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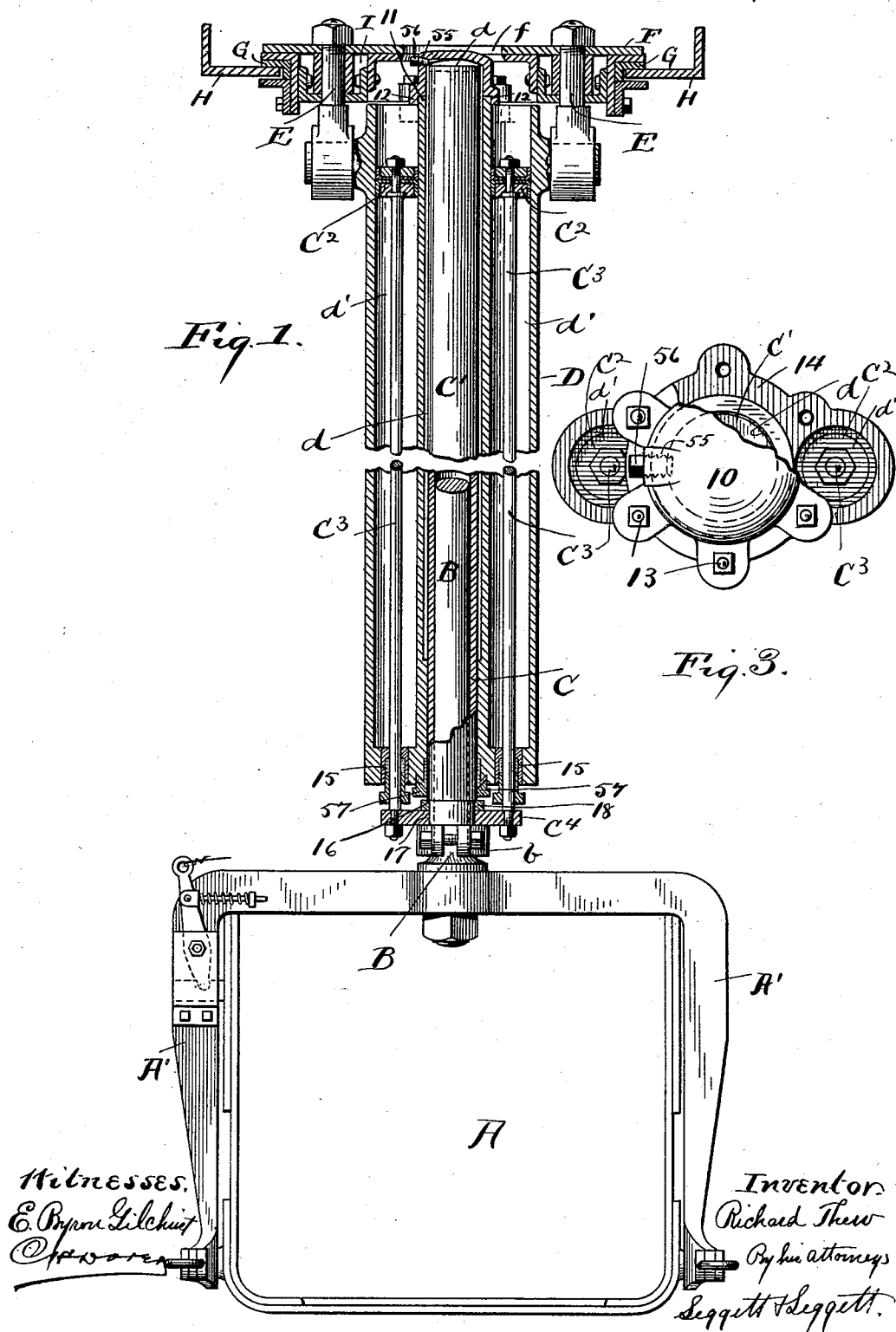
3 Sheets—Sheet 1.

R. THEW.

EXCAVATOR SHOVEL OR SCOOP.

No. 530,210.

Patented Dec. 4, 1894.



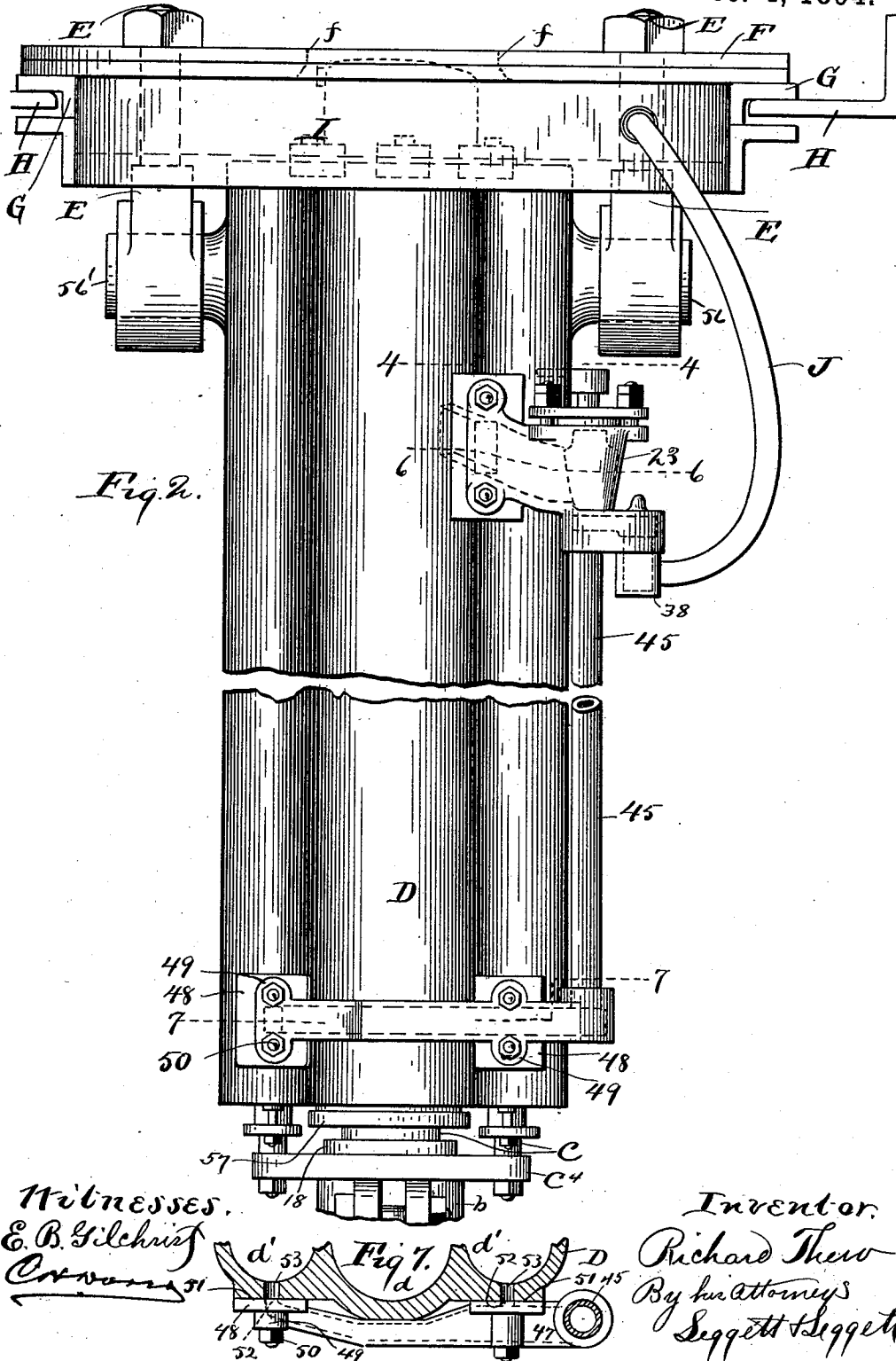
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Witnesses.
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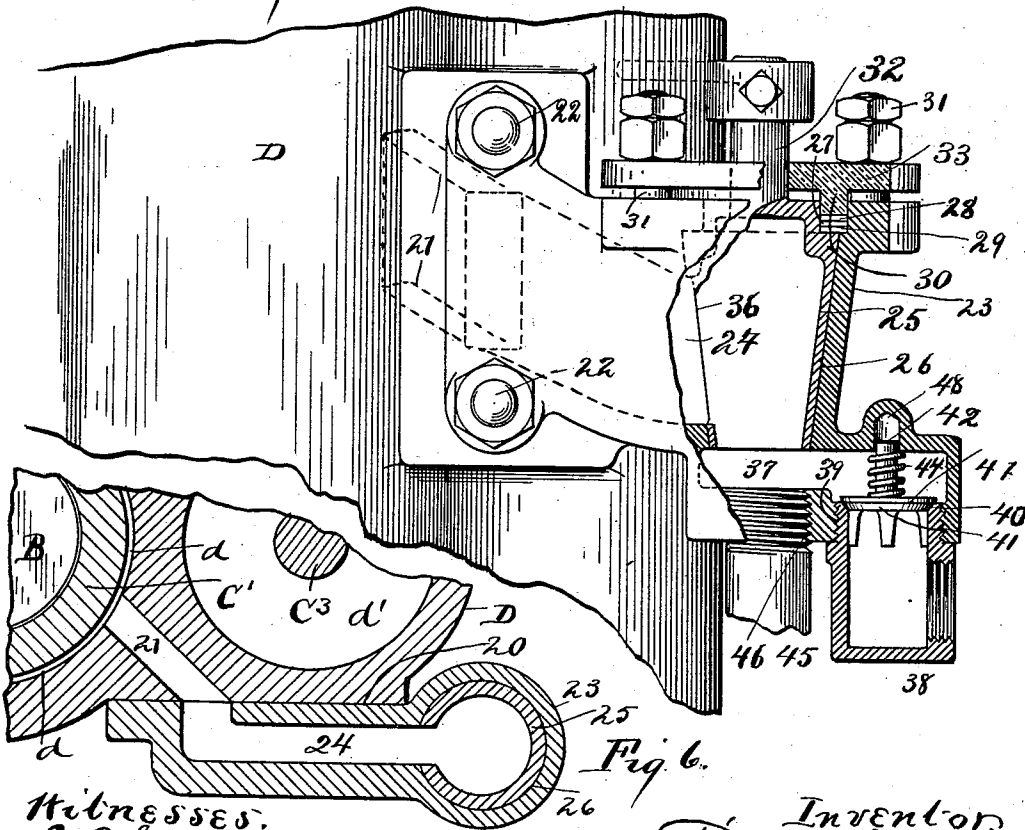
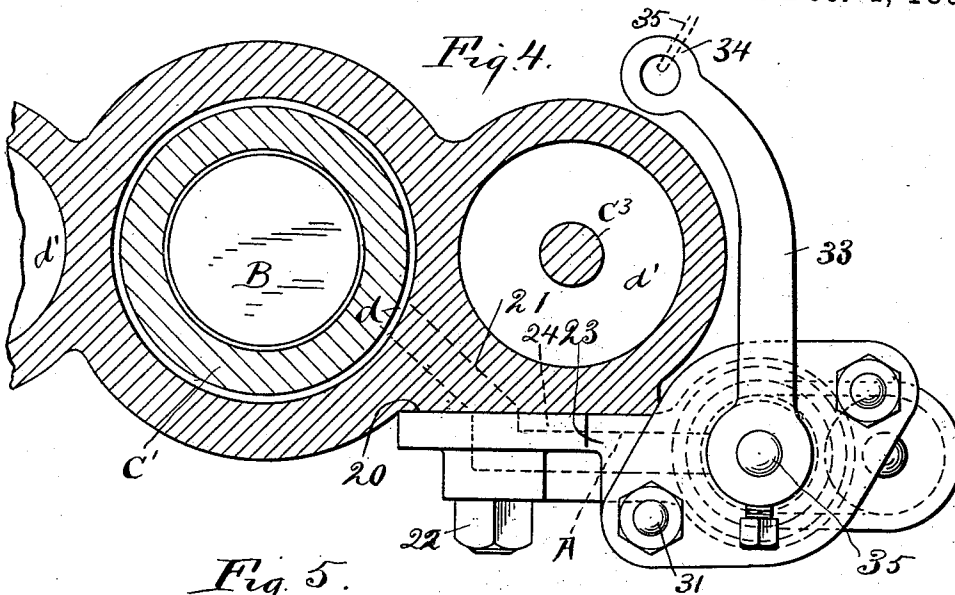
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UNITED STATES PATENT OFFICE.

RICHARD THEW, OF CLEVELAND, OHIO.

EXCAVATOR SHOVEL OR SCOOP.

SPECIFICATION forming part of Letters Patent No. 530,210, dated December 4, 1894.

Application filed October 1, 1892. Renewed October 29, 1894. Serial No. 527,321. (No model.)

To all whom it may concern:

Be it known that I, RICHARD THEW, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Shovels or Scoops; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in shovels or scoops and it consists more especially in a scoop or shovel-handle or arm composed of two or more sections adapted to telescope the one in the other to shorten or lengthen the handle as required to vary the sweep of the scoop or shovel and enable the latter to operate equally well at different elevations, in combination with suitable means whereby when the handle or arm has been adjusted to the proper length the handle or arm may, in such adjustment, be blocked by a liquid, both as against shortening and lengthening.

My invention consists also in certain features of construction and in combination of parts hereinafter described and pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation of a scoop or shovel provided with my improved handle or arm, the latter being shown in longitudinal central section, partly in elevation, this figure also showing the pivotal connection of the arm or handle with a trolley or carriage for moving the scoop from one place to another, the trolley or carriage and track supporting same being shown in transverse section, and the sections of the handle or arm being shown telescoped the one within the other. Fig. 2 is an enlarged side elevation of the upper section of the handle or arm, showing also the trolley or carriage and the connection of said section of the handle with a liquid supply-tank supported by the trolley. Fig. 3 is a top plan of the upper section of the handle or arm with a portion of top or cover 10 broken away to more clearly show the construction. Fig. 4 is a section taken on line 4—4, Fig. 2, showing a top plan of valve-casing 23, and Fig. 5 is a side elevation of said valve-casing and attachments, portions being broken away

to more clearly show the construction, Figs. 4 and 5 being enlarged as compared with the illustration of the corresponding parts in Fig. 2. Fig. 6 is a top plan in section on line 6—6, Fig. 2. Fig. 7 is a top plan, partly in section, on line 7—7, Fig. 2.

Referring to the drawings, A represents the shovel or scoop proper, the same being pivoted to and between the ends of a bail, A', to which, and centrally of the same, is rigidly secured the handle or arm of the scoop or shovel. The handle or arm, in the present instance, is composed of three sections, B, C, and D, (see Fig. 1) adapted to telescope the one in the other. Section C comprises a tubular plunger C' and two pistons C² operatively connected with said plunger, said pistons and plunger being adapted to operate endwise in chambers d' d', d, respectively, of section D. Section B, at its lower end, is secured to the bail of the scoop or shovel. Section B extends into central tubular plunger C' of section C, section B and plunger C' being secured in their relative adjustment by means of a clamp, b, and tubular plunger C' being closed at its upper end.

Upper section D of the handle comprises three longitudinal chambers, d' d' d'. (Already referred to.) These chambers are preferably cylindrical in transverse section and arranged as shown, with chamber d centrally between chambers d' d' and closed at its upper end by means of a cap or cover, 10, that rests upon the upper end of the surrounding wall of chamber d that extends somewhat above the adjacent chambers d' d', as at 11. Cap or cover 10 has a depending flange, 12, that nicely fits outside of the upper extremity of the surrounding wall of chamber d and is bolted, as at 13, (see Fig. 3) to lateral flange 14 of section D. Chambers d' d' are preferably open at the top and have the same transverse area, and pistons C² of section C fit nicely within the respective chambers. C³ represents the piston-rods that extend downwardly through stuffing-boxes 15 at the lower ends of chambers d' d', and at their lower ends said piston-rods are secured to a cross-head C⁴ in common.

Tubular plunger C of the handle is slightly reduced in size, as at 16, (see Fig. 1) forming an external annular shoulder, and cross-head

C⁴ is operatively connected with plunger C, preferably as shown in Fig. 1, wherein the cross-head is centrally perforated, as at 17, to embrace plunger C, and is held in place between a ring 18 interposed between the cross-head and shoulder 16 of plunger C, and clamp *b* mounted on plunger C next below the cross-head. Section D at the upper end and at one side, is flat or plain externally, as at 20. (See Figs. 4, and 6.) 21 represents a port or passage-way open at and leading from said plain or flat portion into chamber *d*, said port or passage-way declining more or less as shown in dotted lines Figs. 2 and 5. To flat or plain portion 20 is secured, preferably by means of bolts 22, a valve-casing 23. (See Figs. 4 and 5.) Within casing 23 is a port or passage-way, 24, that discharges into port or passage-way 21, and at the receiving end of port or passage-way 24, is located a hollow plug-valve, 25, seated, as at 26, within casing 23, the plug of the valve externally and at the upper end being cut away circumferentially, as at 27, and the valve-casing being cut away adjacent thereto, as at 28, forming a recess, for the reception of packing and a gland, 29 and 30, respectively, the gland being secured to the valve-casing by means of bolts 31. The stem 32 of the plug-valve extends upwardly through gland 31 and is provided at its outer end with a crank 33 for turning the valve. Crank 33 terminates in an eye, 34, for attaching a cord 35 that extends to within reach of the operator. The hollow plug of the valve has a lateral port 36 adapted to register with port or passage way 24, and is open at the bottom and in open communication with a chamber, 37, below the plug-valve.

38 represents an elbow the one end whereof is externally screw-threaded and screwed into a correspondingly threaded perforation 39 in the bottom wall of chamber 37, the opposite end of elbow 38 being adapted to have attached a liquid supply-pipe or hose. Elbow 38 is provided with a seat 40 for a suction-valve 41 adapted to be lifted upwardly off its seat and to open and close communication between elbow 38 and chamber 37. Stem 42 of said valve extends upward into a recess, 43, in the top wall of chamber 37 said recess being sufficiently deep to accommodate the extreme upward movement of said valve-stem.

44 represents a coil-spring confined upon said valve-stem below the top wall of chamber 37 and acting in the direction to retain the valve in its seat.

45 represents a pipe that is screwed into a screw-threaded perforation 46 in the bottom wall of chamber 37 and thence leads downward and connects with a pipe 47 that extends transversely of the lower end and at one side of section D of the shovel-arm or handle and is provided with lateral flanges

and lugs 48 and 49, respectively, secured by means of bolts 50 to flat or plain portion 51 of the casing of section D. Connecting-pipe 47 has lateral openings 52 (see dotted lines, Fig. 7) discharging into ports 53 that open into the lower ends of chambers *d'* *d'* of section D.

Section D of the scoop or shovel-arm or handle, at the upper end, has lateral trunnions, as at 56', adapted to be journaled in the eyes of eye-bolts E secured to trolley or carriage F that has lateral slides G adapted to travel endwise of tracks or ways H. The trolley or carriage is centrally slotted as at *f*, to accommodate the location and the vibration or swinging movement of the upper end of section D of the scoop or shovel-arm or handle, and is provided with a liquid-supply-tank, I, about slot *f*.

J represents a flexible pipe or tube that establishes open communication between tank I and chamber 37 in valve-casing 23 at the upper end of section D, being attached to elbow 38.

Cap or cover 10, at its upper end, is provided with a screw-threaded aperture, 55, closed by a correspondingly externally threaded plug 56 that, to permit the escape of air from chambers *d d' d'*, is removed during the introduction of the liquid employed for blocking sections C and D in the desired adjustment of the shovel-arm or handle.

From the foregoing description, it will be observed that the liquid is introduced into chamber *d* above plunger C' via ports 24 and 21, plug-valve 25 being opened for the purpose, and is introduced into chambers *d' d'*, below pistons C² via pipes 45 and 47 and ports 53. By giving section C (plunger C' and pistons C²) a full stroke in the one direction and thereupon a full stroke in the opposite direction, a vacuum will, in turn, be formed within chambers *d d' d'* above and below plunger C' and pistons C², respectively, resulting in the automatic lifting of suction-valve 41 from its seat and in the flow of liquid from tank I to supply the vacuum thus formed and to fill, with liquid, chambers *d* and *d' d'* above and below the plunger and pistons, respectively, as well as the connecting ports and passage-ways. Said chambers and connecting ports and passages, having been supplied with liquid, the tension of spring 44 will return suction-valve 41 to its seat, whereupon the shovel or scoop-arm or handle is lengthened or shortened according as plunger C' and pistons C² of section C are moved in the one direction or the other, and is blocked by the liquid in said chambers upon closing plug-valve 25. The aggregate transverse area of chambers *d' d'* is such relative to the transverse area of chamber *d* that the displacement of plunger C' is equal to the aggregate displacement of pistons C², and hence the quantity of liquid displaced from chamber *d* into chambers *d' d'*

d' in shortening the handle is equal to the aggregate quantity of liquid displaced from chambers d' d' into chamber d in lengthening the handle. The tension of spring 44 is such that the moment a vacuum, however slight, occurs in chambers d' d' , resulting, for instance, from a leakage of said chambers, valve 41 will thereupon be immediately lifted against said tension, and permit liquid to flow from supply-tank I to supply said vacuum, and as soon as the vacuum has been supplied, said valve will be reseated. Likewise if a vacuum occurs, in chamber d , for instance, from a leakage of said chamber, by opening plug-valve 25, suction-valve 41 will be acted upon to permit said vacuum to be supplied, and this having been done valve 41 will thereupon again close, whereupon plug valve 25 is again closed to block sections C and D of the shovel-arm or handle in the desired adjustment.

Chamber d , the entire length thereof, except at its lower end, is sufficiently larger in diameter than plunger C' to enable the latter to operate with as little friction as practicable.

What I claim is—

1. In a scoop or shovel-handle, the combination with a section comprising a plunger and one or more pistons operatively connected with the plunger, and another section having a chamber for receiving the aforesaid plunger, and one or more chambers for receiving the aforesaid piston or pistons and having ports or passage-ways for establishing open communication between said chambers, the aforesaid chambers being adapted to receive and hold a liquid, and the arrangement of parts being such that the scoop or shovel-arm or handle is lengthened or shortened according as the aforesaid plunger and piston or pistons are moved in the one direction or the other, of a valve for cutting off communication between the piston and plunger-chambers, substantially as and for the purpose set forth.

2. In a scoop or shovel-arm or handle, the combination with a section having three longitudinal chambers adapted to receive and hold liquid and ports and passage-ways for establishing open communication between said chambers, and a section comprising a plunger extending into one of said chambers and a piston within each of the other chambers, said pistons and plunger being operatively connected with each other, and the arrangement of parts being such that the scoop or shovel-arm or handle is lengthened or shortened according as the aforesaid plunger and pistons are moved in the one direction or the other, of a valve for cutting off communication between the plunger and piston-chambers, substantially as and for the purpose set forth.

3. In a scoop or shovel-arm or handle, the combination with a section having three lon-

gitudinal chambers adapted to receive and hold liquids and ports and passage-ways for establishing open communication between said chambers, and a section comprising a plunger extending into one of said chambers and a piston within each of the other chambers, said pistons and plunger being operatively connected with each other, and the arrangement of parts being such that the scoop or shovel-arm or handle is lengthened or shortened according as the aforesaid plunger and pistons are moved in the one direction or the other, of a valve for cutting off communication between the plunger and piston-chambers, the aggregate transverse area of the piston-chambers relative to the transverse area of the plunger-chamber being such that the displacement of the plunger shall be equal to the aggregate displacement of the pistons, substantially as set forth.

4. In a scoop or shovel-arm or handle, in combination, a section having a longitudinal chamber d closed at the upper end and two chambers d' d' closed at their lower end, ports and passage-ways establishing open communication between the upper end of chamber d and the lower ends of chambers, d' d' , a section comprising a plunger and pistons adapted to operate in unison endwise of chambers, d and d' d' , respectively, and a valve for cutting off communication between the plunger and piston-chambers, substantially as and for the purpose set forth.

5. In a scoop or shovel-arm or handle, in combination, a section having three chambers, d d' d' , adapted to receive and retain liquid and arranged substantially as indicated, ports and passage-ways for establishing open communication between said chambers, a section comprising a plunger, as at C' , and two pistons, C^2 , adapted to operate endwise of chambers d and d' d' , respectively, and connected with each other to move in unison, and a valve for cutting off communication between the plunger and piston-chambers, the aggregate transverse area of the piston-chambers being such relative to the transverse area of the plunger-chamber that the displacement of the plunger will equal the aggregate displacement of the pistons, substantially as and for the purpose set forth.

6. In a scoop or shovel-arm or handle, a section having three longitudinal chambers adapted to receive and hold liquid and ports and passage-ways for establishing open communication between said chambers and having an aperture for permitting the escape of air from said chambers in the introduction of the liquid, in combination with a section comprising a plunger extending into one of said chambers and a piston within each of the remaining chambers, said pistons and plunger being operatively connected with each other, and a valve for cutting off communication between the plunger and piston-chambers,

the arrangement of parts being substantially as and for the purpose set forth.

7. In a scoop or shovel-arm or handle, a section, D, having a chamber d , closed at its upper end and a port, 21, in open relation with the upper end of said chamber, and having two chambers d' d' and ports 53 in open relation with the lower ends of said chambers, in combination with a section, C, comprising a plunger and pistons operatively connected with each other and adapted to operate endwise chambers d and d' d' , respectively, of section D, a valve-casing secured to the upper end of section D and having a port, 24, in open relation with port 21 and a valve for closing said port, 24, and pipes, as at 45 and 47, connecting and adapted to conduct liquid from port 24 to ports 53, or vice versa, according as the aforesaid plunger and pistons are actuated to displace liquid from the plunger or piston-chambers to shorten or lengthen the arm or handle, substantially as set forth.

8. The combination with a scoop or shovel-arm or handle having a section comprising three longitudinal chambers adapted to receive and retain liquid, and having a section comprising a plunger extending into and adapted to operate endwise one of said chambers and a piston in each of the other chambers and operatively connected with the plunger, of a liquid-supply-tank or receptacle, pipes and passage-ways for establishing open communication between said supply-tank or receptacle and the aforesaid chambers and between the plunger and piston-chambers, and a suction valve for cutting off said communication between the plunger and piston-chambers, the arrangement of parts being substantially as and for the purpose set forth.

9. The combination with a scoop or shovel-arm or handle having a section comprising three longitudinal chambers adapted to receive and retain liquid, and having a section comprising a plunger extending into and adapted to operate endwise one of said chambers, and a piston in each of the other chambers and operatively connected with the plunger, of a liquid supply tank or receptacle, pipes and passage-ways for establishing open communication between said supply-tank or receptacle and the aforesaid chambers and between the plunger and piston-chambers, a suction-valve for cutting off said communication, a spring having a tension substantially as described and acting in a direction to retain said valve in its seat, and a valve for closing communication between the plunger and piston-chambers, the arrangement of parts being substantially as and for the purpose set forth.

10. In a scoop or shovel-arm or handle, a section, D, having a chamber, d , closed at its upper end and a port, 21, in open relation with the upper end of said chamber, and having two chambers d' d' and ports 53 in open relation with the lower ends of said chambers, in combination with a section C, comprising a plun-

ger and pistons operatively connected with each other and adapted to operate endwise chambers d d' d' , of section D, respectively, a valve-casing secured to the upper end of section D and having a port, 24, in open relation with port 21 and a valve for closing said port 24, and pipes, as at 45 and 47, connecting and adapted to conduct liquid from port 24 to ports 53 or vice versa, according as the aforesaid plunger and pistons are actuated to displace liquid from the plunger or piston-chambers to shorten or lengthen the arm or handle, a liquid-supply-tank or receptacle, a pipe, tube or passage-way for conducting liquid from said tank or receptacle to the aforesaid valve-casing, and a suction-valve, for cutting off the supply of liquid to the valve-casing, substantially as and for the purpose set forth.

11. In a scoop or shovel-arm or handle, a section, D, having a chamber d closed at its upper end and a port 21 in open relation with the upper end of said chamber, and having two chambers d' d' and ports 53 in open relation with the lower ends of said chambers, in combination with a section C comprising a plunger and pistons operatively connected with each other and adapted to operate endwise of chambers d and d' d' , respectively, a valve-casing secured to the upper end of section D and having a port 24 in open relation with port 21, a chamber, 37, and a hollow plug-valve in open relation with chamber 37 and provided with a lateral port adapted to register with port or passage-way 24, pipes, as at 45 and 47, connecting and establishing open communication between chamber 37 and ports 53, a liquid-supply-tank or reservoir, a pipe or tube for establishing open communication between said tank or reservoir and chamber 37, a suction-valve for cutting off said last-mentioned communication, and suitable means for retaining said valve in its seat when chambers d d' d' of section C of the arm or handle are supplied with liquid, and to yield to the suction created by a vacuum formed in said chambers, substantially as and for the purpose set forth.

12. The combination with a trolley carrying a liquid-supply tank or reservoir, of a scoop having an arm or handle pivotally connected at its upper end with said trolley and comprising two sections adapted to telescope the one within the other and be blocked by a liquid both as against shortening and lengthening, and a pipe or tube for conducting liquid from said tank or reservoir to the arm or handle for the purpose indicated, substantially as set forth.

13. The combination with a trolley carrying a liquid supply tank or reservoir, of a scoop having an arm or handle pivotally connected at its upper end with said trolley and comprising two sections adapted to telescope the one within the other and be blocked by a liquid both as against shortening and length-

ening, and a pipe or tube for conducting liquid from said tank or reservoir to the handle for the purpose indicated, said trolley having an opening at the central portion to
5 accommodate the location and vibration or swinging movement of the upper end of the handle, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 4th day of August, 1892.

RICHARD THEW.

Witnesses:

C. H. DORER,
WARD HOOVER.