(No Model.) 2 Sheets—Sheet 1.

S. A. SAGUE.

MACHINE FOR CLEANING METAL PLATES.

No. 493,560. Patented Mar. 14, 1893.

Fig. 1.

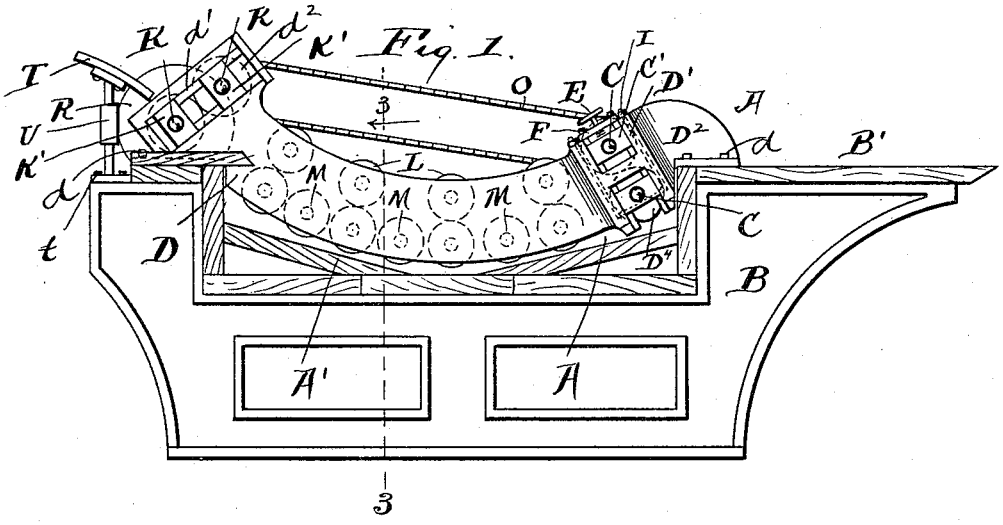
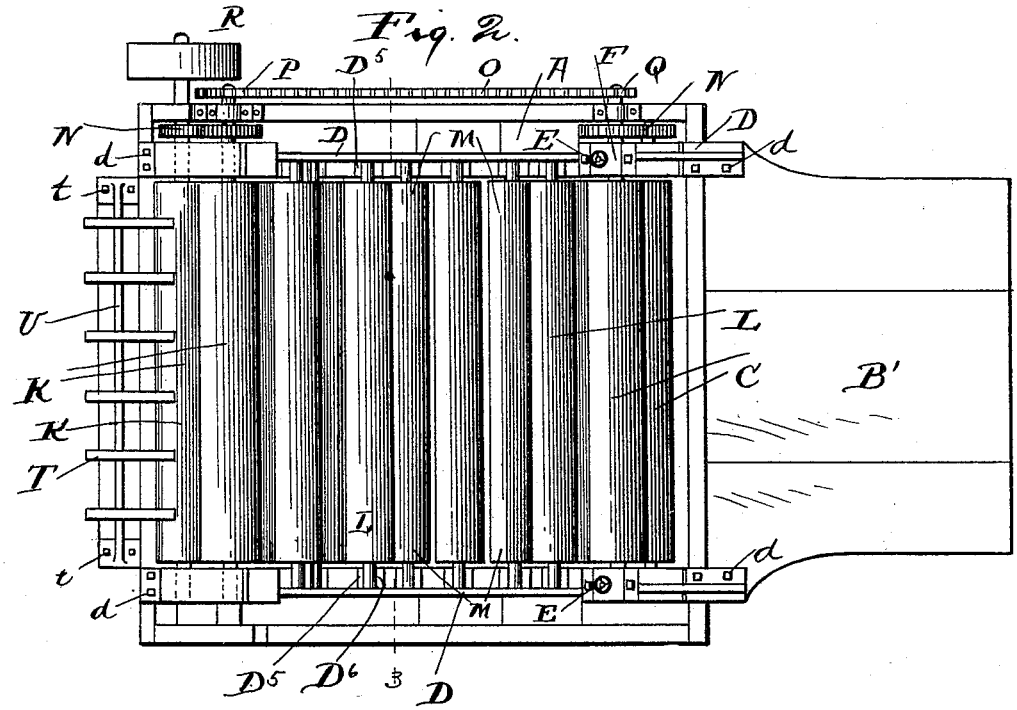


Fig. 2.



Witnesses.
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C. F. Wood

Inventor.
Samuel A. Sague
By Seggett & Seggett
his Attorneys

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

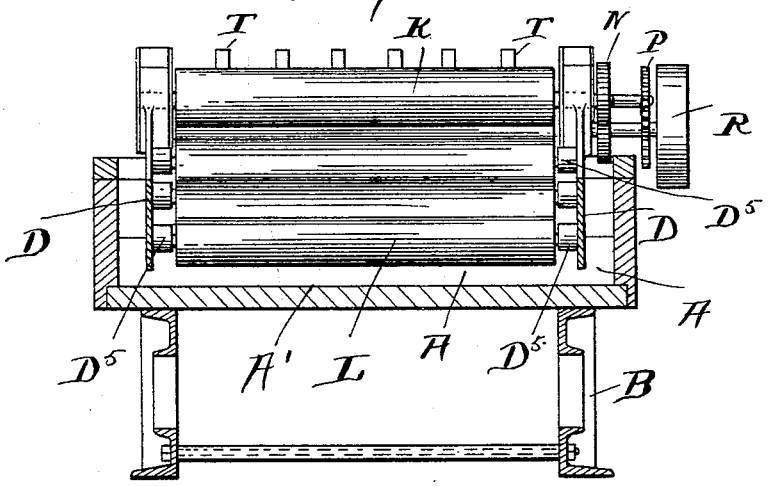
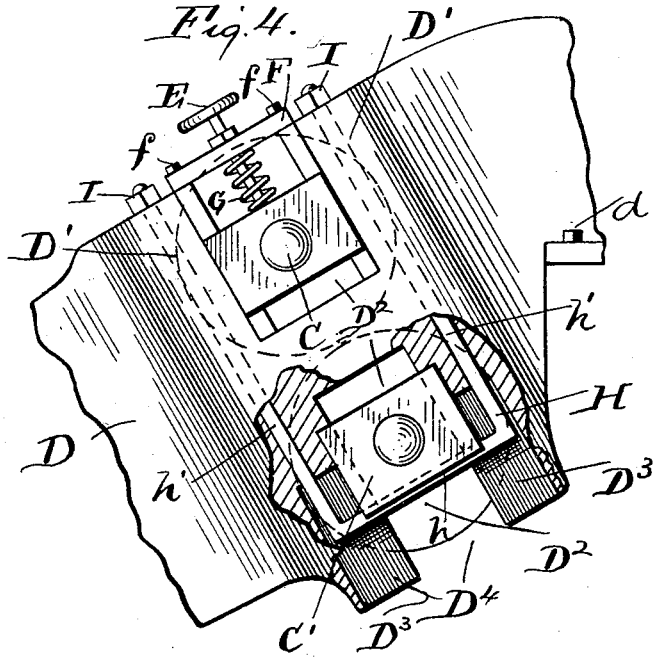


Fig. 4.



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UNITED STATES PATENT OFFICE.

SAMUEL A. SAGUE, OF CLEVELAND, OHIO.

MACHINE FOR CLEANING METAL PLATES.

SPECIFICATION forming part of Letters Patent No. 493,560, dated March 14, 1893.

Application filed June 16, 1892. Serial No. 436,957. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL A. SAGUE, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Scrubbing or Cleaning and Acid-Coating Apparatus; 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 scrubbing or cleaning and acid-coating apparatus, more especially designed for use in the manufacture of so-called "galvanized" sheet iron and steel. In the manufacture of such iron and steel the metallic sheets or plates as received from the rolling mill are first immersed in what is called a "pickling-bath," that is composed of sulphuric acid, the object being to remove scales and dirt that may be adhering to the surface of the sheets or plates and after being properly scraped or rolled to remove impurities and foreign substances from the surface of the sheets or plates and in order to properly prepare them for the zinc or spelter-coating by the formation of a flux upon the surface of the sheets or plates to cause the zinc or spelter to more closely adhere thereto, and to still further and more thoroughly clean them, the sheets or plates are immersed in muriatic acid. Of course before immersing the sheets or plates in a zinc or spelter-bath, after withdrawing them from the tank of muriatic acid, they are thoroughly dried. Heretofore, a plain open tank was used for this muriatic acid bath and the sheets or plates were immersed or dipped therein in batches. The means and method thus employed were objectionable in that too much handling of the sheets or plates was required, and the latter were not uniformly treated and not infrequently spots on the surface of the sheets or plates, owing to grease or fatty matter adhering thereto, would not be acted upon by the acid at all. I have therefore devised the vat and attachments illustrated in the accompanying drawings, wherein

Figure 1 is a left-hand side elevation of the same, the respective side-wall of the vat being broken away to more clearly show the construction. Fig. 2 is a top plan. Fig. 3 is a vertical section on line 3—3, Figs. 1 and 2, looking in the direction of the arrow. Fig. 4 is a side elevation in detail, partly in section, to more clearly show the construction.

Referring to the accompanying drawings, A represents a vat of any suitable construction and made preferably of timber, lined with a substance non-corrosive by the acid employed, such, for instance, as lead, A′ representing the bottom of the vat and B representing the supporting-frames of the vat. Supporting-frames B, at the forward end, support a table, B′, upon which the sheet or plate to be treated is fed to the vat. At or near each side of the vat is located a metallic frame, D, said frames being coated with any suitable non-corrosive substance, and bolted at each end, as at *d*, to the top of the vat or its supporting-structure.

Frames D are enlarged laterally at opposite ends, as at D′, *d*′, the enlargements D′ at the forward ends constituting housings for sliding-boxes, C′, in which are journaled the trunnions of feed-rollers, C, and being slotted, as at D^2, to accommodate the adjustment apart of said sliding-boxes the adjustment of the upper roller being effected by screws, E, that are operatively connected with the sliding-boxes of said roller, and extend through correspondingly screw-threaded perforations in cross-bars, F, secured preferably by means of bolts, *f*, to the top of housings D′, a spring, G, being preferably confined upon the screw between said sliding-boxes and cross-bars F and adapted to act in the direction against said sliding-boxes. The adjustment of the lower feed-roller is effected by a U-shaped rod or bar, H, the sliding boxes of the lower feed-roller resting upon central members *h* of said U-shaped rods or bars, and end members *h*′ *h*′ of said rods or bars extending through corresponding holes or perforations in housings D′, being screw-threaded at their outer ends for the reception of nuts, I, by manipulating which U-shaped bars or rods H and the sliding-boxes of the lower feed-roller supported thereby as aforesaid, are adjustable relative to the upper roller, as required, the slots in the housings for the accommodation of said adjustment of the sliding-boxes of the lower feed-roller being enlarged at their lower end, as at D^3, not only for the accommodation of the location and movement of central mem-

bers *h* of said U-shaped bars or rods, but being open at the bottom, as at D^4, for the purpose hereinafter described.

The lateral enlargements *d'* at the rear ends of frames D are slotted, as at d^2, and constitute housings for sliding-boxes K' that afford bearing for the trunnions of wiper or wringer-rolls K, whose peripheral surface is preferably of rubber.

At suitable intervals between feed-rollers C and wiper or wringer-rolls K, and extending transversely of the vat, are located pairs of guide and scrubbing-rolls L, that are located within the vat and preferably arranged in the same curved or circular plane as shown. Between the lower rolls of adjacent pairs of rolls are located single guide-rollers M. The combined scrubbing or cleaning and guiding-rolls L and guide-rollers M are composed of material non-corrosive by the action of the muriatic-acid bath, such, for instance, as porcelain, or the body thereof may be made of any desired material and coated or covered with a suitable non-corrosive substance. The trunnions of said rolls and rollers have bearing in inwardly-projecting lugs D^5 of frames D, said lugs being vertically slotted, as at D^6, for the purpose, said slots being open at the top whereby said rolls and rollers can be readily removed in case it is desired to scour or clean the vat.

By the construction hereinbefore described lower feed-roller C can also be removed from the vat with great facility, it being merely necessary to remove nuts I from the ends of U-shaped bars or rods H, whereupon the latter, by reason of the open-ended enlarged portions D^3 of lower slots D^2, will, together with the said feed-roller and its supporting-sliding-boxes, drop to the bottom of the vat. The removal of the upper feed-roller, it will be observed, is readily effected upon removing the securing-bolts *f* of cross-bars F.

The sheet or plate to be scrubbed or cleaned and prepared for the zinc or spelter-coating is fed from table B' between feed-rollers C to and between the series of pairs of guiding and scrubbing-rolls L and over the intermediate single guiding rollers M to and between wringer or wiper rolls K. Motion is communicated to the rolls and rollers L M by the friction of the traveling sheet or plate. Rolls L rub the acid into the surface of the sheet or plate, or, in other words, scrub the latter, resulting in a thorough cleaning of the entire surface of the sheet or plate, and in a proper preparation of the surface for the zinc or spelter-coating.

The rollers of the pair of feed-rollers, as well as the rolls of the pair of wringer or wiper-rolls are intergeared with each other, as at N N and wringer or wiper-rolls K and feed-rollers C are operatively connected with each other, for instance, as shown, by an endless chain, O, leading over a sprocket-wheel P mounted upon a trunnion of one of the wringer or wiper-rolls and a sprocket-wheel Q on a trunnion of one of the feed-rollers, and wringer-rolls K are located such a distance from the feed-rollers that the sheet or plate being treated will be received by the wringer-rolls before it has become entirely disengaged from the feed-rollers.

R represents the driving-pulley mounted on a trunnion of one of the wiper or wringer-rolls.

T represents a series of preferably curved plates or bridges that are bolted or secured to a frame U, in common, frame U being secured to the supporting-structure of the vat preferably by means of bolts *t*.

Curved plates or bridges T are located in suitable proximity to wiper or wringer-rolls K, that they shall receive the sheets or plates from said rolls, and are preferably located in such proximity to the entrance of a drying-chamber (not shown) that they will deliver the sheet or plate directly into the drying chamber.

A single wide bridge might be employed, but a series of narrow bridges as shown is preferred for the reason that less surface (that may have dust and dirt adhering to it) is presented to the sheet or plate.

In cleaning the vat the gears that operatively connect the feed rollers are of course first removed from the trunnions of said rollers.

What I claim is—

1. The combination, with an acid-coating and scrubbing or cleaning-vat, of feed-rollers located at the receiving-end of said vat, wringer or wiper-rolls located at the rear or delivering-end of said vat, scrubbing and rubbing-rolls located within the vat at suitable intervals between said feed-rollers and wringer or wiper-rolls and a guide-roller located between the lower scrubbing and rubbing-rolls, substantially as and for the purpose set forth.

2. The combination, with an acid-coating vat for coating metallic sheets or plates, of a pair of feed-rollers at the forward or receiving end of said vat, a pair of wringer or wiper-rolls at the rear or delivering-end of said vat, pairs of rubbing rolls within and at suitable intervals between said feed-rollers and wringer or wiper-rolls and guide-rollers between the lower rubbing-rolls, the pair of feed-rollers and pair of wringer or wiper-rolls being operatively connected with each other and located such a distance apart that the wringer or wiper-rolls will receive the sheet or plate before it has become entirely disengaged from the feed-rollers, substantially as set forth.

3. The combination, with an acid-coating vat for coating metallic sheets or plates, of a pair of feed-rollers at the forward or receiving-end of the vat and pair of wringer or wiper-rolls at the rear or delivering-end of the vat, pairs of rubbing rolls within and at suitable intervals between said feed-rollers and wringer or wiper-rolls, and guide-rollers between the lower rubbing-rolls, said feed-

rollers and wringer or wiper-rolls being operatively connected with each other, and located such a distance apart that the wringer or wiper-rolls will receive the sheet or plate before it has become entirely disengaged from the feed-rollers, and one or more curved plates or bridges at the rear of the wringer or wiper-rolls and adapted to receive the sheet or plate from said rolls, substantially as set forth.

4. The combination of an acid-coating vat having a frame, as at D, at or near each side of the same, feed-rollers at the forward or receiving-end of the vat, wringer or wiper-rolls at the rear end of the vat, pairs of rubbing rolls within the vat and at suitable intervals between the feed-rollers and wring or wiper-rolls, and guide-rollers between the lower rubbing-rolls, all of said rolls and rollers, being supported by said frames D or attachments of the same, substantially as set forth.

5. The combination with an acid-coating vat, of feed-rollers located at the forward or receiving-end of said vat, and supported by sliding-boxes, frames or housings, as at D′, for said sliding-boxes, U-shaped rods or bars, as at H, for supporting the sliding-boxes of the lower feed-roller, the end members of said rods or bars extending through corresponding holes or perforations in frames or housings D′ and being screw-threaded at their free or upper ends, and nuts, as at I, mounted upon said screw-threaded portions of the U-shaped rods or bars, said frames or housings being slotted, as at D^3, substantially as and for the purpose set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 21st day of April, 1892.

SAMUEL A. SAGUE.

Witnesses:
C. H. DORER,
WARD HOOVER.