

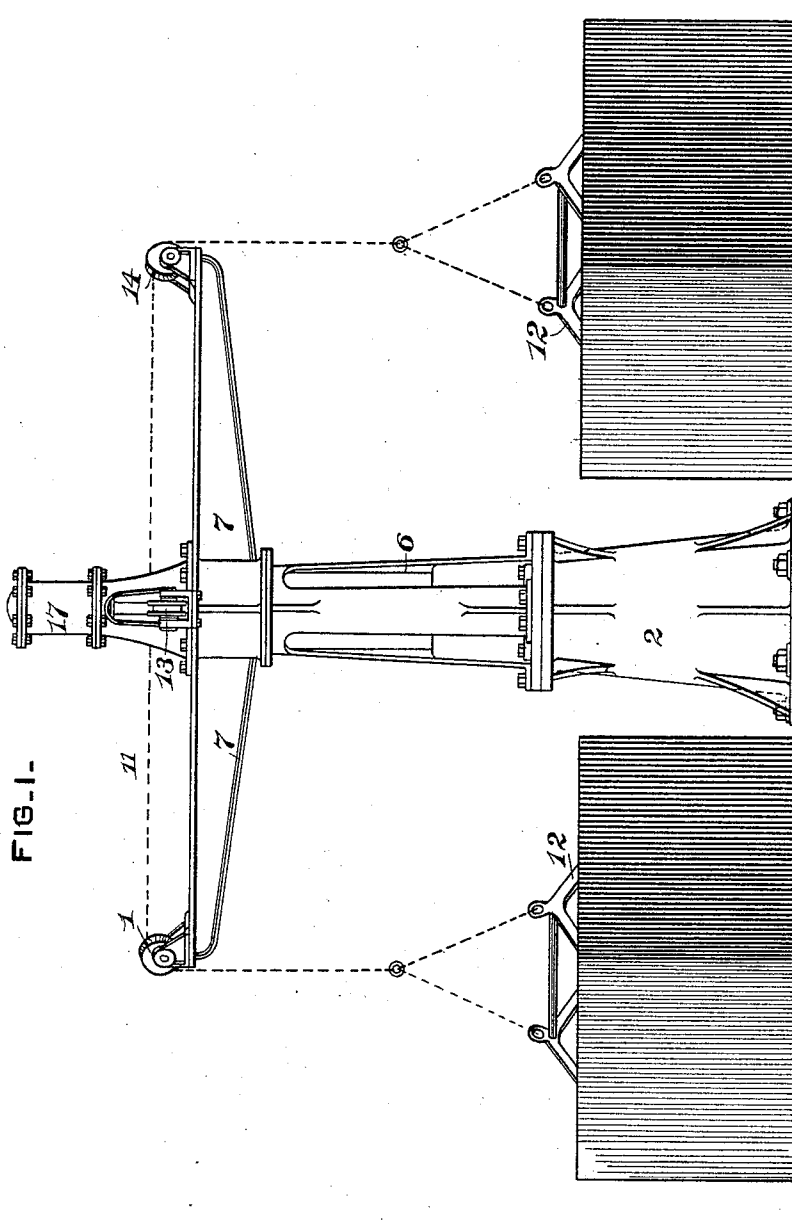
(No Model.)

2 Sheets—Sheet 1.

A. E. SAWERS.
APPARATUS FOR PICKLING SHEETS, &c.

No. 536,399.

Patented Mar. 26, 1895.



WITNESSES:

Danville B. Wolcott
C. E. Hunt.

INVENTOR,

Arthur E. Sawers,
by George H. Christy
Att'y.

(No Model.)

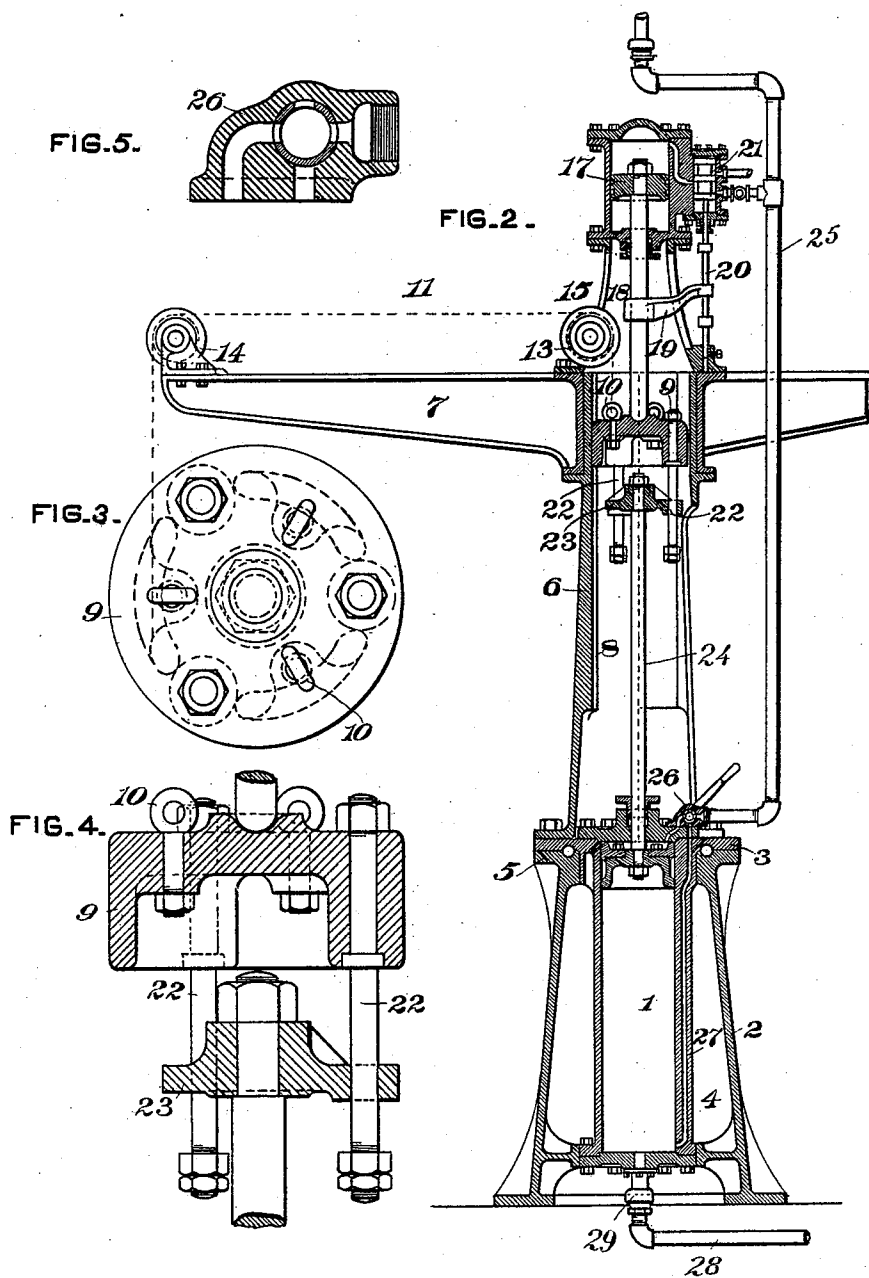
2 Sheets—Sheet 2.

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APPARATUS FOR PICKLING SHEETS, &c.

No. 536,399.

Patented Mar. 26, 1895.



WITNESSES:

Darwin S. Wolcott
C. E. Hunt

INVENTOR,

Arthur E. Sawers,
by George H. Christy

Att'y. 1

UNITED STATES PATENT OFFICE.

ARTHUR E. SAWERS, OF BELTZHOVER, PENNSYLVANIA.

APPARATUS FOR PICKLING SHEETS, &c.

SPECIFICATION forming part of Letters Patent No. 536,399, dated March 26, 1895.

Application filed December 21, 1893. Serial No. 494,304. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR E. SAWERS, a subject of the Queen of Great Britain, residing at Beltzhoover borough, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Apparatus for Pickling Sheets, &c., of which improvements the following is a specification.

In coating metal sheets, a number of them are placed in a cage or support, and then dipped in acid and cleaning baths, in order to prepare them for the metal coating. In order that the liquid of the baths may come in contact with a washing action with every part of the sheet, the cages are moved around in the bath preferably in a vertical direction, so as to prevent a splashing of the liquid out of the tank. These cages are usually connected to arms carried by the piston rod of a vertically arranged cylinder of such a length as to permit of the lifting of the cages entirely out of the baths, and capable of rotation so that the cages and sheets may be transferred from one bath to another. In order to obtain the desired slushing action of the liquid on the sheets, the cages must be lifted up and down in the baths. This reciprocating action is usually obtained by so arranging the valve mechanism of the cylinder as to impart only a short stroke to the piston thereof, except when it is desired to lift the cage entirely out of the bath. This feature of construction is objectionable for the reason that the cylinder becomes rapidly worn along that portion of the cylinder where the piston operates during its short stroke.

The object of the present invention is to provide independent cylinders for the reciprocation of the cages, and for lifting the latter entirely out of the bath, the operation of such cylinders being wholly independent.

In the accompanying drawings forming a part of this specification, Figure 1 is a view, in side elevation, of a pickling apparatus embodying my invention. Fig. 2 is a sectional elevation of the same. Fig. 3 is a top plan view of the main cross-head. Fig. 4 is a sectional elevation of the main and auxiliary cross-heads; and Fig. 5 is a sectional detail view of the ports and valve mechanism con-

trolling the flow of fluid pressure to the lifting cylinder.

In the practice of my invention, the main or lifting cylinder 1 is arranged within a vertical case or support 2, the upper end of the cylinder being provided with flanges 3, which rest upon the upper end of the support. Near its lower end, the case or support is provided with an annular guide or bearing surface 4, for the lower end of the cylinder. In order to facilitate the rotation of the cylinder within the case or support, friction rollers 5 are interposed between the flange 3 and the upper end of the support. Upon the flange 3 is bolted the hollow mast 6, having the radial arms 7, secured to it at or near its upper end. On the inner walls of the mast are formed guides 8, for the main cross-head 9, which is provided with eyes 10, or other suitable means for the attachment of the chain or other flexible connection 11 to the cages 12. These flexible connections are arranged over guide pulleys 13 and 14, at the inner and outer ends of the arms 7.

On top of the mast 6, is secured a frame 15, having the secondary or reciprocating cylinder 17 secured thereto. The piston rod 18 of this cylinder projects down through the lower head thereof, and bears, when the parts of the apparatus are arranged or adjusted for slushing sheets, upon the main cross-head 9. To this piston rod is secured an arm 19, having connected to its outer end the stem 20, of the valve mechanism 21, controlling the admission and exhaust of fluid pressure to and from the cylinder 17.

A series of two or more rods 22 is secured to the under side of the main cross-head 9, and extend down through suitable openings in the auxiliary cross-head 23. These rods are made of sufficient length as to extend below the main cross-head a distance a little greater than the stroke of the auxiliary or reciprocating cylinder 17, and are provided with heads at their lower ends. This auxiliary cross-head is attached to the piston rod 24 of the main cylinder 1. Fluid pressure is supplied to the secondary and main cylinders by the pipe 25, the admission of fluid pressure to the main cylinder being controlled by the valve mechanism 26, as shown in Fig. 5. The exhaust

passage 27 for the main cylinder is preferably formed through the wall thereof and opens thereinto near its lower end, the exhaust being conducted therefrom by a pipe 28, connected centrally to the lower head of the cylinder, said pipe being provided with a rotatable joint 29, so as to permit of the free rotation of the cylinder.

As is customary in this kind of apparatus, three lifting arms are employed and two tanks or vats, so arranged around the base of the apparatus as to afford space where one of the cages be may emptied and loaded, while the others are in use. In the operation of my device when it is desired to change the position of the cages from one vat to another, fluid pressure is admitted into the upper end of the lifting cylinder 1, thereby forcing down its piston and rod, and with it the auxiliary cross-head 23. As the latter descends, it engages the heads on the ends of the rods 22, thereby pulling down the main cross-head 9, this movement, through the medium of the flexible connections 11, lifting the cages from the vats. The main cylinder, the mast with its arms, and the auxiliary cylinder, are now rotated to bring the cages into proper vertical position, whereupon the valve mechanism 26 is so shifted as to permit of the escape of fluid pressure from the upper end of the main cylinder, whereupon the weight of the cages will lift the cross-heads with the piston of the main cylinder, as the cages descend into the vats. Fluid pressure is now admitted to the auxiliary or reciprocating cylinder, and as the piston of said cylinder descends, its rod 18 will bear upon the main cross-head, and force the latter down. As the piston reaches the end of its stroke, the arm 19 will so shift the valve mechanism 21, as to open the exhaust port of the auxiliary cylinder, thus permitting the cages to descend, and thereby lift the main

cross-head and piston of the auxiliary cylinder. As the piston reaches the upper end of its stroke, the valve mechanism is again shifted to admit fluid pressure to the upper end of the cylinder.

It will be observed that the downward movement of the main cross-head, when actuated by the auxiliary cylinder, as above stated, will not affect the auxiliary cross-head or piston of the lifting cylinder, as the rods 22 slide freely through said cross-head.

I claim herein as my invention—

1. In an apparatus for pickling sheets, &c., the combination of cages, a main cross-head connected to the cages and provided with headed bolts, an auxiliary cross-head adapted to slide along said bolts and engage the heads thereof, a main cylinder provided with a piston for operating the auxiliary cross-head, and an auxiliary cylinder provided with a piston for operating the main cross-head independent of the auxiliary cross-head, substantially as set forth.

2. In an apparatus for pickling sheets, &c., the combination of a frame or support, a main or lifting cylinder provided with a piston rotatably arranged within said support, a mast secured to the head of the main cylinder, arms attached to the mast, an auxiliary cylinder provided with a piston arranged on the mast, a main cross-head, cages having flexible connections to the main cross-head, an auxiliary cross-head and connections between the main and auxiliary cross-head, permitting the independent operation of the main cross-head, substantially as set forth.

In testimony whereof I have hereunto set my hand.

ARTHUR E. SAWERS.

Witnesses:

DARWIN S. WOLCOTT,
F. E. GAITHER.