

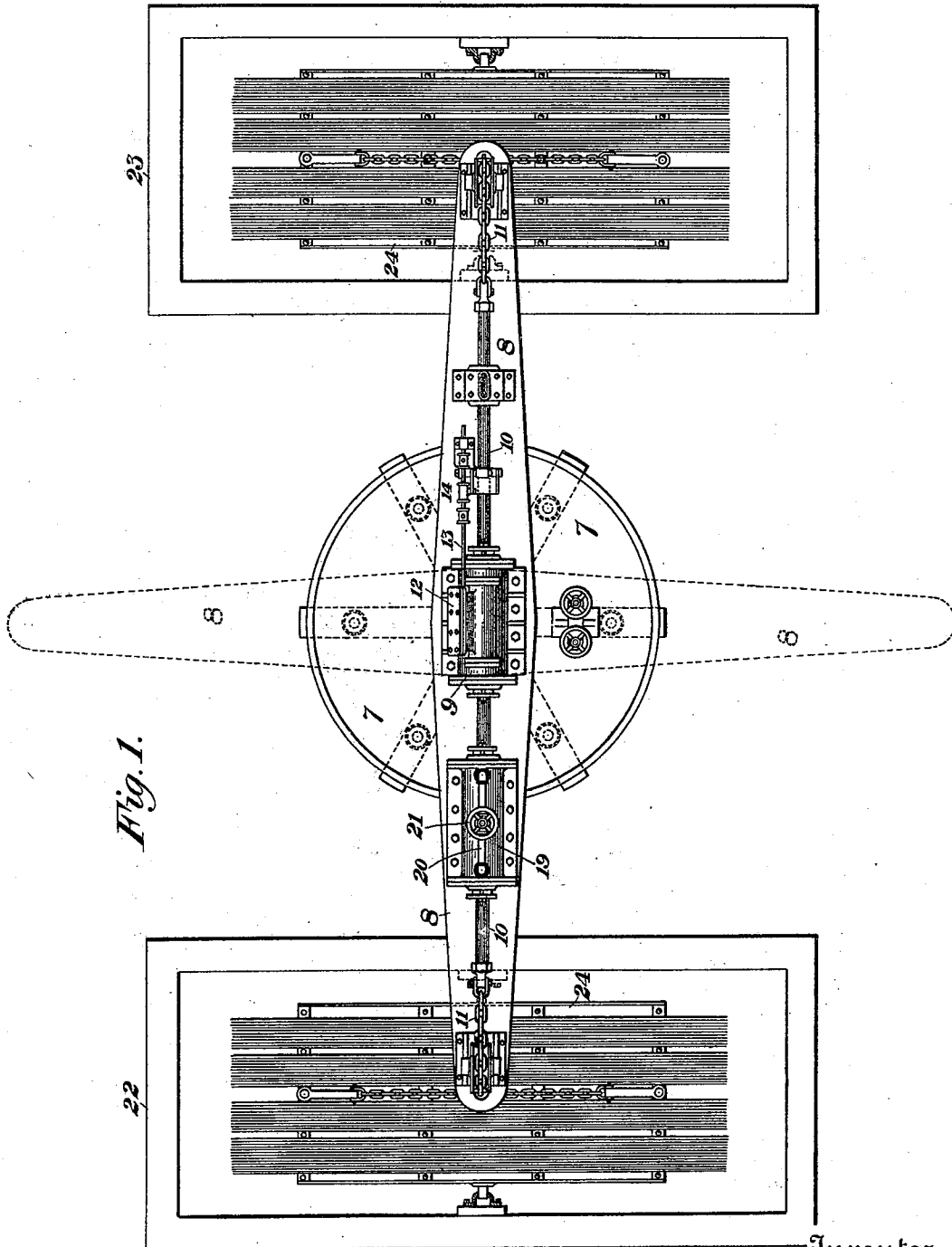
(No Model.)

3 Sheets—Sheet 1.

G. MESTA.
APPARATUS FOR PICKLING METAL.

No. 510,697.

Patented Dec. 12, 1893.



Witnesses

Thomas W. Baxendell
A. W. Corwin

-Inventor

George Mead

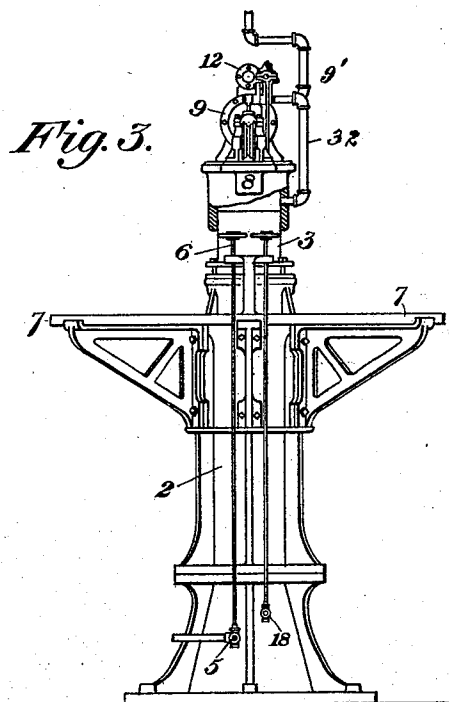
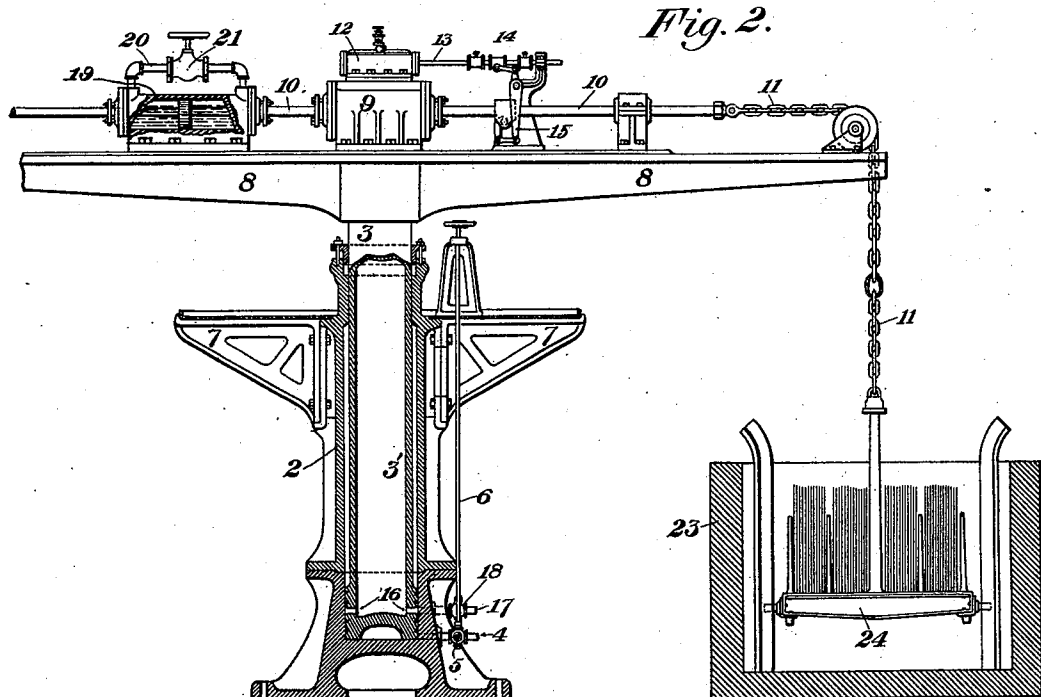
(No Model.)

3 Sheets—Sheet 2.

G. MESTA.
APPARATUS FOR PICKLING METAL.

No. 510,697.

Patented Dec. 12, 1893.



Witnesses

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(No Model.)

3 Sheets—Sheet 3.

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Fig. 4.

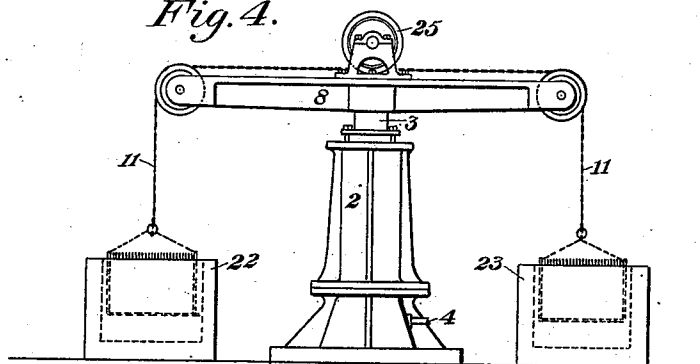


Fig. 5.

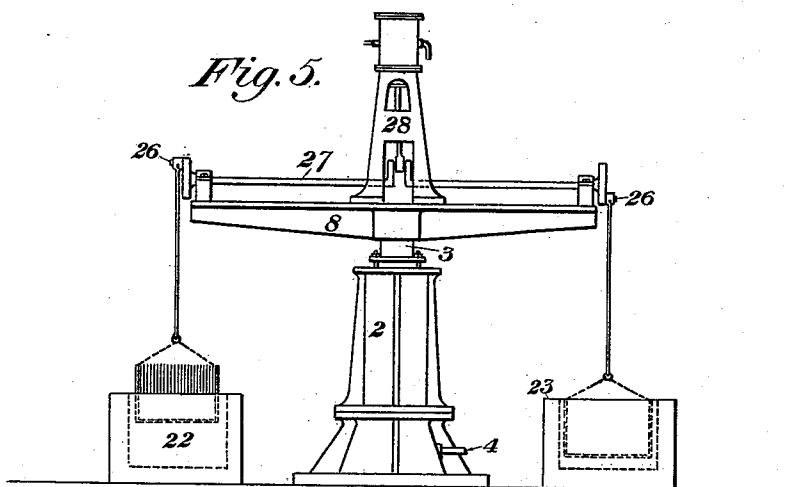
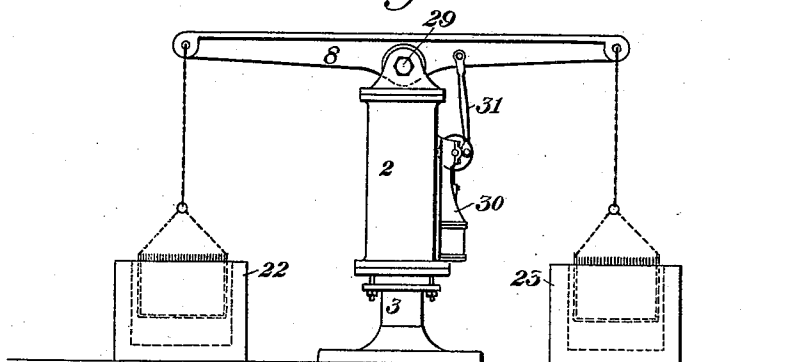


Fig. 6.



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UNITED STATES PATENT OFFICE.

GEORGE MESTA, OF PITTSBURG, PENNSYLVANIA.

APPARATUS FOR PICKLING METAL.

SPECIFICATION forming part of Letters Patent No. 510,697, dated December 12, 1893.

Application filed March 21, 1893. Serial No. 467,018. (No model.)

To all whom it may concern:

Be it known that I, GEORGE MESTA, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Metal-Pickling Apparatus, of which the following is a full, clear, and exact description.

My invention is designed to provide improved means for pickling and washing metal plates or other material, and its object is to improve and simplify the mechanism and to increase its efficiency. It is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the apparatus, including the vats. Fig. 2 is a side elevation, partly in section, showing one of the vats. Fig. 3 is an end elevation; and Figs. 4, 5 and 6 are side elevations of modified constructions.

The machine affords necessarily three mechanical motions, a vertical lifting motion by which the crates carrying the metal plates can be lifted from and introduced into the vats, a rotary motion by which they may be transferred laterally from one vat to the other, and a short motion of the crates within the vats in order to insure the thorough action of the liquid thereon. I shall now describe the means by which these motions are effected.

The lifting motion is accomplished by an upright cylinder 2, containing a plunger 3, and provided at its base with an inlet 4 for water or other motive fluid, controlled by a valve 5, whose operating rod 6 may extend to a platform 7 set near to the top of the cylinder, so as to be in a convenient position for the operator. The plunger carries a jib 8 whose arms extend radially in opposite directions. The crate-agitating device is constructed so that in acting it shall be balanced by the crates themselves, *i. e.*, so that as one crate is raised, the other is lowered, and that by reason of the balance thus caused, the crates can be moved easily and with the expenditure of but little power. Various means may be employed for this purpose. I show one form in Figs. 1, 2, and 3, consisting of a double-acting power-cylinder 9, set on the jib and having a fluid supply pipe 9' and a pis-

ton with rods or plungers 10 projecting from both ends thereof. This piston is caused to reciprocate by means hereinafter described, and as the crates are suspended by chains 11 extending from the rods over sheaves at the ends of the jib, the crates are caused to move up and down alternately with reference to each other, the gravity of the descending crate counterbalancing the other and assisting in its motion. The only work done by the cylinder is therefore exerted in overcoming the friction of the moving parts and the difference in weight between the loaded crates, and the motion is made easy without jar. The reciprocation of the piston may be effected automatically by a valve, which may be an ordinary slide valve, whose valve-chamber is marked 12 in the drawings, the valve-stem 13 being connected by tappets 14, and levers 15, (in the manner usual in steam pumps or otherwise,) with the piston rod 10, so that at the end of each stroke the valve is automatically reversed and the piston caused to move back. I prefer to derive the motive fluid for the cylinder 9 from the same source as that of the cylinder 2, and for that purpose I connect the inlet ports of the valve-chamber with a hollow passage 3' in the plunger 3, and provide the plunger with a lateral port 16, which, at the lowest position, communicates with an inlet-port 17 controlled by a valve 18, whose operating rod may extend to the platform 7. By opening this valve, when the plunger is at its lowest position, motive fluid is admitted to the valve-chamber 12, and the piston rods 10 are caused to reciprocate, and when the plunger 3 is raised the fluid supply is cut off automatically by disconnection of the ports 16 and 17. 32 is the steam supply pipe for the cylinder 9.

In order to cushion the motion of the piston of the cylinder 9, I may employ a liquid-filled dash-pot-cylinder 19 through which one of the rods 10 passes and in which it is provided with a piston-head. The ends of this cylinder are connected by a pipe 20, which is provided with a valve 21, and as the piston-rod moves back and forth, the piston in the cylinder 19 displaces the liquid alternately from one end of the cylinder to the other

through said pipe, the speed of motion of the piston being governed by setting the valve 21 and depending for its rate upon the size of the port-opening afforded by that valve.

5 This device constitutes an efficient means for stopping the reciprocating action of the rod 10, for if the valve 21 be closed it is obvious that the motion of said rod will be instantly arrested.

10 22 and 23 are the vats. These are set parallel to each other on opposite sides of the apparatus, and separated sufficiently to enable two crates 24, suspended from the chains 11 at the ends of the jib, to operate within them.

15 One of the vats contains an acid pickle, and the other contains water for washing the pickled sheets of metal. They are preferably provided with suitable upright guides to steady the crates in their reciprocation.

20 The operation is as follows:—The jib being in the position indicated by the dotted lines in Fig. 1 with the crates suspended therefrom, and the crates having been filled with metal plates intended to be pickled and

25 washed, the jib is raised by admitting water into the cylinder 2 and elevating the plunger 3 until the crates are above the level of the vats. The jib may then be turned by hand

30 power or otherwise, turning the plunger 3 within its cylinder, until the crates are directly above the vats. The motive fluid is then exhausted from the cylinder 2, and this permits the plunger to descend and causes the crates to be lowered into the liquid in the

35 vats. Then by operation of the valves the piston-rod 10 is caused to reciprocate, and, as above described, acting with a short stroke, alternately raises and lowers the crates within the vats, producing an agitation of the liquid

40 contents and causing the same to act thoroughly on the surfaces of the plates. When this operation has continued sufficiently long, the plunger 3 is again raised so as to lift the crates from the vats, and the reciprocation

45 of the rod 10 having been stopped, the jib is again swung around, so as to bring the crate from the pickle-vat above the water-vat, and vice versa. The jib is then lowered so as to introduce the crates into the vats, and the

50 agitating operation above described is repeated, with the effect of pickling the plates in one crate and washing the plates in the other. After this operation, the jib is raised again, the agitation stopped, and the jib is

55 swung around into the position shown by the dotted line and lowered. The crate containing the washed plates is then detached, and a crate charged with plates to be pickled substituted therefor. The jib is then raised and

60 swung radially so as to bring the crate with the fresh plates to the pickling vat and the crate with the pickled plates to the water vat. The operations above described are then repeated, and after each pickling and washing the jib

65 is brought to the position shown by dotted

lines, and a new crate substituted for the crate having the washed plates.

The operations of the apparatus as thus described may be conducted very rapidly, and the ease of motion occasioned by the balancing of the agitating mechanism greatly enhances the operation. I derive an advantage from the use of two vats set parallel with each other and on opposite sides of the apparatus, leaving the middle clear for the loading and unloading of the crates, and as this arrangement is new I intend to claim it broadly.

In Figs. 4, 5 and 6 I show modified constructions of my apparatus, also designed to effect the balancing of the agitating mechanism by the crates themselves. In Fig. 4 this consists of a drum 25, set on the jib, and provided with a motor, not shown, adapted to give it an oscillating motion of short extent.

The chains 11 which support the crates, are connected and are passed around the drum, so that its oscillation shall produce a short reciprocation of the crates, which act to balance each other. In Fig. 5 I show the crates

suspended from crank-pins 26 set at opposite points on a rotatory shaft 27, which is journaled on the jib and extends from end to end thereof. This shaft is rotated by an engine

28 on the jib, and as the crank-pins are set opposite to each other, such rotation will produce an alternate reciprocation of the crates, which counterbalance each other in their motions, and render the operation of the shaft very easy. In Fig. 6 I show the jib pivoted

at a middle point 29, with the crates suspended directly from its ends. The jib is rocked on its pivot 29 by a motor 30 connected with the jib by crank-and-pitman mechanism 31.

When the jib is rocked, the crates will be reciprocated alternately and will balance each other in their motions.

Other modifications of my improved apparatus will suggest themselves to those skilled in the art.

I claim—

1. In pickling or cleaning apparatus, the combination with a substantially horizontal beam, having an intermediate support, of crates suspended from the beam on either side of said support and means for reciprocating the crates simultaneously in opposite directions; substantially as described.

2. In pickling or cleaning apparatus, the combination with a rotary beam having an intermediate support, of two crates carried thereon, and means for reciprocating the crates simultaneously in opposite directions, whereby they continuously counterbalance each other; substantially as described.

3. The combination with a beam carried upon a motor arranged to raise and lower the same, of crates suspended from the beam on either side of said support, and means for reciprocating the crates simultaneously in opposite directions; substantially as described.

4. The combination of a lifting motor having a rotatory jib carried thereon, crates suspended from said jib, vats registering with the crates, and means for reciprocating the
5 crates simultaneously in opposite directions.

5. In pickling or cleaning apparatus, the combination with a lifting device, of a rotary beam centrally pivoted thereto, crates hung from the opposite ends of said beam, and

means for vertically tilting said beam on its central pivot; substantially as described.

In testimony whereof I have hereunto set my hand.

GEORGE MESTA.

Witnesses:

THOMAS W. BAKEWELL,
W. B. CORWIN.