

G. RUSSELL.
TREATING SHEET METAL.
APPLICATION FILED MAR. 10, 1911.

Patented Oct. 24, 1911.
2 SHEETS—SHEET 1.

1,006,881.

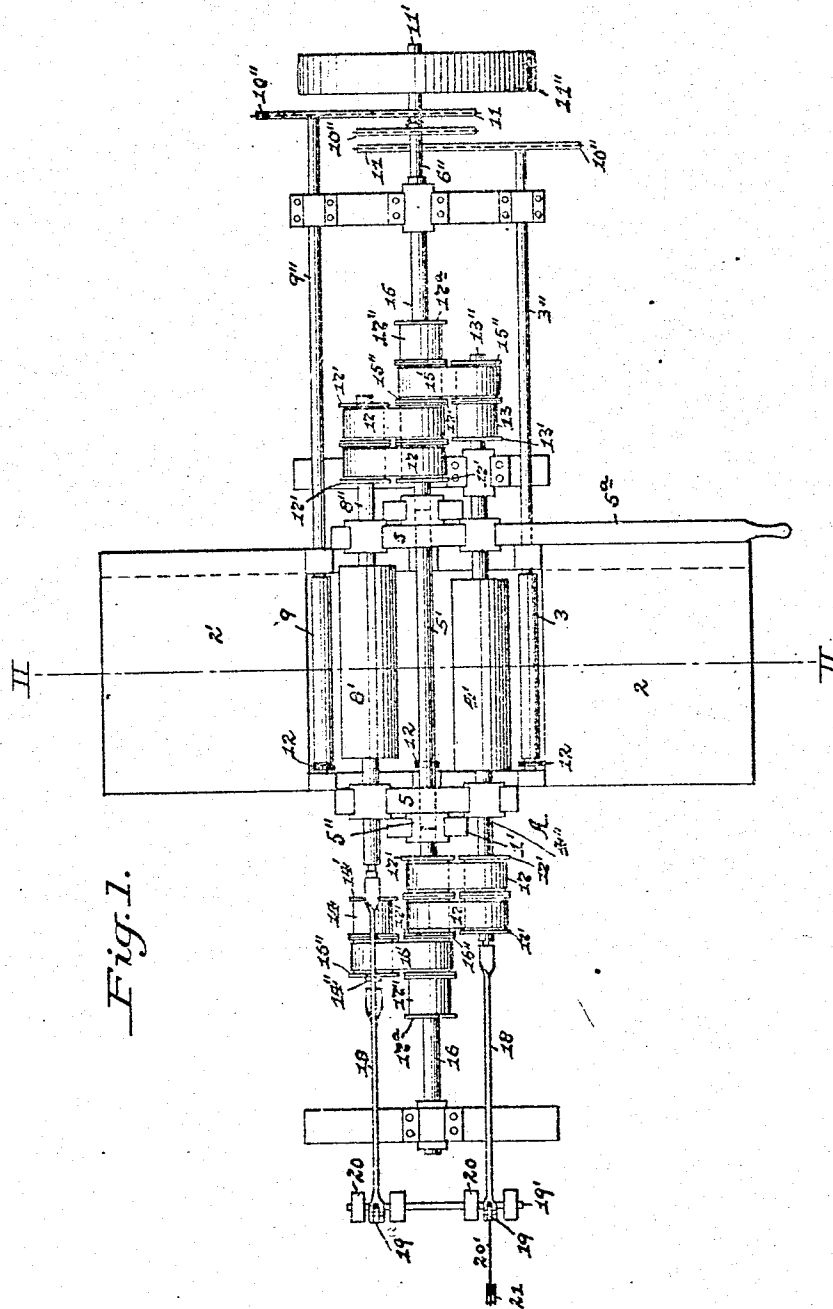


Fig. 1.

WITNESSES
W. B. Humphries.
O. L. Thompson.

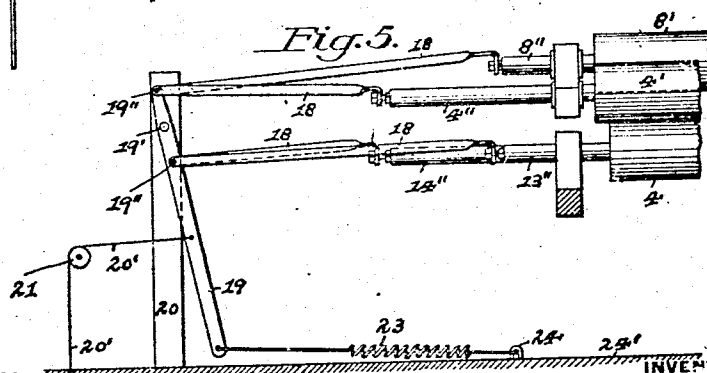
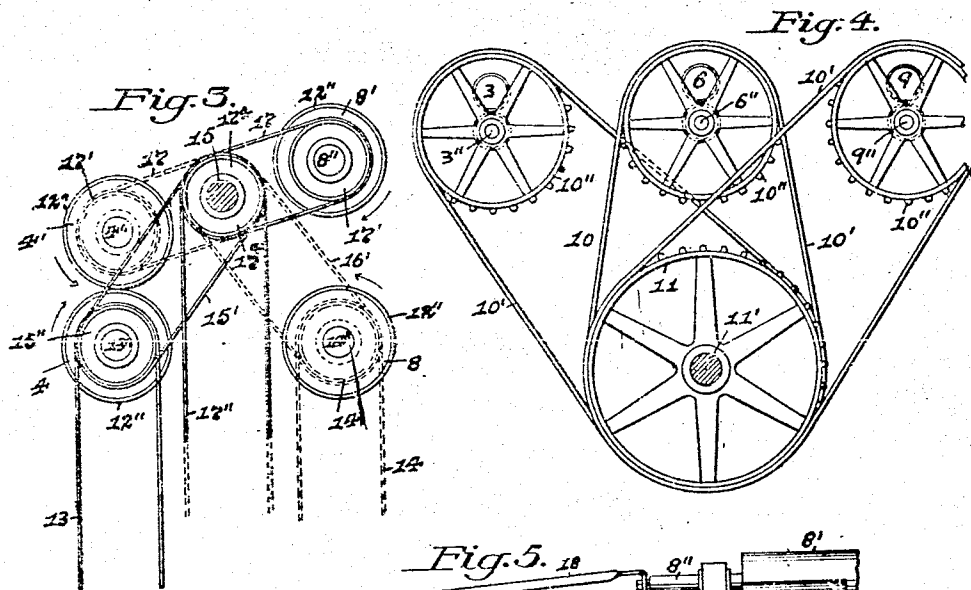
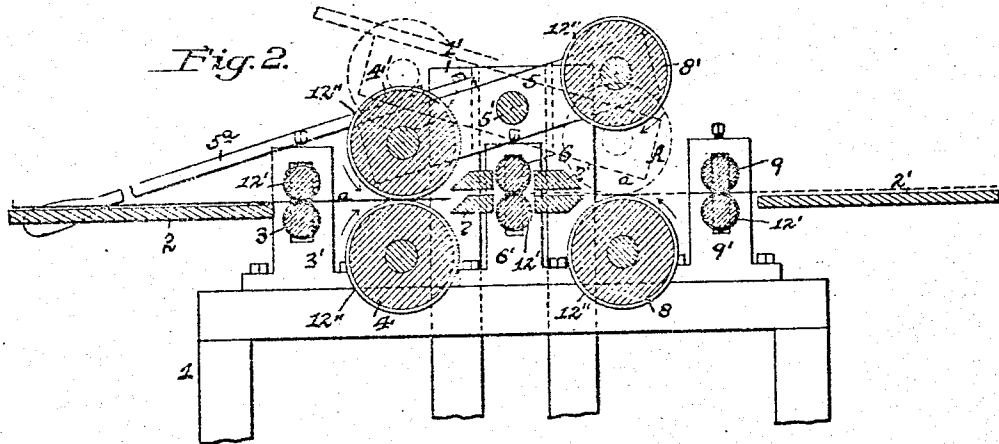
INVENTOR
George Russell.
By J. A. Cooley
Attorney.

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2 SHEETS-SHEET 2.



WITNESSES
M. H. Thompson
O. L. Thompson

INVENTOR
George Russell,
By J. M. Cooke
Attorney.

UNITED STATES PATENT OFFICE.

GEORGE RUSSELL, OF McKEESPORT, PENNSYLVANIA.

TREATING SHEET METAL.

1,006,881.

Specification of Letters Patent.

Patented Oct. 24, 1911.

Application filed March 10, 1911. Serial No. 613,654.

To all whom it may concern:

Be it known that I, GEORGE RUSSELL, a resident of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Treating Sheet Metal, and do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to treating sheet metal, and has special reference to an apparatus for the cleaning and polishing of metal sheets to treat the same preparatory to having a coating applied thereto.

The object of my invention is to provide a cheap, simple and efficient machine for cleaning and polishing sheet metal, which will be automatic in its operation, and which will enable each sheet as it is fed through the same to be completely and thoroughly polished on both sides of the same to clean and polish the sheet and remove any dust, hairs or other foreign matter from the same, so that when such sheets are coated with any suitable material to finish the same, all imperfections or objections in the coating will be removed, and the sheet will thus present a finished and neat appearance to the eye when formed into other articles, such as cans, etc.

To these ends my invention consists, generally stated, in the novel arrangement, construction and combination of parts of the machine, as hereinafter more specifically set forth and described and particularly pointed out in the claims.

To enable others skilled in the art to which my invention appertains to construct and use my improved machine for cleaning and polishing sheet metal, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a plan view of my improved machine for cleaning and polishing metal sheets. Fig. 2 is a central cross-section of the same in the line II—II, Fig. 1. Fig. 3 is a diagram view showing the belting for driving the shafts of the apparatus. Fig. 4 is a like view showing the chain drive for the feed roll mechanism. Fig. 5 is an elevation of a portion of the machine, showing the means for reciprocating the polishing rolls longitudinally.

Like symbols of reference herein indicate like parts in each of the figures of the drawings.

As illustrated in the drawings, A repre-

sents the machine having the supporting frame 1, upon which is mounted the two front feed rolls 3 in the usual housings 3' on the frame 1, which rolls are in a vertical line with each other, and in front of and positioned in line with the bite of such rolls is the table 2. Back of the rolls 3 are the two polishing rolls 4 and 4', which are adapted to be placed in a vertical line with each other, and with the lower roll 4 being fixedly mounted in suitable housings on the frame 1 (not shown), while the upper roll 4' is mounted at the front end of a tilting frame 5, hereinafter described, whereby said roll will be movable toward and from the roll 4. Back of the rolls 4 and 4' are the two intermediate feed rolls 6, which are vertically mounted in the housings 6', and have the guides 7 and 7' in front and back of the same, respectively. Back of the rolls 6 and guide 7' are the polishing rolls 8 and 8', which are adapted to be placed in a vertical line with each other, and with the lower roll 8 being fixedly mounted in suitable housings on the frame 1 (not shown), while the upper roll 8' is mounted at the rear end of the tilting frame 5. This frame 5 is pivotally mounted centrally of the same by a shaft 5' which is supported in the housings 5'' in the upwardly extending portion 1' of the frame 1, and is operated by means of a lever 5'' secured thereto. Back of the rolls 8 and 8' are the two feed rolls 9, which are mounted in a vertical line and in housings 9' on the frame 1, and in the rear of and positioned in line with the bite of said rolls 9 is the delivery table 2'.

The feed rolls 3, 6 and 9 are positively driven by means of the chain drive 10 at one end of the same, such as is shown in Figs. 1 and 4, which consists of the three chains 10', each engaging with a sprocket-wheel 10'' on each of the shafts 3'', 6'' and 9'' of the lower rolls 3, 6 and 9, respectively, and each with a similar wheel 11 mounted on a driving shaft 11' positioned below and in line with the rolls 6, which is provided with a driving pulley 11'', such wheels 10' being of the same diameter and the wheel 11' being somewhat larger in diameter than said first named wheels. Each pair of such feed rolls 3, 6 and 9 are positively geared together by the gearing 12 at the other end of the same, and such rolls are provided with a flexible rope wrapping 12' applied around each of the same to form a cushion

and permit a yielding contact with the sheet to be polished, while the polishing rolls 4, 4', 8 and 8' are each provided with a suitable flexible wrapping or buffing surface 12'' around the same.

The polishing roll 4 is positively driven by means of the drive-belt 13, which is located on one side of the machine and passes around the pulley 13' on the shaft 13'' of said roll, while the roll 8 is positively driven by the belt 14 located on the other side of the machine and passing around the pulley 14' on the shaft 14'' of said roll. The shafts 12'' and 14'' are connected with the short drive-shafts 15 and 16 in line with the shaft 5' and located respectively on opposite sides of the machine through the belts 15' and 16', respectively, passing around the pulleys 15'' and 16'' on said shafts 13'', 14'', 15 and 16, and these countershafts 15 and 16 are in turn connected to the shafts 4'' and 8'' of the upper rolls 4 and 8, respectively, by means of the belts 17 passing around the pulleys 17' on said shafts, while the shafts 15 and 16 are positively driven by means of the belts 17'' passing over the pulleys 17'' on said shafts. In this manner all the polishing rolls 4, 4', 8 and 8' are positively driven and all suitably belted or connected together to produce a uniform motion in each, with the contacting faces of the front polishing rolls 4 and 4' revolving in the same direction and in the direction of movement of the sheet *a* being polished, while the rear polishing rolls 8 and 8' are revolved in the opposite direction from the rolls 4 and 4' with their contacting faces revolving against the direction of movement of said sheet shown by dotted lines in Fig. 2.

The polishing rolls 4, 4', 8 and 8' are adapted to be reciprocated during the polishing operation through the shafts 13'', 4'', 14'' and 8'', respectively, on said rolls being each connected by means of a strap 18 with levers 19 and 19', said levers being pivoted by the rod 19'' to a frame 20, with the ends of the straps 18 connecting the upper roll shafts 4'' and 8'' being pivotally connected at 19'' to the tops of said levers above said rod, and the ends of such straps connecting the lower roll shafts 13'' and 14'' being pivotally connected to said lever and below said rod, as at 19''. These straps 18 are reciprocated upon the pivot rod 19, by means of the strap or chain 20' being connected to one of said levers and passing over a roller 21, so as to be connected to the crank disk 22 positioned at any suitable point, and such disk is power-driven through the shaft 22', so that in completing one revolution said disk will act to draw said levers in one direction to thereby move the rolls 4, 4', 8 and 8' in the longitudinal direction, while the spring 23 connected to said lever 19 and to a suitable stationary

point 24 on a floor 24' will return said levers in the opposite direction after the tension on the strap or chain 20' is removed during the latter half of the rotation of the said disk.

The thin metal sheets, such as preferably what is known as "black iron", are taken in the condition as made by the sheet metal and placed in a suitable cage, so that each of such sheets when in such cage are supported on their edges and free from contact with each other. This cage carrying such sheets is then submerged in a pickling bath, preferably composed of pickeline and water, and into which bath a steam line or pipe is run to provide heat for such bath, so that after remaining in such bath for a short period (say 15 minutes) any scale or rust will be removed from such plates or sheets by said bath and then the cage carrying such plates or sheets is removed from such bath. After the sheets have been taken from the pickling bath, each sheet is passed between suitable iron rollers similar in shape and size to the rubber rollers on a clothes wringer, then through a leather scraper, which will remove any surplus liquid from the pickling bath from such sheet, and then such sheet is passed through heated rolls to dry such sheet thoroughly. After the sheet has been thus thoroughly dried and it is desired to polish the same, such as by the machine *A*, such sheet, as at *a*, is laid upon the table 2 and moved forward between the bite of the positively driven feed-rolls 3, which will feed such sheet forward onto the stationary polishing roll 4 which is being rotated in the direction of the arrow, while said polishing roll and all the other polishing rolls revolve at the same rate of speed and much higher in comparison with the feed rolls 3 and the other feed rolls of the machine. The operator next depresses the levers 5^a to bring the upper polishing roll 4' on the tilting frame 5 into contact with the metal sheet on the roll 4 to be polished, and this roll 4' is rotating in the direction of the arrow so that the contacting face is moving in the direction of motion of the sheet to be polished. These rolls 4 and 4' are treated with fine emery dust, and such sheet in passing through the same will be cleaned and polished. The sheet next continues into and between the guides 7 and between the feed rolls 6, the pass of which is located at a somewhat higher plane than the surface of the polishing rolls 4 and 4', such as is shown in Fig. 2, and the sheet then continues in its forward motion through said rolls 6 and guides 7' at the rear of the same until its rear end passes from operating position between rolls 4 and 4'. Just before the rear end of the sheet passes from the rolls 4 and 4' the operator raises the lever 5^a, which de-

presses the polishing roll 8 on the tilting frame 5 to engage the upper surface of the sheet being polished and also depresses the sheet into contact with the fixed lower polishing roll 8, while the polishing roll 4' is thus raised from the roll 4 by said frame. These rolls 8 and 8' rotate in the opposite direction in relation to the moving sheet as the rolls 4 and 4' as will be indicated by the arrows, while in its progress the sheet moves between the bite of the feed roll 9 just before the roll 8' is depressed, so that in the further and complete polishing of the sheet by said rolls 8 and 8', such rolls will remove any traces of emery remaining on such sheet by the rolls 4 and 4', and such sheet is passed from between the rolls 8 upon the table 2'. These polishing operations on the sheet *a* may be repeated one or more times as desired, and in a similar manner to that just described, in order to clean and get the desired polish to such sheet. After the sheet comes between the bite of rolls 4 and 4' the feed rolls 3 act as hold-back rolls, and after the sheet leaves said polishing rolls 4 and 4' and comes in position between rolls 8 and 8', and the lever 5^a is raised to depress roll 8' in contact with the sheet as hereinbefore described, the feed rolls 9 then act as hold-back rolls. The front polishing rolls 4 and 4', as will be seen by the arrows, revolve in the same direction as the direction of motion of the sheet being polished, and the rear polishing rolls 8 and 8' revolve against the direction of motion of the sheet, which will prevent bending, hooking or buckling of the sheet at the rear end of the same, while the bite of the feed rolls 6 and guide 7 being higher than the top of the roll 8 will enable such sheet to pass over said roll and away from the same, so that it can be caught by the rolls 9 at its front end, and while being held between the rolls 9, the upper roll 8' is lowered and the polishing of the sheet between said rolls 8 and 8' then takes place. As soon as the sheet being polished is caught at its front end by the feed rolls 9, the polishing roll 4' is raised and the other polishing roll 8' is dropped onto said sheet by the tilting frame 5. While the sheet is being passed between the two rolls 4 and 4' and between the two rolls 8 and 8', each of said pairs of rolls are being reciprocated, while the sheet is being operated upon by the same, through the straps 18 being connected to the shafts of such rolls and operated by the levers 19 and 19^a connected to said straps and to the chains 20, which are operated by the disks 22, which motion with the motion of the rolls 4 and 4' and 8 and 8' in revolving upon the sheet will have the effect of double polishing the sheet, and also give such buffing or polishing rolls a uniform bearing on said sheet. After the sheet *a* has passed through the cleaning and polish-

ing machine A it is removed from the table 2' and passed through the rolls of a coating machine of any suitable construction, preferably as shown in my application filed August 5, 1910, Serial No. 511,464, which will affix or apply a coating of lacquer or enamel, preferably flexible, to both sides of said sheet at one pass through said rolls. After such sheet has been so coated it is placed on a rack, where it rests upon pointed ends of a bar, such as is shown in my application filed August 5, 1910, Serial No. 511,465, and such racks with coated sheets thereon are piled on a suitable car, so that such car carrying the same can be run into an oven and such sheets subjected to a heat of about 350 degrees for a period of about 90 minutes.

It will thus be seen that by my improved machine for polishing metal sheets all liability of the sheet becoming injured by bending, hooking or buckling is overcome and it is enabled to be polished in a rapid, easy and clean manner, which practical experience has proved, while the thin black iron sheet so cleaned and polished, when the lacquer or enamel coating is placed thereon, will present to the eye the appearance of a highly polished coated sheet, and resembling a coated sheet of tin plate, thereby greatly cheapening the cost of manufacture of such coated sheets for the purposes intended.

Various modifications and changes in process and in the design and construction of my improved machine for cleaning and polishing metal sheets may be resorted to, without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as my invention and desire to secure by Letters Patent is—

1. A machine for polishing metal sheets comprising a pair of vertical polishing rolls for engaging with the sheet and revolving in the direction of its movement, another pair of vertical polishing rolls in the rear of said rolls for engaging with the sheet and revolving in the opposite direction from said first named rolls, the top of the lower polishing rolls being below the intermediate feed, and means for feeding the sheet through said rolls.

2. A machine for polishing metal sheets comprising a pair of vertical polishing rolls for engaging with the sheet and revolving in the direction of its movement, another pair of vertical polishing rolls in the rear of said rolls for engaging with the sheet and revolving in the opposite direction from said first named rolls, with the upper one of said rolls movable for being lowered to engage with the sheet, the top of the lower polishing rolls being below the intermediate feed, and means for feeding the sheet through said rolls.

3. A machine for polishing metal sheets

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13. A machine for polishing metal sheets comprising a pair of vertical polishing rolls for engaging with the sheet and revolving in the direction of its movement, another
5 pair of vertical polishing rolls in the rear of said rolls for engaging with the sheet and revolving in the opposite direction from said first named rolls, a tilting frame carrying the upper rolls of each of said pairs
10 for lowering said rolls alternately to engage the sheet, the top of the lower polishing

rolls being below the intermediate feed, means for feeding the sheet through said rolls, and means for reciprocating said polishing rolls.

In testimony whereof, I, the said GEORGE RUSSELL, have hereunto set my hand. 15

GEORGE RUSSELL.

Witnesses:

T. B. HUMPHRIES,
J. N. COOKE.