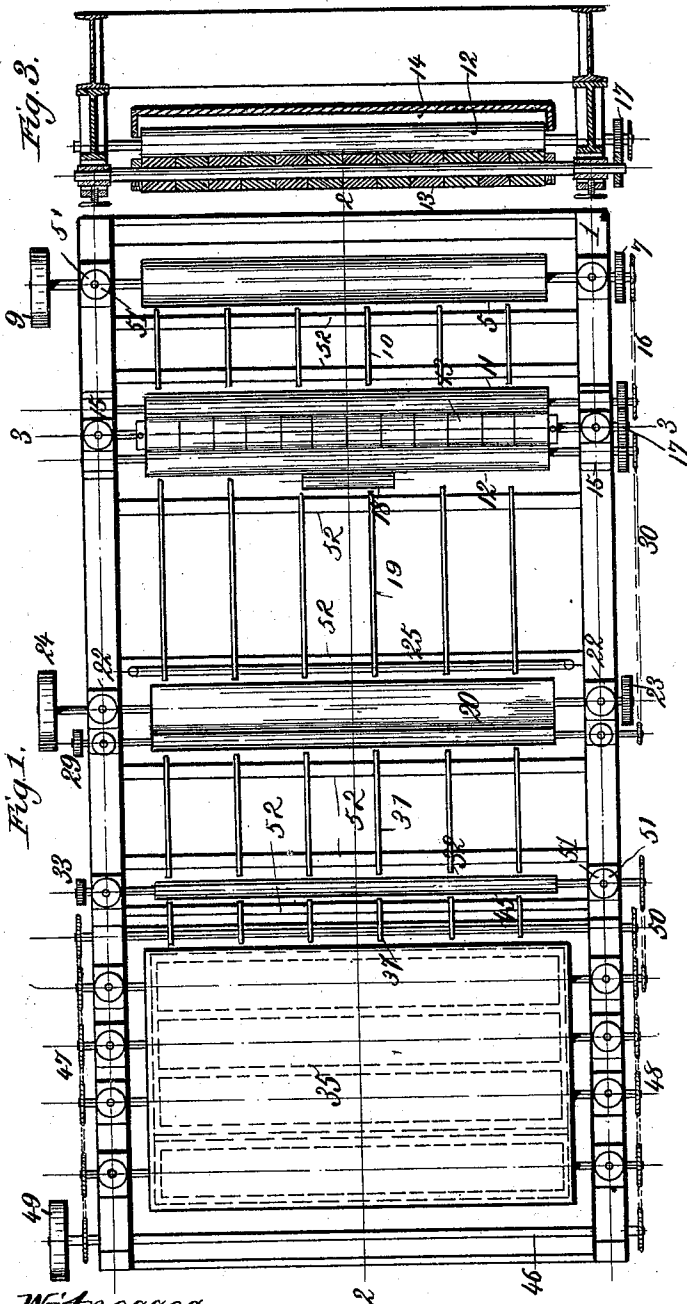


(No Model.)

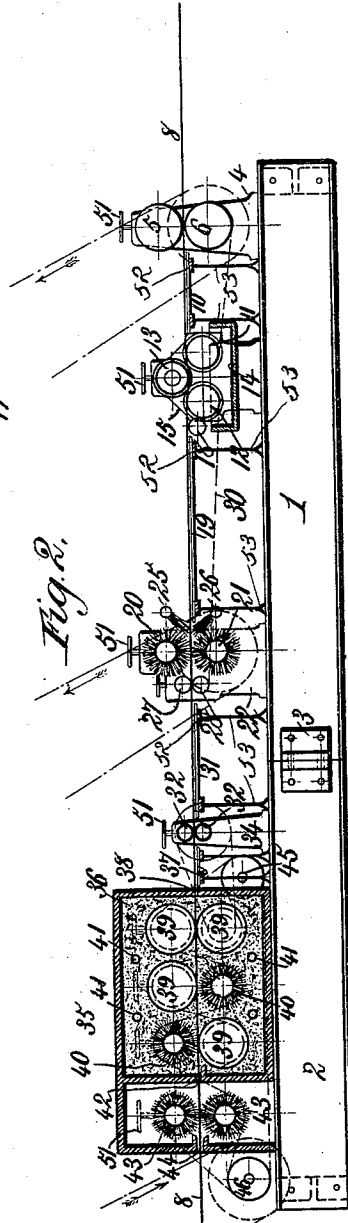
C. C. ROBERTS.
MACHINE FOR CLEANING SHEET METAL.

No. 582,952.

Patented May 18, 1897.



Witnesses.
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UNITED STATES PATENT OFFICE.

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MACHINE FOR CLEANING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 582,952, dated May 18, 1897.

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To all whom it may concern:

Be it known that I, CHARLES C. ROBERTS, a citizen of the United States, residing at Ansonia, in the county of New Haven and State of Connecticut, have invented new and useful Improvements in Machines for Cleaning Sheet Metal, of which the following is a specification.

This invention relates to machines for cleaning sheet metal, and particularly for removing oxid from the backs of metal sheets that have been tinned on one side, the oxid being commonly formed on the back of the sheet when the hot tin is applied to its face. Ordinarily the oxid is removed through the action of an acid solution applied by means of a swab, which is a tedious, costly, and unsatisfactory operation. It is very important that the application of the acid should be effected in such manner as to keep it away from the tinned side of the sheet, as it will instantly destroy the tin if allowed to come in contact therewith. It is also important that the tinned-metal sheets should be thoroughly dried as quickly as the oxid is removed. The straightening of the tinned-metal sheets while being cleaned to effect removal of wrinkles is also desirable. These objects can be much better and more economically accomplished by means of suitable machinery than by hand labor.

My invention consists in features of construction and novel combinations of devices in a machine for cleaning and removing oxid from tinned-metal sheets, as hereinafter set forth.

In the annexed drawings, illustrating the invention, Figure 1 is a plan of my improved sheet-metal-cleaning machine. Fig. 2 shows the same in vertical longitudinal section on the line 2 2 of Fig. 1. Fig. 3 is a vertical transverse section on the line 3 3 of Fig. 1.

Referring to the drawings, the numeral 1 designates the main portion of the machine-frame, designed for supporting the mechanism for straightening the tinned-metal sheets and cleaning the oxid therefrom. A detachable supplemental frame 2 is preferably provided to support the apparatus for drying the cleaned metal sheets as soon as the oxid and acid are removed. By means of suitable lugs and fastenings 3 at adjoining ends of the

frames 1 and 2 they can be rigidly connected, if desired, or the frame 2 can be detached if the drying apparatus is not needed.

In bearings 4 at one end of the main frame 1 are journaled two rolls 5 and 6, one above the other, for straightening the sheets to tinned metal as they are fed to the machine between said rolls. The upper roll 5 may be made from steel and the lower roll 6 from rubber, or any other suitable elastic or inelastic material may be used for either roll. These rolls 5 and 6 are geared together by means of pinions 7 to revolve in proper directions for feeding the metal sheet 8 into the machine, and they may be driven by any suitable power through belting to a pulley 9 on the shaft of the lower roll.

From the straightening and feeding rolls 5 and 6 the sheet of tinned metal is passed over a guide or guides 10 to a group of three rolls 11, 12, and 13 for applying acid to the under side of the metal sheet for removing oxid therefrom. The two lower rolls 11 and 12 are in contact with the under side of the metal sheet and are revolved in a tank or receptacle 14, that may contain oil of vitriol or other suitable acid diluted with water. The first lower roll 11 may be composed of wood or other suitable material, and the second roll 12 may have a cloth covering. These rolls 11 and 12 deposit acid on the under side of the metal sheet to loosen the oxid, so that it will readily come off. The metal sheet is held down onto the acid-applying rolls 11 and 12 by means of the upper roll 13, which is preferably composed of a number of copper collars detachably mounted on a shaft or axle, so that any of the said collars may be removed from either end or be replaced to correspond with the width of the tinned-metal sheet. I prefer that the collars composing this upper roll 13 shall be so adjusted in number that the ends of the said roll will come within only a half-inch of the width of the metal sheet, so that by thus lessening the pressure at the edges of the sheet the acid deposited on its under side cannot get onto the top or tinned side, which is uppermost. The rolls 11, 12, and 13 are carried on shafts that are journaled in bearings 15, supported on the main frame 1, and are driven by sprocket-gearing 16 from the lower straightening-roll 6, the shafts of

the rolls 11, 12, and 13 being connected by spur-gearing 17, as shown.

After passing the acid-rolls the sheet of metal is carried over a small roller 18, to insure that the acid will get into any wrinkles that may be in the sheet, which is often the case with metal rolled in strips, and thence it passes over a guide or guides 19 to rotary scouring-brushes 20 and 21, the shafts of which are journaled in bearings 22 on the main frame of the machine. The brush-shafts are connected by gears 23, arranged to revolve the lower brush faster than the upper one, and are driven by belting to a pulley 24 on one of said shafts. Just before reaching the brushes 20 and 21 water is sprayed from perforated pipes 25 and 26 against the upper and lower sides of the metal sheet. The water is to wash off the acid and the oxid, which is loosened the instant that the acid touches it. The cleaning off of the oxid is completed in the passage of the metal sheets between the rotary brushes 20 and 21, that are mounted adjacent to the point where the water is sprayed onto the sheet.

Two rolls 27 and 28, preferably of rubber, are mounted one above the other immediately behind the brushes 20 and 21 to hold the metal sheet steady while the scouring brushes are in operation. These two rolls 27 and 28 are connected by pinions 29 to revolve together, and are driven by sprocket-gearing 30 from the shaft of one of the acid-rolls.

The scoured metal sheets may be passed over a guide or guides 31 to a pair of rubber rolls 32 for wringing off the moisture from the sheets. These rolls 32 may be connected by gears 33 to revolve together. As shown, they are journaled in bearings 34, supported on the detachable supplemental frame 2, though it is obvious that they might be mounted on the main frame. Instead of being composed of rubber they may be made from or faced with a material such as felt or cloth or some other soft substance.

To further dry the metal sheets, a steam-piped sawdust-box or drying-chamber 35 is provided. This sawdust-box is preferably supported on the supplemental frame 2, though it is obvious that the entire metal cleaning and drying apparatus may be mounted altogether on one frame only, if desired.

By reference to Fig. 2 it will be seen that the sawdust-box 35 comprises two compartments and that the larger one is filled with a body of sawdust 36, that will be capable of absorbing moisture from the metal sheets passed through the box.

Between the wringer-rolls 32 and the box 35 will be arranged a guide or guides 37, over which the metal sheet is carried to and through a transversely-slotted opening 38 in the end of the sawdust-box. In passing through the sawdust-compartment of the box 35 the metal sheet is carried between the up-

per and lower series of rolls 39 and rotary brushes 40, which may be disposed in any convenient or preferred manner to exert friction on the upper and lower sides of the metal sheets. The rolls 39 may be made from wood or any suitable material. Any required number of rolls and brushes may be mounted in the box. The sawdust will be pressed and rubbed against the sides of the metal sheets and will absorb the moisture therefrom. In order to keep the sawdust dry, a series of steam pipes or coils 41 is placed in the box.

From the larger compartment of the box 35 the metal sheet is passed through a transverse slot or opening 42 into a smaller box-compartment and between two rotary brushes 43, mounted therein, which remove from the metal sheet any sawdust that may have adhered thereto. The cleaned metal sheet 8 is now discharged through a transverse opening or slot 44 in the end of the drying-box.

At the opposite ends of the box 35 are mounted transversely-arranged shafts 45 and 46, that are connected at both ends, by sprocket-gearing 47 and 48, with the shafts of the several rolls and brushes mounted in the drying-box. A pulley 49 on the shaft 46 furnishes means for applying power to drive the drying rolls and brushes, and the gearing may be so arranged that the several rolls and brushes will run at any required variations of speed. For instance, the first one on top may run twice as fast as the first bottom one and the others may alternately run fast and slow in succession. The wringer-rolls 32 may be run by sprocket-gearing 50 from the shaft of one of the rolls in the drying-box. The bearings of the upper rolls and brushes throughout the cleaning and drying apparatus may be provided with adjusting-screws 51, as shown, to regulate their pressure as required, according to the thickness and condition of the metal sheets to be cleaned. The guides 10, 19, 31, and 37 should extend quite close to the several rolls, and they may preferably consist of narrow strips set at intervals on cross-bars 52, that are extended across the machine and supported by standards 53 at their ends.

It will be obvious that metal sheets may be rapidly, economically, and thoroughly cleaned and dried with this apparatus and that the acid employed will not be liable to come in contact with the tinned side of the sheet.

What I claim as my invention is—

1. In a machine for cleaning metal sheets, the combination with the straightening-rolls, of a group of three rolls for applying acid to the under side of a metal sheet, an acid tank or receptacle in which two of said rolls revolve the third roll being mounted in contact with the upper side of the sheet and being adjustable to the width of the sheet, a pair of rotary scouring-brushes between which the metal sheet is passed from the acid-applying rolls, means for spraying water on the upper

and under sides of the metal sheet adjacent to the scouring-brushes, and guides for supporting the metal sheet, substantially as described.

2. The combination with the acid tank or receptacle, the two rolls mounted to revolve in said tank in contact with the under side of a metal sheet to be cleaned, a roll adjustable in length to come within the width of the metal sheet and mounted in contact with the upper side of said sheet and above the two acid-applying rolls, a roll 18 adjacent to one of said acid-applying rolls, to insure that the acid will get into any wrinkles in the metal sheet, a guide or sheet support, two rotary scouring-brushes, water-spraying devices, and means for holding the metal sheet steady for operation of the scouring-brushes thereon, substantially as described.

3. The combination with the acid tank or receptacle and the acid-applying rolls located in said tank for removing oxid from a metal sheet, of the two rotary scouring-brushes between which the metal sheet is passed from the acid-applying rolls, the perforated pipes for spraying water onto the upper and under sides of the metal sheet adjacent to the scouring-brushes, and a pair of rolls mounted beyond and adjacent to said brushes to steady the metal sheet while acted on by the scouring-brushes, substantially as described.

4. The combination with a tank or receptacle for acid, and two rolls mounted to revolve in said tank and apply acid to the under side of a metal sheet to be cleaned, of a roll comprising a shaft and a number of removable collars mounted on said shaft above and in contact with the upper side of said metal sheet and above the rolls that revolve in the tank, the number of collars on said shaft being variable to adjust the length of said upper roll so that it will come within the width of the metal sheet to prevent access of

acid to the upper side of the metal sheet, 45 substantially as described.

5. The combination with mechanism for applying acid to the under side of a metal sheet to be cleaned, a pair of rotary scouring-brushes, water-spraying devices and rolls 50 for steadying the metal sheet while acted on by said scouring-brushes, of the pair of wringer-rolls, and guides to support the metal sheet, substantially as described.

6. The combination with mechanism for 55 cleaning metal sheets, of a sawdust-box through which a metal sheet is to be passed from the cleaning mechanism, a number of rolls and rotary brushes mounted in said sawdust-box to operate in contact with the 60 upper and under sides of a cleaned metal sheet to dry the same, steam pipes or coils in said box to keep the sawdust dry, a pair of rotary brushes to remove sawdust from the cleaned and dried metal sheets, and mech- 65 anism for driving the said rolls and brushes at variable speeds, substantially as described.

7. The combination with mechanism for cleaning metal sheets, and a main frame in which said cleaning mechanism is mounted, 70 of a sawdust-box through which a metal sheet is to be passed from the cleaning mechanism, a number of rolls and rotary brushes mounted in said sawdust-box to operate in contact with the metal sheet to dry the same, steam- 75 pipes in said box to keep the sawdust dry, a supplemental frame on which the sawdust-box is mounted, and means for detachably connecting the main frame and supplemental frame, substantially as described. 80

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES C. ROBERTS.

Witnesses:

D. E. ROBERTS,

LEWIS S. STODDARD.