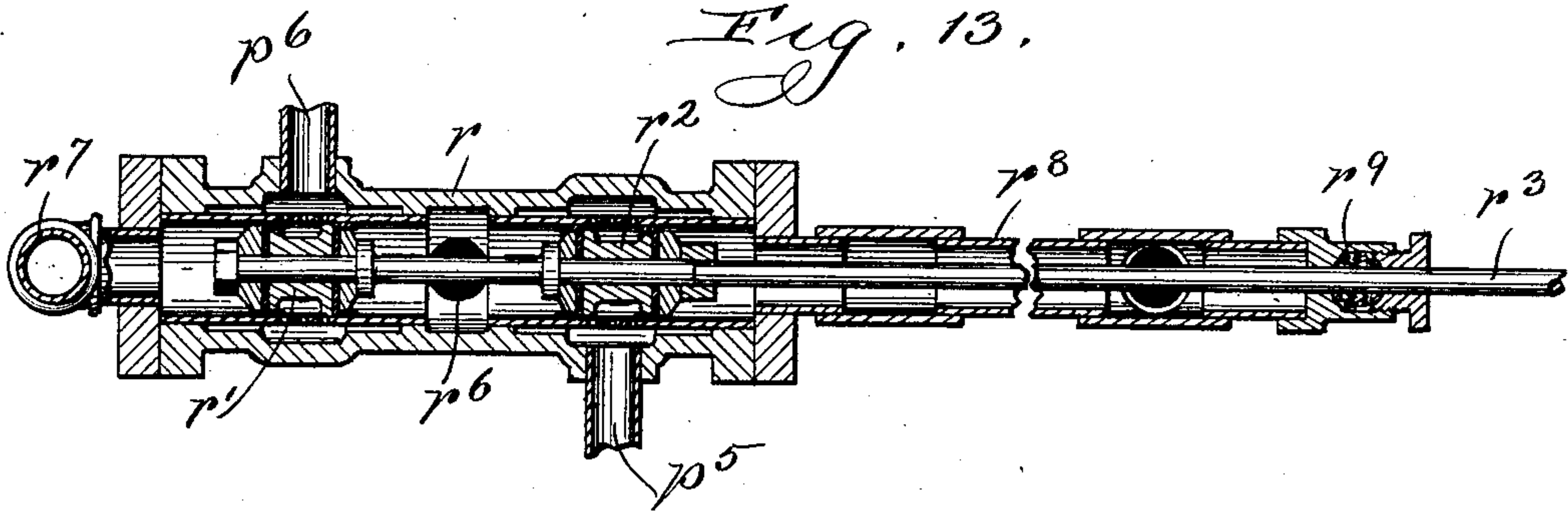


Fig. 13.



UNITED STATES PATENT OFFICE.

LA VERNE W. NOYES AND DANIEL R. SCHOLLES, OF CHICAGO, ILLINOIS; SAID SCHOLLES ASSIGNOR TO THE AERMOTOR COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DRAW-BENCH.

No. 897,922.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed May 16, 1901. Serial No. 60,527.

To all whom it may concern:

Be it known that we, LA VERNE W. NOYES and DANIEL R. SCHOLLES, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Draw-Benches, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

Our invention relates to a draw bench for use in the manufacture of metallic tubes.

Our invention contemplates an improved construction of a draw bench particularly the frame thereof and the mounting for the buggy track.

Moreover, our invention contemplates improved means for reciprocating the buggy and for moving the draw bench itself, and to numerous details of construction as more particularly hereinafter described and claimed.

We have illustrated our invention in the accompanying drawing in which:—

Figures 1, 2 and 3 show the machine in elevation. Fig. 4 is a plan view of the machine. Fig. 5 is a longitudinal sectional view through the cylinder carried upon the machine. Fig. 6 is a view illustrating the automatic stopping mechanism. Fig. 7 is a sectional view of the valve mechanism. Fig. 8 is a sectional view on line 8—8 Fig. 2. Fig. 9 is a transverse sectional view through the valve chest. Fig. 10 is a side view of the buggy. Fig. 11 is an end view thereof. Fig. 12 is a sectional view on line 12—12 Fig. 3. Fig. 13 is a sectional view of the valve mechanism for controlling the cross-motion cylinder.

Like letters refer to like parts in the several figures.

The draw bench is mounted upon wheels adapted to travel upon the rails, a, a' , which extend parallel to the face of the furnace in which the skelps are adapted to be heated. Along side the rails, a, a' , are the racks, a^2, a^3 , respectively. The wheels, a^4, a^5 , are mounted upon a truck, a^6 , consisting of two side plates adapted to extend downward upon opposite sides of the wheels, and carrying journal boxes in which the axles of the wheels are mounted. Likewise, the wheels, a^7, a^8 , are mounted upon a truck, a^9 , of a construction similar to the truck, a^6 . Carried upon the wheel, a^5 , is a gear wheel, a^{10} , adapted to en-

gage the rack, a^2 , and a similar gear wheel, a^{11} , is carried upon the wheel, a^8 , and is adapted to engage the rack, a^3 . The wheels, a^5 , and a^8 , are rigidly mounted upon an axle, a^{12} . The axle, a^{12} , and the engaging racks and gear wheels maintain the traveling draw bench perpendicular to the rails and prevent the swinging of the draw bench out of proper alinement.

Supported upon the trucks, a^6, a^9 , are the longitudinal stringers, b, b' , which are preferably formed from channel bars having the flanges extending inward. To reinforce the stringers we preferably provide along the middle portions of the stringers the additional channel bars, b^2, b^3 , having their flanges extending outward. The lower flanges of the channel bars serve as tracks for the travel of the wheels which carry the cable carriages hereinafter described. Secured to the upper flanges of the channel bars are the arch shaped brackets, c, c , and these brackets straddle the space between the stringers, extend upward sufficiently to accommodate the travel of the cable carriages and carry at the upper ends the angle plates, c', c^2 . These angle plates have their vertical flanges secured to the brackets and have their horizontal flanges extending toward each other and arranged to leave a narrow channel between their opposed edges. The buggy, d , travels upon the track thus formed by the angle plates, c', c^2 . This buggy is preferably formed as illustrated wherein it is shown as comprising a horizontal portion, d' , carrying longitudinal channels, d^2, d^2 , in the opposite sides thereof and having at one end an upwardly extending part, d^3 , adapted to receive one end of one of the cables, and having a downwardly extending part, d^4 , adapted to receive the end of the other cable. The upwardly extending part, d^3 , carries in the end a slot, d^5 , to receive the tongs.

Mounted upon the draw bench between the stringers, b, b' , is a cylinder, e , within which moves a piston, e' . From one end of the piston, e' , a piston rod, e^2 , passes through a stuffing box at the end of the cylinder and carries upon the end the yoke, e^3 . From the other end of the piston a rod, e^4 , extends, the same carrying upon the end a yoke, e^5 . The rod, e^4 , is surrounded by a cylinder, e^6 , which passes through a stuffing box in the end of the cylinder, e . The cylinder, e^6 , consti-

tutes in effect a piston rod of enlarged diameter. The effective area upon one side of the piston is thus greater than that upon the other side. Upon the side of the cylinder, 5 *e*, is mounted a valve chest, *f*, within which moves a valve, *f'*. The valve, *f'*, moves within a suitable cylinder, *f²*, having one end in communication with an exhaust passage, *f³*, and having in the wall thereof, a number 10 of openings which communicate with an annular space, *f⁴*, which is connected with one end of the cylinder, *e*, through the passage, *f⁵*. An inlet pipe, *f⁶*, communicates with the interior of the valve chest, *f*, and the 15 inlet, *f⁶* is connected by means of a flexible pipe, *f⁷*, with any suitable fluid supply, as for instance, a water tank or water supply main. The valve, *f'*, is mounted upon a rod, *f⁸*, suitably guided by a piston, *f⁹*, working in a cylinder *f¹⁰*, and the piston, *f⁹* is 20 connected by means of a link, *f¹¹*, with the valve operating mechanism as hereafter described. A pipe, *f¹²*, extends from the supply pipe, *f⁷*, directly to the end of the cylinder 25 *e* in which moves the piston rod of enlarged diameter. One end of the piston is thus continuously subjected to the pressure of the fluid supply. When the valve is in the position shown in Fig. 7, the end of the 30 cylinder within which moves the piston rod of smaller diameter is connected through the openings in the cylinder, *f²*, with the exhaust, *f³*. When the valve, *f'*, is moved to the right so as to rest between the exhaust, 35 *f³* and the openings in the cylinder, *f²*, the inlet, *f⁶*, is connected through said openings and the annular chamber, *f⁴*, and the duct, *f⁵*, with the working cylinder. By the movement of the valve, *f'*, the end of the 40 working cylinder may thus be connected either with the supply inlet or with the exhaust. The exhaust pipe, *f³*, is connected with any suitable leading off duct by a flexible pipe which will accommodate the move- 45 ment of the draw bench. We preferably connect the exhaust, *f³*, with a pair of telescoping pipes, *f¹³*, *f¹⁴*, the pipe, *f¹³*, moving with the draw bench and the pipe, *f¹⁴*, resting in a stationary position.

50 Journaled upon the yoke, *e³*, are the wheels, *h*, *h'*, (Fig. 12), which travel upon the lower flanges of the stringers. Upon the yoke are also journaled the cable wheels, *h²*, *h³*. The yoke and wheels we term the 55 cable carriage. Upon the yoke, *e⁵*, similar traveling wheels and cable wheels are mounted, one of the traveling wheels, *h'*, being shown in Fig. 1 as well as one of the cable wheels, *h³*. As the piston in the work- 60 ing cylinder moves back and forth, the cable carriages are caused to travel backward and forward between the longitudinal stringers. Journaled upon the longitudinal stringers, *b* *b'*, at one end are the stationary cable 65 wheels, *k* *k'*, and mounted upon said stringers

at the opposite end are the stationary cable wheels, *k²*, *k³*. One of the cables, *l*, is connected at one end to the stringers, *b*, *b'*, at *l'*, passes then back and forth around the 70 movable and stationary cable wheels and has its opposite end connected with the downwardly extending portion *d⁴*, of the buggy, *d*; this being the portion which moves beneath the angle plates, *c'*, *c²*. It will be 75 noted that when the hot skelp is drawn through the bell carried upon the support, *m*, the flanges of the plates, *c'*, *c²*, rest between the skelp and the said cable, whereby injury to the cable is prevented. The second cable, 80 *l²*, has one end mounted in a stationary position at *l³*, and passes thence over the movable and stationary cable wheels and has its opposite end connected with the upwardly extending portion, *d³*, of the buggy, *d*. This is 85 the cable which serves to move the buggy when the skelp is being drawn through the bell, and it will be noted that the cable and the line of pull thereof are in alinement with the skelp as the same passes through the 90 bell; the cable thus exerts a direct pull in line with the resisting force. As the piston in the working cylinder moves in one direction the buggy, *d*, is moved in one direction, and as the piston is moved in the opposite direc- 95 tion the buggy is, likewise, moved in the opposite direction. By passing the cable back and forth over the cable pulleys several times the travel of the carriage is made much greater than that of the piston in the working 100 cylinder. By the proper adjustment of the cables in this manner any desired relative movement of the piston and buggy may be secured.

Mounted upon the stringer, *b*, is a bracket, 105 *o*, to which is journaled a lever, *o'*. The link, *f¹¹* connected with the valve, *f'*, is also connected with said lever, *o'*. At one end of the machine is the bracket, *o³*, supporting the pivotally mounted lever, *o⁵*. The lever, 110 *o⁵*, is connected by means of link, *o⁶*, rod *o⁷*, and link, *o⁸*, with the lever, *o'*. The lever *o'* may thus be operated from the end of the machine. When the lever, *o'*, is thus moved 115 to carry the valve, *f'*, to the right, the water is admitted at the right hand end of the cylinder as seen in Fig. 2, thus moving the piston to the left and carrying the buggy to the right. When the lever, *o'*, is moved in 120 the opposite direction, to move the valve to the left, the right hand end of the cylinder is connected with the exhaust and the water is permitted to escape. Since the effective area of the piston upon the left hand side is less than the effective area upon the right 125 hand side, the admission of the water under pressure to the right hand side of the piston moves the same to the left, and the connection of the right hand side of the piston with the exhaust permits the pressure upon the 130 left hand side of the piston to move the same

to the right. One side of the piston is thus constantly subjected to a fixed pressure and the pressure upon the other side of the piston is varied to cause the movement thereof in opposite directions. When the piston moves to the right, as seen in Fig. 2, the buggy is carried to the left.

In order that the valve may be actuated to stop the buggy automatically, we provide upon the bar, o^7 , the stops, o^{12} , o^{13} , adapted to be engaged by the parts, o^{14} , o^{15} , carried upon the cable carriage. The parts, o^{14} , o^{15} , are preferably resiliently mounted upon springs to prevent sudden shocks. When the cable carriage moves to the right, the part, o^{14} , engages the part o^{12} , thereby moving the bar, o^7 , and carrying the valve, f' , to the central position to stop the movement of the piston. In the opposite movement, when the part, o^{15} , engages the stop, o^{13} , the bar, o^7 , is moved to the left, thereby carrying the valve to the central position to stop the movement of the piston. The starting of the buggy on its advance travel is accomplished by hand while it is stopped automatically. Likewise, the starting of the buggy on the return travel is by hand, while the stopping is automatic.

For moving the draw bench along the rails, we provide a fluid pressure cylinder, p , which we call the cross-motion cylinder, the same being mounted upon brackets, p' , p^2 , secured respectively to the under sides of the longitudinal stringers, b , b' , etc. Within the cylinder is a piston mounted upon a piston rod, p^3 , the end of which is rigidly secured to a stationary bracket or support, p^4 . A valve chest r , is mounted above the valve chest, f , and two valves or pistons, r' , r^2 , are adapted to be moved therein, the same being connected by means of a valve rod, r^3 , and link r^4 , with an operating handle, r^5 , pivoted upon the bracket, o^3 , at the end of the machine. One end of the cylinder, p , is connected by pipe, p^5 , with the right hand end of the valve chest, r , as seen in Fig. 2, and the left hand end of said valve chest is connected by pipe, p^6 , with the opposite end of the cylinder, p . A pipe, r^6 , connects the middle portion of the chest, r , with the inlet pipe, f^6 , while the opposite ends of the chest, r , are connected by pipes, r^7 , and r^8 , with the exhaust pipe, f^3 . The valve rod, r^3 , passes through the interior of the pipe, r^8 , and a stuffing box, r^9 , is provided in the end of the said pipe through which the valve rod, r^3 , is adapted to move. When the valves, r' , r^2 , are moved to the right as shown in Fig. 13, the pipe, p^5 , is connected with the inlet, r^6 , and the pipe, p^6 , is connected with the exhaust. Fluid is thus admitted to the left hand end of the cylinder, p , as seen in Fig. 8, and the draw bench is thus moved to the left. When the valves, r' , r^2 , are moved to the left as seen in Fig. 3, the pipe, p^6 , is connected with the inlet, r^6 , and the pipe, p^5 , is connected with the ex-

haust, and fluid pressure is thus admitted to the right hand end of the cylinder, as seen in Fig. 8, and, accordingly, the draw bench is moved to the right.

It will be noted that by the construction above described wherein the buggy track is mounted above the main frame carrying the cylinder, cable carriages, etc., and separated therefrom by suitable ventilating spaces, the buggy track is permitted to expand and contract under the influence of the heat from the tube which is being operated upon without twisting or distorting the main frame and without danger of throwing the moving parts guided thereby out of proper alinement. The brackets, c , c , yieldingly support the buggy track in position while providing a mounting which is rigid enough to produce a substantial and strong construction. Any tendency, however, of the buggy track to twist or become distorted under the influence of heat will not be permitted to distort the main frame and the parts carried thereon.

Having described our invention what we claim as new and desire to secure by Letters Patent is:—

1. In a draw-bench, the combination of a traveling frame, comprising a pair of longitudinal stringers, a track mounted upon said frame, a buggy adapted to travel back and forth upon said track, cable-wheels mounted at each end of said frame, a pair of cable-carriages mounted between the stringers of said frame and adapted to travel back and forth therebetween, a cylinder carried by said frame for supplying power for operating said buggy, a piston rod extending from each end of said cylinder, each rod being operatively connected with its respective cable-carriage, and a pair of cables operatively connecting said buggy with said cable-carriages for moving said buggy in opposite directions, each cable passing over one of the cable-wheels and its associated cable-carriage.

2. In a draw-bench, the combination with a suitable track, of a buggy having portions extending respectively above and below said track, and a pair of cables for moving said buggy in opposite directions, the cable for moving the same in one direction being connected with the portion of the buggy extending above the track, and the cable for moving the buggy in the other direction being connected with the buggy extending below the track.

3. The combination with a draw bench, of a truck supporting the same and having a pair of wheels mounted rigidly upon the opposite ends of an axle, a gear wheel carried upon each of said wheels, and racks alongside the tracks with which said gear wheels are adapted to engage to maintain the truck in alinement.

4. The combination with a draw bench, of a truck for supporting the same, of a track

and cooperating racks and gear wheels associated with said track and truck for maintaining the truck in alinement, and a power device independent of said track and gears
5 for moving said truck transversely.

5. In a draw bench, the combination with a traveling frame comprising a pair of longitudinal stringers, of a track consisting of a pair of longitudinal members mounted above
10 the stringers and spaced apart so as to form a guide-slot between them, a buggy traveling upon said track and guided by said slot, and means for operating the buggy.

6. In a draw bench, the combination with
15 a traveling frame, comprising a pair of stringers, of a track consisting of longitudinal members mounted above said stringers and spaced apart to form a guide-slot between them, a buggy traveling upon said
20 track and guided by said slot, and a fluid pressure cylinder carried upon said frame and mounted between said stringers and having its piston connected with said buggy.

7. In a draw bench, the combination with
25 a traveling frame, comprising a pair of stringers, of a suitable track for the buggy, consisting of parallel longitudinal members carried above said stringers, a buggy adapted to travel upon said track, and a fluid pres-
30 sure cylinder and associated cable carriages mounted between said stringers and connected with said buggy.

8. In a draw bench, the combination with a traveling frame, comprising a pair of
35 stringers, of arch-shaped brackets connecting said stringers at the upper ends, a track consisting of parallel longitudinal members carried upon said brackets, a buggy adapted to travel upon said track, and fluid pressure
40 means mounted between said stringers for operating the buggy.

9. In a draw bench, the combination with a traveling frame, comprising a pair of
45 stringers having inwardly extending flanges, of a buggy, a suitable track for the buggy mounted above said stringers, a fluid pressure cylinder mounted between said stringers and cable carriages having wheels riding upon the flanges of said stringers.

10. In a draw bench, the combination with
50 a traveling frame, comprising a pair of stringers in the form of channel bars having inwardly extending flanges, of a buggy, a suitable track for the buggy carried above
55 said stringers, a fluid pressure cylinder mounted between said stringers, and cable carriages having wheels riding upon the flanges of said channel bars.

11. In a draw bench, the combination with
60 a traveling frame, comprising a pair of stringers, of a fluid pressure cylinder and cable carriages mounted between said stringers, a track for the buggy mounted above said stringers and comprising a pair of longitudinal
65 plates or beams having a slot formed be-

tween the opposed edges thereof, and a buggy riding upon said track and guided by said slot.

12. In a draw bench, the combination with a traveling frame, comprising a pair of longitudinal stringers, of a fluid pressure cylinder and cable carriages mounted between said
70 stringers, a track for the buggy mounted above said stringers and comprising a pair of angle plates having horizontal flanges resting at a distance apart to leave a longitudinal
75 slot for guiding the buggy, and a buggy adapted to travel upon the track.

13. In a draw bench, the combination with a traveling frame, comprising a pair of string-
80 ers in the form of channel bars having inwardly extending flanges, of a fluid pressure cylinder mounted between said stringers, cable carriages having wheels riding upon the lower flanges of said stringers, arch-
85 shaped brackets secured to the upper flanges of said stringers and spanning the space between the same, a track for the buggy, comprising a pair of angle bars resting with their
90 flanges horizontal and at a distance apart to leave a slot for guiding the buggy, and a buggy adapted to travel upon the track.

14. In a draw bench, the combination with a suitable track, of a buggy having portions
95 extending respectively above and below said track, and a pair of cables for moving said buggy in opposite directions, the cable for moving the same during the working stroke being connected with the portion of the buggy
100 extending above the track, and the cable for moving the buggy during the return stroke being connected with the buggy extending below the track.

15. In a draw bench, the combination with a buggy, of a track, comprising a pair of
105 plates or parts arranged to form a longitudinal slot, said buggy having parts extending above and below said plates, a cable for moving the buggy during the working stroke connected with the part of the buggy above said
110 plates, and a cable for moving the buggy during the return stroke connected with the part of the buggy below said plates.

16. In a draw bench, the combination with a buggy, of a track comprising a pair of plates
115 or parts arranged to leave a longitudinal slot, said buggy having a suitable part adapted to ride upon the first of the plates and having a portion thereof extending through said slot and operating cables connected with the parts
120 of said buggy extending above and below said plates.

17. In a draw bench, the combination with a suitable traveling frame, of a buggy operat-
125 ing mechanism carried thereon, and a track mounted upon suitable brackets above said frame, whereby ventilating spaces are formed between said track and frame to permit
130 twisting or distortion of the track under the influence of heat without disturbing the aline-

ment of the frame, said tracks comprising a pair of parallel longitudinal members spaced apart so as to form a guide-slot for the buggy between them.

- 5 18. In a draw bench, the combination with a traveling main frame, of a buggy reciprocating means mounted on said main frame, and suitably guided thereby, a buggy track supported by suitable brackets above said
10 main frame, whereby ventilating spaces are formed between said track and frame to permit twisting or distortion of the track under the influence of heat without throwing the

parts of the buggy reciprocating means out of alinement, said track comprising a pair of 15 longitudinal members spaced apart so as to form a guide-slot for the buggy between the same.

In witness whereof, we have hereunto subscribed our names in the presence of two witnesses. 20

LA VERNE W. NOYES.
DANIEL R. SCHOLLES.

Witnesses:

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