C. C. WICKWIRE.

WIRE CLEANING AND COATING MACHINE.

APPLICATION FILED MAR. 20, 1917.

1,244,153.

Patented Oct. 23, 1917.

5 SHEETS—SHEET 1.

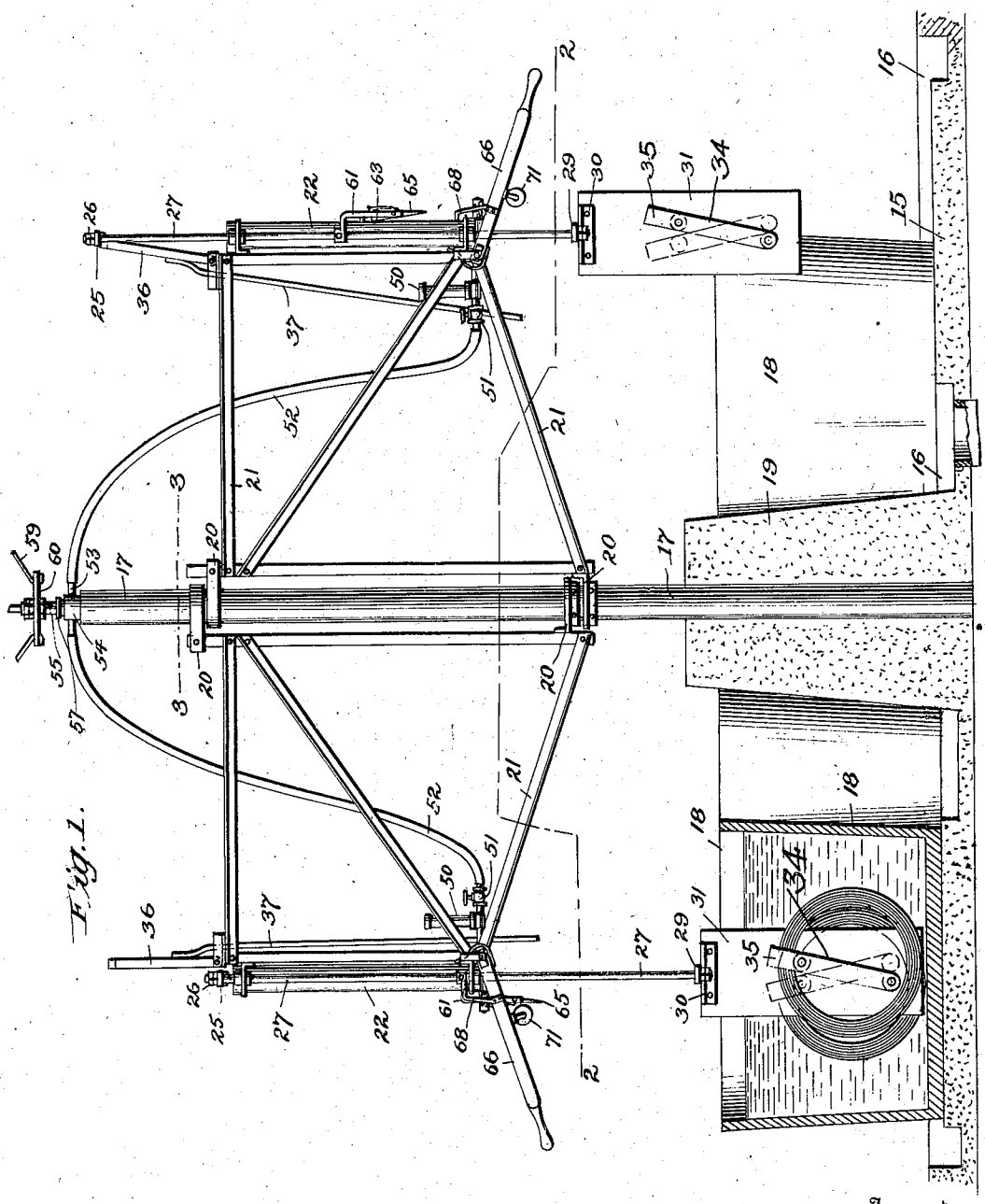


Fig. 1.

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Fig. 2.

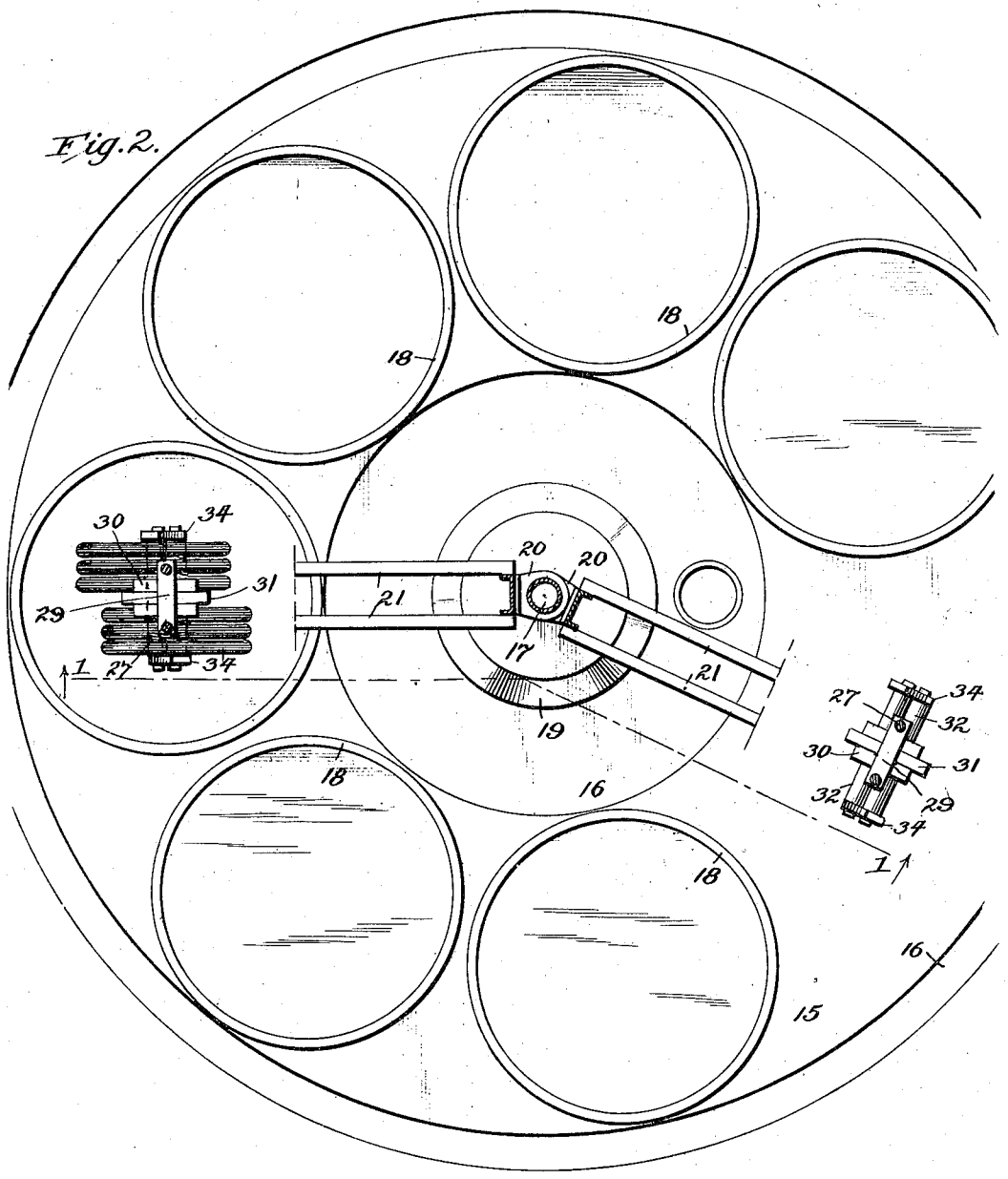
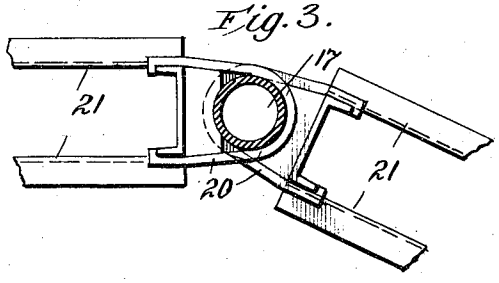


Fig. 3.



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Fig. 4.

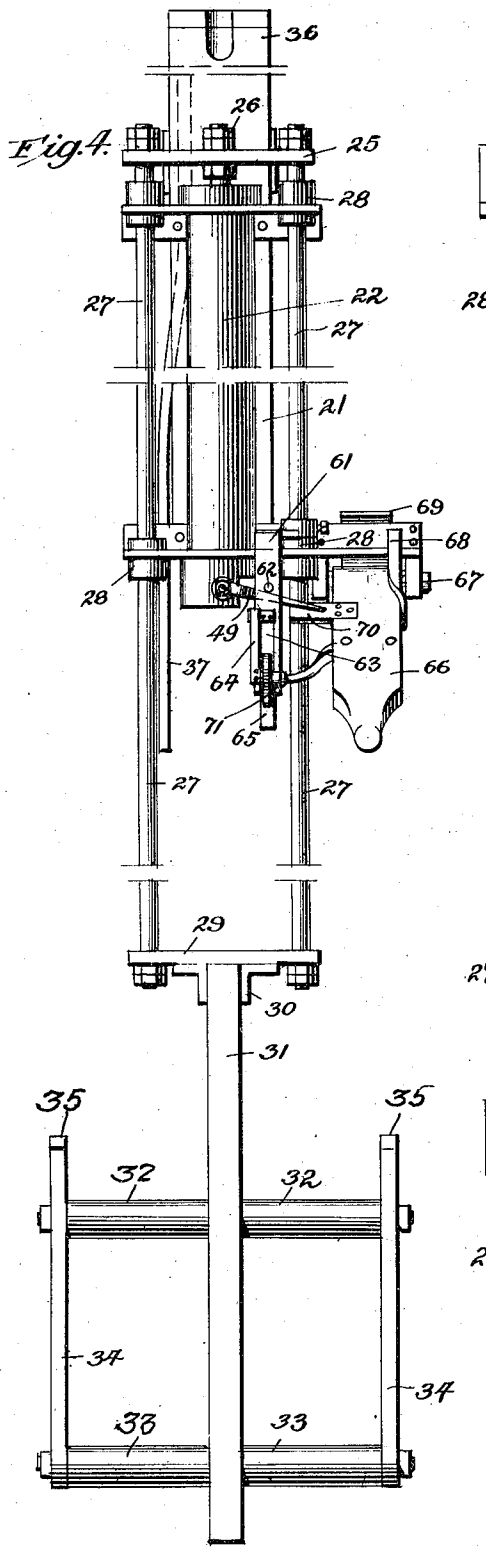
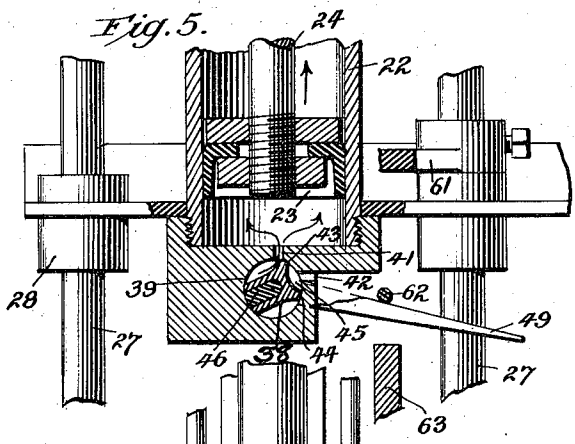


Fig. 5.



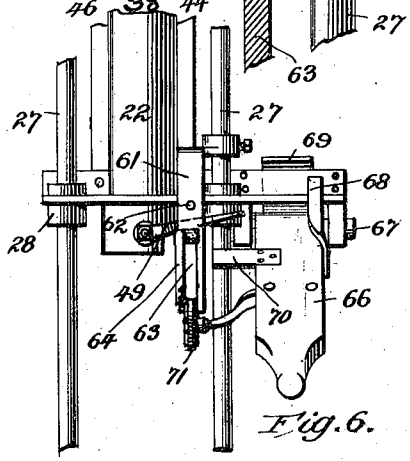


Fig. 6.

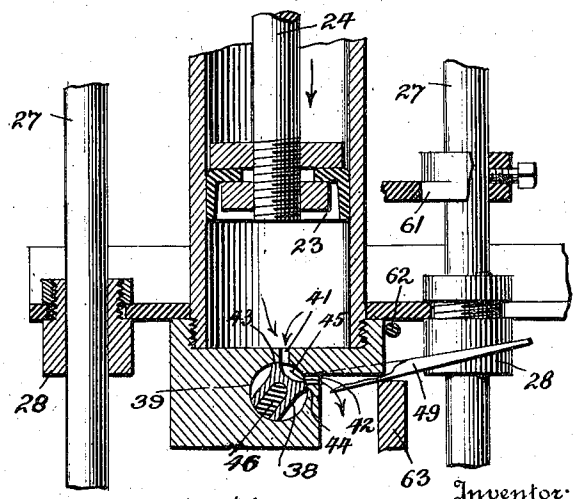


Fig. 7.

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5 SHEETS—SHEET 4.

Fig. 8.

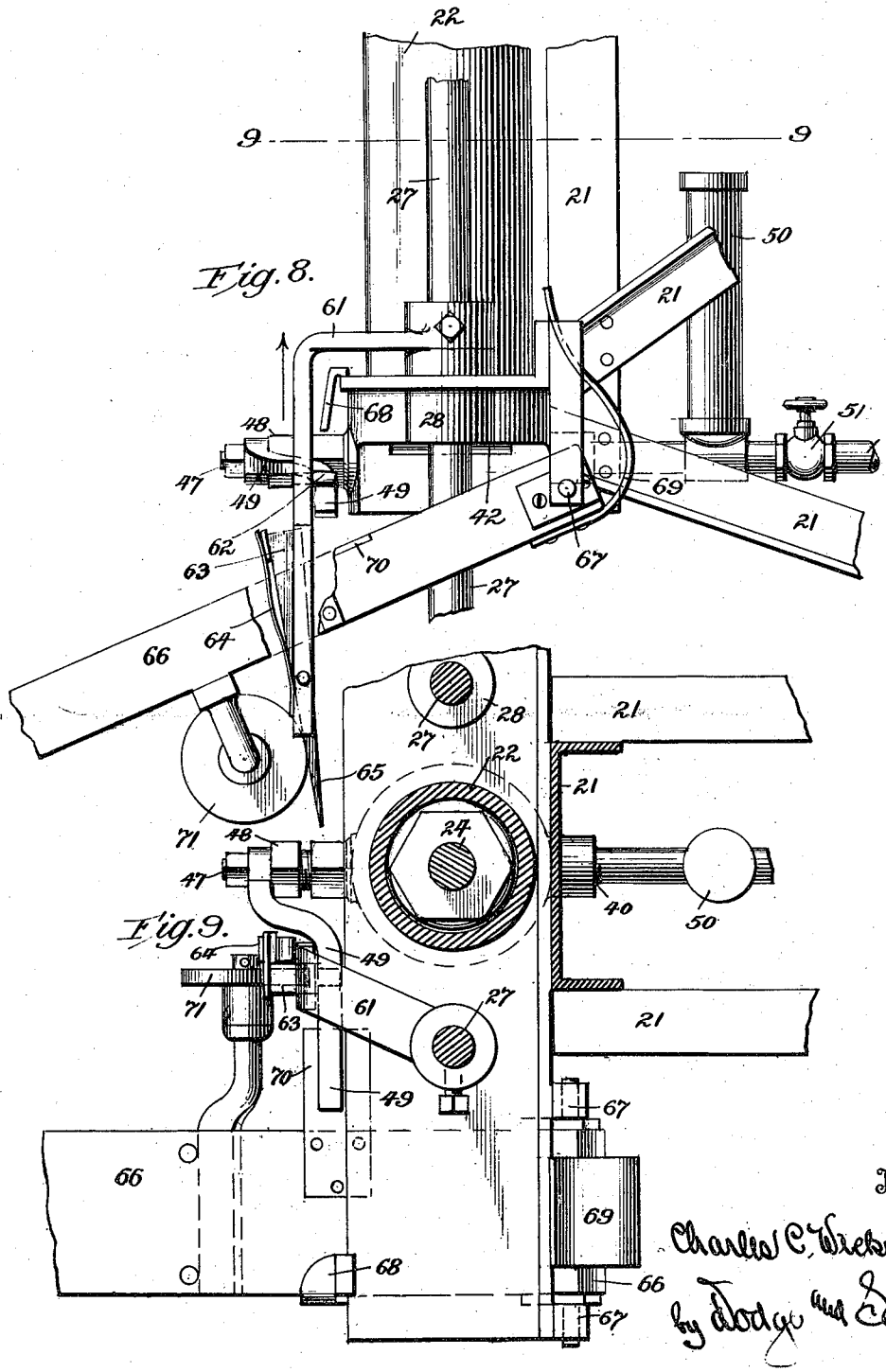


Fig. 9.

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5 SHEETS—SHEET 5.

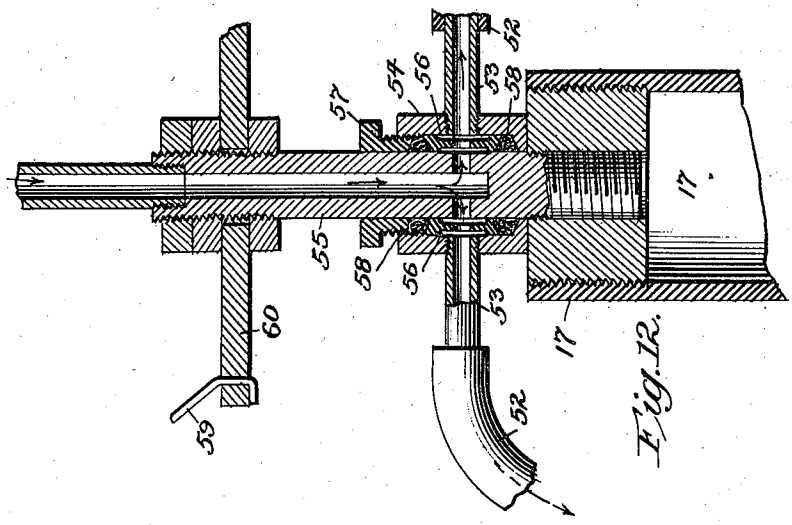


Fig. 12.

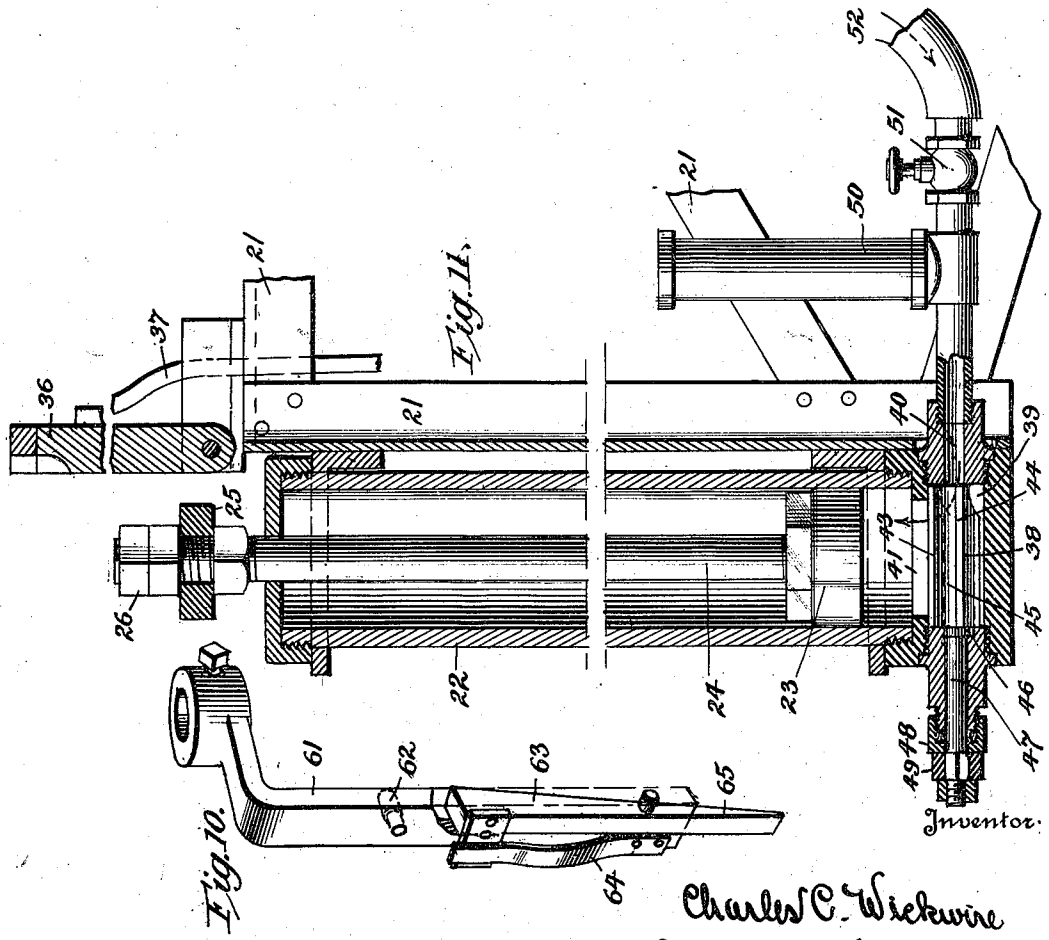


Fig. 11.

Fig. 10.

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UNITED STATES PATENT OFFICE.

CHARLES C. WICKWIRE, OF CORTLAND, NEW YORK.

WIRE CLEANING AND COATING MACHINE.

1,244,153. Specification of Letters Patent. Patented Oct. 23, 1917.

Application filed March 20, 1917. Serial No. 156,158.

To all whom it may concern:

Be it known that I, CHARLES C. WICKWIRE, a citizen of the United States, residing at Cortland, in the county of Cortland and State of New York, have invented certain new and useful Improvements in Wire Cleaning and Coating Machines, of which the following is a specification.

This invention relates to machines for cleaning and coating wire to prepare it for drawing.

The invention provides a device in which the coils of wire are elevated and transferred from each of the successive pickling, washing and coating solutions to the next, and in which the duration of treatment in each solution may be determined by the operator for each load or batch of wire. The invention also provides a simple and effective valve and valve mechanism for each hoist, which automatically causes reciprocation of the wire coil carriers in a vertical direction when in their lower positions. The coil carriers are further so formed that when reciprocated they cause a slow rotation of the coils hung thereon. This reciprocation and rotation of the coils is peculiarly effective in loosening scale and other adherent matter and secures a complete and effective action of the various solutions.

I illustrate an actual and successful embodiment of the invention in the accompanying drawings, in which:—

Figure 1 is a view of the complete device partly in elevation and partly in section, the line of section being shown at 1—1 in Fig. 2;

Fig. 2 is a horizontal sectional plan on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a front elevation of one hoist element showing the hoist lowered and the valve mechanism operative to produce reciprocation, the hoist being about to start an upward movement;

Fig. 5 is a section showing the valve in the position it assumes in Fig. 4;

Fig. 6 is a fragmentary view similar to Fig. 4 but showing the hoist about to start a downward reciprocative movement;

Fig. 7 is a section similar to Fig. 5 showing the valve in the position it assumes in Fig. 6;

Fig. 8 is a side elevation of the valve control for the hoist on an enlarged scale;

Fig. 9 is a section on the line 9—9 of Fig. 8;

Fig. 10 is a perspective view of the valve latch for causing reciprocative action of the hoist;

Fig. 11 is a vertical section through the hoist; and

Fig. 12 is a vertical section through the air manifold swivel connection at the head of the supporting post.

In the drawings 15 represents a concrete base of generally circular contour provided with drain gutters 16 and supporting a central column 17. Arranged around the base 15 are several tubs or vats 18, six being shown, and these contain the various cleaning and coating liquids in which the wire is to be successively immersed. A space is left between the first and last tubs of the series to serve as a loading and discharge platform. The concrete base 15 is extended upward in the center as shown at 19 to support the column 17 and also to protect it from acid splashing or overflowing from the tubs.

Independently swiveled on the column 17 by means of straps or collars 20 are two substantially identical hoist frames or jib cranes 21 whose form is clearly shown in Fig. 1. Each crane carries at its outer end an air hoist the cylinder 22 of which is vertically arranged at such radial distance from the post 17 as to swing directly over the centers of the tubs 18.

Each cylinder 22 has a single acting piston 23 (see Fig. 11) the rod 24 of which passes out of the upper end of its cylinder 22 and is connected to a yoke or plate 25 best shown in Fig. 4, by any approved means such as the nuts 26. The plate 25 is similarly connected to hoist rods 27 which slide in guides 28 along side cylinder 22 and are connected together at their lower ends, below the lower end of cylinder 22, by a plate or yoke 29, also shown in Fig. 4.

The plate 29 carries by means of angle braces 30 a depending board or tongue 31 of wood or any acid resisting material, intended to dip into the vats 18 in the lowered positions of the hoists. The board or tongue 31 carries two upper brackets 32 and two lower brackets 33 tied together at their outer ends by the strips 34 which project upward

beyond the brackets 32 to form retaining fingers 35. The brackets 32 are not in vertical alinement with the brackets 33 but are laterally offset in reverse directions as best shown in Fig. 1. Since the coils of wire do not closely fit around the brackets 32, 33 the reciprocating or churning motion of the carriers in the solutions in the vats causes a slow rotation of the coils on the brackets, which is highly beneficial, to the cleaning function particularly. Such rotation is due to the fact that each upper bracket 32 is out of vertical alinement with the lower bracket 33, and that each lower bracket is so positioned with reference to the inner diameter of the coil as to permit said coil when at rest to hang freely suspended from the upper bracket 32. Under such conditions the quick upward movement of the coil-carrier or support will carry the coil upward in the position in which it normally hangs on the upper bracket 32, but upon sudden reversal of the movement of the carrier the momentum of the coil will cause it to continue its upward movement until the lower portion of the coil contacts with the lower bracket 33, which being to one side of the center of the coil causes the latter to swing or move about such lower bracket as a center of motion, tending to bring the center of the coil in vertical alinement with the axis of the lower bracket, and to give the coil a new point of support on the upper bracket when the carrier again moves upward. This rapidly recurring cycle of operations produces a progressive rotation of the coil, and a rapid series of concussions between the carrier brackets and the coil, which greatly aids the washing action and detachment and removal of scale.

In order to support the hoist at a convenient height for loading or unloading, a strut 36 is provided back of the top of cylinder 22 and may be swung forward by means of an arm 37 so as to enter beneath yoke 25 as this is descending. This gives a ready support during loading and avoids needless valve manipulation, it being difficult to hold an air hoist at rest at mid stroke.

At the lower or head end of each cylinder 22 is located a valve 38, together with mechanism for actuating said valves. The valve 38 is an oscillatory rotary D-valve controlling admission and exhaust. The cylinder valve chamber 39 receives air or other pressure fluid through an end port 40. (See Fig. 11.) It communicates with the cylinder through a port 41 and with the atmosphere through a port 42. (See Figs. 5, 7 and 11.) The lap 43 of the valve 38 controls the cylinder port 41, and the lap 44 prevents the escape of air from chamber 39 through exhaust port 42. The exhaust port 45 of the valve 38 serves in one position to connect cylinder port 41 to exhaust port 42.

The valve 38 has a slot in its back and is actuated by a key 46 engaging the valve through said slot, and having a stem 47 extending out through a stuffing box 48. The valve 38 is given a rotary oscillation by means of an arm 49 which has a limited vertical movement. In the lower position of arm 49 (see Fig. 5) pressure fluid is admitted to the cylinder through port 41. In the raised position of arm 49 (see Fig. 7) pressure fluid is exhausted from the cylinder through ports 41, 45 and 42.

Compressed air is the preferred pressure fluid, and when such an expansible pressure fluid is used I place a small chamber or reservoir 50 in communication with the supply port 40 close to each cylinder, and a globe valve 51 in advance of each such chamber (see Figs. 1, 8 and 11). The valves 51 may each be set to give a desired slow movement of the hoist with which it is associated, in its full traverse, the effect of the additional air volume in reservoir 50 being to give relatively rapid reciprocative action of the hoist when the valve 38 is oscillated as hereinafter described. This action of the reservoir is due to the fact that the compressed air in the reservoir is depleted by a continuous long stroke. When making short reciprocations, air is drawn only on the upstroke, and the reservoir is partially replenished during the down-strokes. The reservoir produces quicker reciprocations equalizing the flow rate through the restricting valve 51.

Air or other suitable pressure fluid is conveyed to valves 51 through tubes 52. As seen in Fig. 12, these are connected to nipples 53 on a swivel sleeve 54 which turns on a feed pipe 55 carried by pillar 17 at its top. The sleeve 54 is provided with a double packing-gland arrangement, consisting of perforated spacer 56, gland-nut 57 and two rings of packing 58, one above and the other below the spacer.

The column 17 may be stayed by wire or other tension stays 59 connected to a stay plate 60. This is mounted on pipe 55 above the sleeve 54, as shown in Fig. 1.

To operate the valve 38 through the arm 49 two mechanisms are provided, the first automatically operative in the lower position of the hoist to cause an oscillating action of the valve and consequent limited reciprocative action of the hoist, and the second a manually operated device to throw the first or automatic valve actuator out of action and cause the complete traverse of the hoist.

As shown in Figs. 1, 4, 6, 8, 9 and 10, the first of these devices is carried on a depending arm 61 fast on one of the hoist rods. A striker pin 62 is fast on the arm 61 in such position as to strike the arm 49 downward near the limit of downward movement of

the hoist. A second striker in the form of a latch 63, held by a spring 64 and having a depending trigger 65, is mounted on arm 61 below pin 62. When the hoist moves downward from its top position the latch 63 may yield so as to ride past the arm 49 so that the arm 49 thereafter lies between the pin 62 and latch 63, and will be shifted up and down thereby as the hoist moves, under the admission and exhaust action of the valve.

The manual control device consists of a lever 66, pivoted at 67, and limited in its downward movements by a stop 68 (see Figs. 1, 4, 6, 8 and 9). It is normally held in an intermediate neutral position by a spring 69. The lever 66 carries a projecting plate 70 adapted to engage and lift the arm 49 when the lever is raised from the above-mentioned mid position. The arm 66 also carries a roller 71 adapted, when the lever is depressed from mid-position, to engage the depending trigger 65 and retract latch 63.

When the lever 66 is in its normal or neutral position and the hoist is down, latch 63 is in operative position and arm 49 has been lowered by pin 62. This shifts valve 38 and causes the hoist to start upward. Soon, however, latch 63 strikes and raises arm 49 causing the hoist to start down, a movement which is again reversed by the collision of pin 62 with arm 49. Thus the hoist has a reciprocative movement of small amplitude. To send the hoist clear up, the lever 66 is moved downward retracting latch 63 and putting it out of action. To lower the hoist the lever 66 may then be raised above its normal position thus raising and holding up the arm 49. As the hoist descends latch 63 will ride over arm 49 and upon the lowering of lever 66 to normal position the reciprocation will commence as before.

This cycle of operation is repeated for each tub or vat until the loading point is reached, when the hoist is stopped in partially lowered position by the strut or latch 36 set for that purpose, as shown at the right-hand side of Fig. 1.

I have shown two swinging brackets or cranes mounted on the post 17, but any desired number may be used, each carrying a separate hoist with its valve and control devices. It is desirable, however, that each be free in order to secure complete independence of the duration of treatment in the several vats.

The mechanism is quickly and easily handled, and because of the churning and rotation of the coils in the solution produces peculiarly rapid and thorough treatment. Various minor modifications obviously are possible and are contemplated.

Having thus described my invention, what I claim is:—

1. A wire cleaning device comprising in combination a vat for holding a treating solution; a carrier provided with laterally offset arms for receiving and loosely supporting a coil of wire; and means for reciprocating said carrier in said vat to agitate and rotate the coil so supported.

2. A wire cleaning device comprising in combination a vat for holding a treating solution; a carrier provided with laterally offset arms for receiving and loosely supporting a coil of wire; means for reciprocating said carrier in said vat to agitate and rotate the coil so supported; and means for lowering and raising said carrier into and out of said vat.

3. A wire cleaning apparatus comprising a column or support; a plurality of jib cranes carried by and independently movable about said column; a plurality of hoists, each carried by a different one of the jib cranes and each provided with a wire carrier; independent control devices for the respective hoists; and a series of vats arranged about the supporting column; whereby each hoist and carrier may be swung independently to position over any vat of the series, and its carrier lowered into or raised out of the vat without disturbing other carriers.

4. In a wire cleaning device, the combination with a vat for holding treating solution, of a hoist overhanging the vat and provided with a wire carrier having coil-receiving arms out of vertical alinement with each other; and means for effecting a more or less rapid vertical reciprocation of the hoist and carrier, whereby a coil of wire placed upon the carrier is moved quickly through the solution and simultaneously rotated.

5. A wire cleaning apparatus comprising, in combination, a fluid-pressure actuated hoist; a vat for holding treating solution; a wire carrier movable by said hoist into and out of said vat, and provided with two coil-receiving arms vertically out of alinement with each other; a valve controlling the admission and exhaust of pressure fluid to and from the hoist; manually operable means for actuating said valve to effect full traverse of said hoist; and an automatic actuator operative upon said valve when the hoist is in its lower positions, whereby a continuous short and relatively rapid reciprocation of the hoist and carrier is effected and rotation of coils of wire on the carrier is produced.

6. A wire cleaning device comprising in combination a fluid pressure operated hoist; a vat for containing treating solution; a

wire carrier movable by said hoist into and out of said vat and provided with laterally offset coil receiving arms; a reciprocable combined admission and exhaust valve for the hoist; automatic valve-actuating means movable by the hoist and operative upon said valve to reciprocate the same and thereby cause the hoist to reciprocate with a limited amplitude; and a single manually operable means for rendering said automatic valve-actuating means inoperative and for actuating said valve to produce a complete traverse of the hoist.

7. A wire cleaning device comprising in combination an air hoist; a vat for holding treating solution; a wire carrier movable by said hoist into and out of said vat; a valve for controlling the admission and exhaust of air to and from said hoist; manually operable means for actuating said valve; an automatic actuator operative in the lower positions of said hoist to actuate said valve alternately in reverse directions and cause a limited reciprocation of said hoist; an air supply pipe leading to said valve; means for restricting the rate of flow through said pipe; and an air chamber communicating with said pipe between said restricting means and valve.

8. A wire cleaning device comprising in combination, a series of vats for holding treating solution; and a plurality of independently movable traversing hoists movable over said vats, and each including a hoist member, a carrier movable by said hoist into and out of said vats, coil-receiving arms on said carrier, manually operable means for operating said hoist, and automatic means for causing a limited reciprocative action of said hoist when lowered.

9. A wire cleaning device comprising in combination, a series of vats for holding treating solution; and a plurality of independently movable traversing hoists movable over said vats, and each including a hoist member, a carrier movable by said hoist into and out of said vats; laterally offset coil-receiving arms on said carrier, manually operable means for operating said hoist, and automatic means for causing a limited reciprocative action of said hoist when lowered.

10. A wire cleaning device comprising in combination a series of vats for holding treating solutions; and a plurality of independently movable traversing hoists movable over said vats, and each including a fluid pressure actuated hoist, a carrier movable by said hoist into and out of said vats, coil-receiving arms on said carrier, a valve for controlling the admission and exhaust of pressure fluid to and from said hoist, automatic means for actuating said valves to cause a limited reciprocative action of said hoist, and manually operable means for controlling the action of said hoist and for rendering said automatic means inoperative.

11. A wire cleaning device comprising in combination, a series of vats for holding treating solutions; and a plurality of independently movable traversing hoists movable over said vats, and each including a fluid pressure actuated hoist, a carrier movable by said hoist into and out of said vats, laterally offset coil-receiving arms on said carrier, a valve for controlling the admission and exhaust of pressure fluid to and from said hoist, automatic means for actuating said valves to cause a limited reciprocative action of said hoist, and manually operable means for controlling the action of said hoist and for rendering said automatic means inoperative.

In testimony whereof I have signed my name to this specification.

CHARLES C. WICKWIRE.