Feb. 3, 1931. C. H. MANION ET AL. 1,791,101

APPARATUS FOR CLEANSING METAL SHEETS

Filed Jan. 24, 1928 3 Sheets-Sheet 1

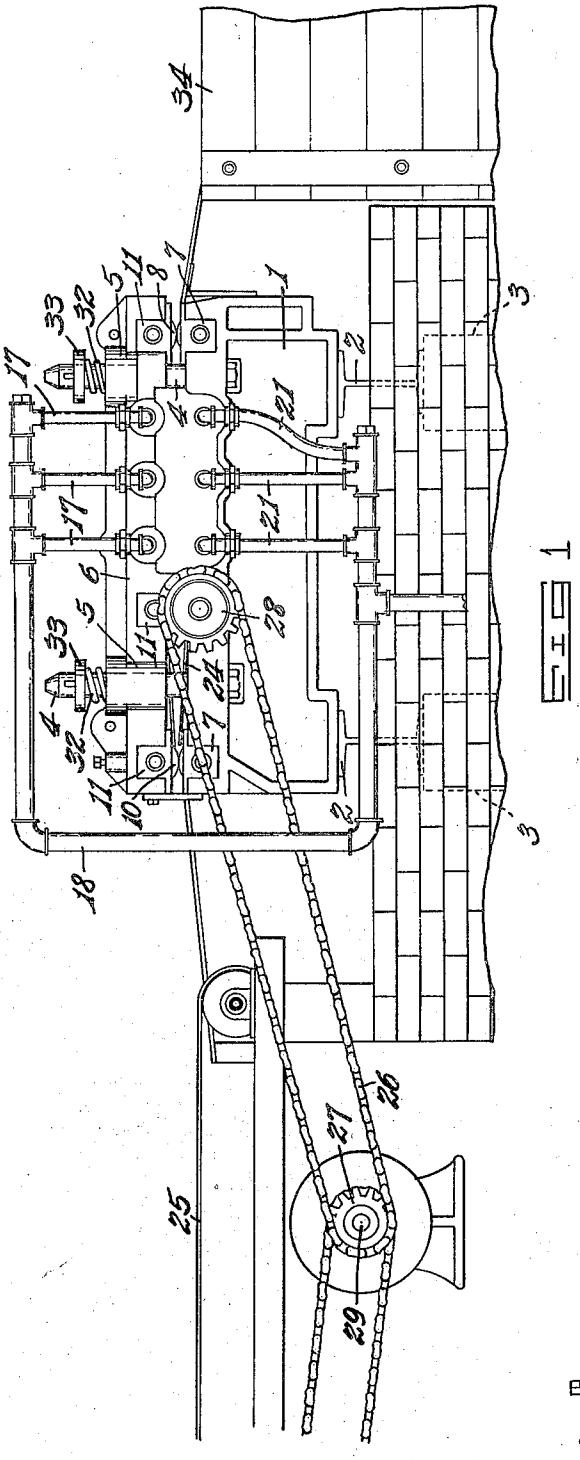


Fig 1

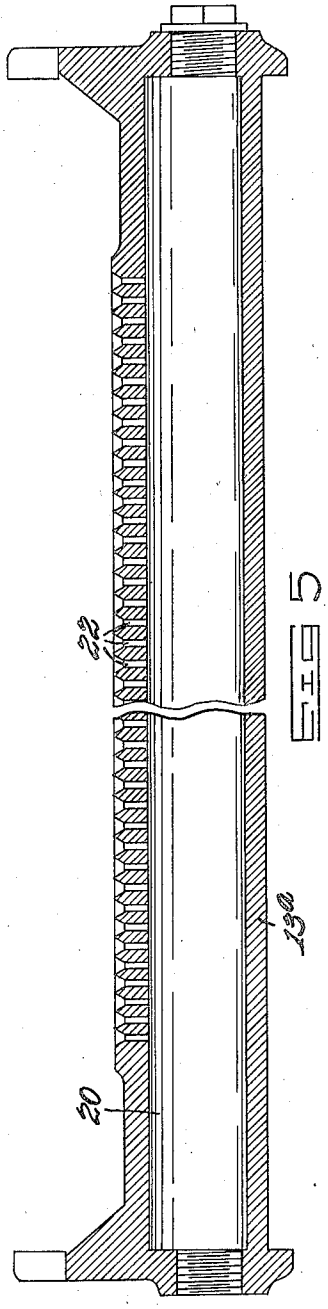


Fig 5

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APPARATUS FOR CLEANSING METAL SHEETS

Filed Jan. 24, 1928 3 Sheets-Sheet 2

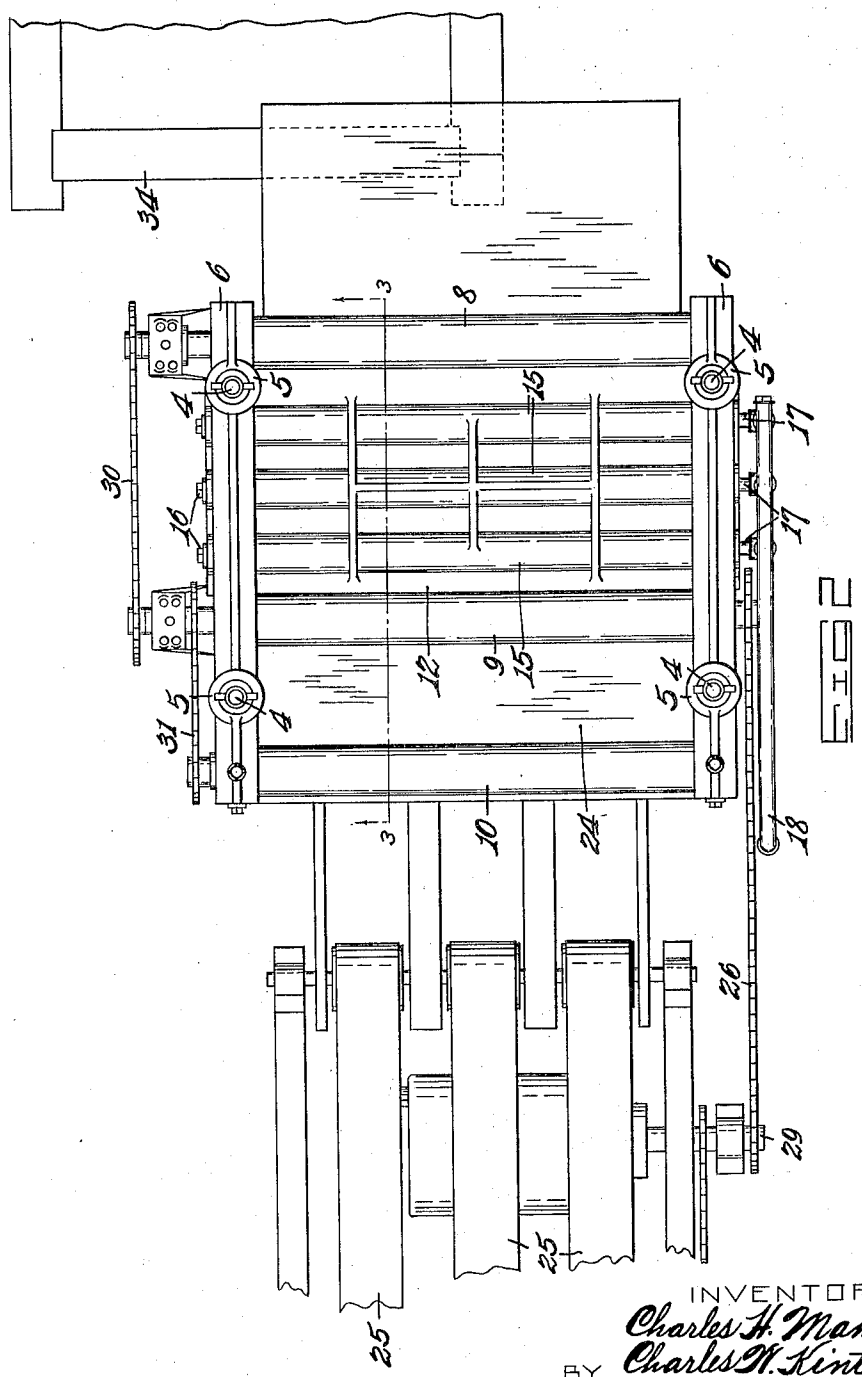


FIG 2

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APPARATUS FOR CLEANSING METAL SHEETS

Filed Jan. 24, 1928 3 Sheets-Sheet 3

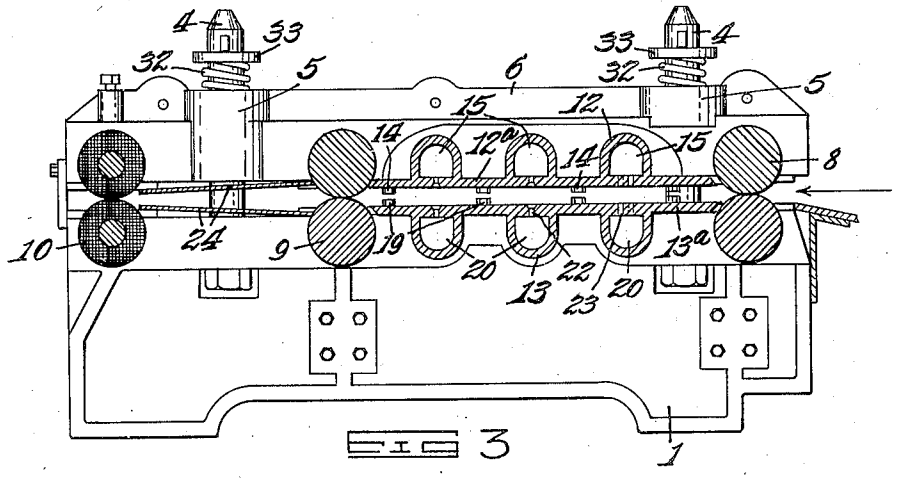


FIG 3

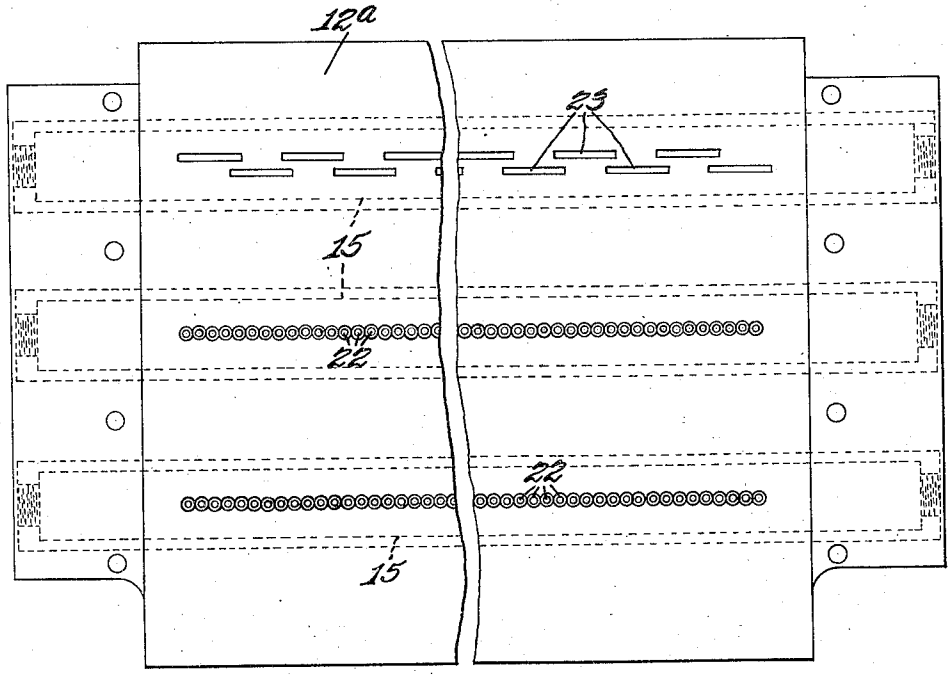


FIG 4

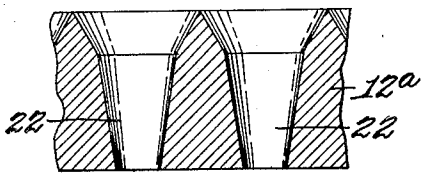


FIG 6

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UNITED STATES PATENT OFFICE

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APPARATUS FOR CLEANSING METAL SHEETS

Application filed January 24, 1928. Serial No. 249,039.

This invention relates broadly to apparatus for cleansing metal sheets, and more specifically to a machine for cleansing such sheets immediately following the pickling operation.

The primary object of the invention is to provide a machine whereby metal sheets may be more or less thoroughly cleansed, rinsed and dried following their removal either from the pickling tank or from a rinsing tank to which they are delivered following the pickling operation.

A further object is to provide a mechanism by means of which the surfaces of pickled sheets are subjected to the spraying action of numerous high pressure jets of hot water whereby said surfaces are effectually cleansed.

In describing the invention in detail, reference is herein had to the accompanying drawings, in which—

Figure 1 is a side elevation of the invention;

Figure 2 is a top plan view of the same;

Figure 3 is an enlarged section on line 3—3, Fig. 2;

Figure 4 is an enlarged under side elevation of the upper spray member;

Figure 5 is an enlarged transverse section of the lower spray member, taken centrally of one of the water chambers; and

Figure 6 is an enlarged fragmentary section of a spray member, showing the form of the spray ports or jets.

Referring to said drawings, 1 designates each of two oppositely disposed frame members which, as herein shown, rest upon transverse I-beams 2 supported upon a suitable foundation 3. Mounted in each of said frame members are the lower ends of two suitably located upright posts 4 upon which are loosely fitted sleeve portions 5 formed on oppositely disposed top frame members 6 which overhang the lower frame members 1.

Journaled in bearings 7 carried by the lower frame members are the lower rolls of a plurality of sets of rolls which occupy spaced relation and which are herein designated 8, 9 and 10; and journaled in bearings 11 carried by the upper frame members are the upper rolls of said sets, said upper rolls being normally disposed in overlying seated relation to the lower rolls and serving to support said upper frame members.

The set of rolls 8, located at the entrance end of the machine, and the set of rolls 9, located a suitable distance in advance of said rolls 8, are designed as conveyor rolls whereby the sheets to be cleansed are advanced, and interposed between said sets 8 and 9 are upper and lower fluid-spray members 12 and 13 which overlie and underlie, respectively, the path of travel of metal sheets which are advanced by said conveyor rolls. Each of said spray members is preferably made in the form of a single metal casting, the upper member comprising a flat plate-like body 12^a which has its opposite ends attached, as by means of bolts 14, to the under sides of the top frames 6. Located upon the upper face of said body 12^a and formed integrally with the latter is a plurality of transversely disposed hollow ribs constituting water chambers 15 which are suitably closed at one end, as by plugs 16, and which have branch water supply pipes 17 connected to their opposite ends, as shown, said branch pipes leading from a main supply pipe 18. The pipe 18 has sufficient flexibility in its couplings at the ends of the vertical part thereof to allow sufficient yielding of the upper frame members 6, but the specific manner by which the fluid is supplied forms no part of the invention; and in case greater flexibility is desired, the pipe may be made of woven metallic or other hose.

The lower member 13 likewise comprises a plate-like body 13^a which has its ends mounted in place, as by means of bolts 19, to the top faces of the lower frame members 1. Formed upon the under face of said body 13^a are transverse hollow ribs constituting water chambers 20, similar in form to the chambers 15 hereinbefore referred to, which have communicating therewith at one end branch water supply pipes 21 leading from the supply pipe 18.

Each of the chambers 15 and 20 is provided with means whereby water may be di-

rected therefrom into contact with the adjacent surfaces of metal sheets for effecting cleansing thereof. Said water directing means preferably consists of one or more rows of bored holes 22 which constitute jets through which water is forcibly sprayed against the surfaces of the passing sheets. Instead of such row of holes 22, the first of each series of water chambers may have therein a series of slots 23, staggered or otherwise, through which relatively large streams of water may be directed upon the sheets, such streams serving initially to flood the sheet surfaces, and the water delivered in sprays through the jets at high pressure acting to produce a scrubbing effect upon the previously flooded surfaces of the sheets.

From the rolls 9, the sheets are passed between guide members 24 to the rolls 10 which, preferably, are designed to free the surfaces of such sheets from moisture which adheres thereto following the cleansing and rinsing effected as aforesaid. Said rolls 10 may be made of metal, rubber or any other appropriate material, but preferably have a surface covering 10^a of a soft, pliable fabric, as flannel, whereby the moisture carried by the sheets is absorbed or squeezed off.

From said rolls 10^a the sheets pass to endless conveyor belts 25 whereby they are advanced to a piling point.

The various sets of rolls of the mechanism may be driven through any suitable gearing, that herein shown comprising a drive chain 26, connecting sprocket wheels 27 and 28 carried by a motor shaft 29 and an end of the lower of rolls 9, respectively. The rolls 8 and 10 are, in turn, driven from the rolls 9 by sprocket chains 30 and 31, respectively.

The upper frame members 6, which have the thereby carried upper rolls of the various sets of rolls normally resting upon the lower rolls of said sets, are rendered readily yieldable in a vertical direction by the provision of coil springs 32 in encircling relation to the projecting upper ends of the posts, said springs having their lower ends seated upon said upper frame members and their upper ends resting against collars 33 which are removably mounted on said posts. Manifestly, said springs permit such vertical movements of the upper frame members and the thereby supported rolls as may be required to permit unobstructed passage of sheets through the rolls. A further object of the sectional construction described is to permit of ready access for cleaning the machine, the upper frame sections, top-rolls and upper spray member being removable as a unit when the branch water pipes 17 have been disconnected.

In practice, metal sheets, taken directly from an adjacent, or conveniently located, pickling tank 3 are entered between the rolls 8, whence they are advanced between the oppositely facing spray members 12 and 13 to the rolls 9. Such sheets are first flooded with hot water directed against their opposite surfaces through the slots 23 and are subsequently impinged by numerous sprays of hot water forcibly directed through the jets 22. The water so applied acts to scrub the surfaces of the sheets and to effect a thorough cleansing and rinsing thereof. The drying rolls 10 serve to remove any water or moisture borne by the sheets following passage of the latter through the conveyor rolls 9.

What is claimed is—

1. A sheet cleansing machine comprising a sectional frame wherein an upper section overlies and is vertically movable relative to a lower section, a plurality of sets of conveyor rolls, the lower rolls of said sets being journaled in the lower frame section and the top rolls on the upper section, and a sheet spraying device disposed between adjacent sets of said rolls on each side of the path of sheet travel from one set to the other, the upper and lower spraying devices being carried by said upper and lower frame sections, respectively, each of said devices including in an integral structure a member forming a sheet guide and having a plurality of transversely disposed water chambers having therein discharge openings facing the path of sheet travel.

2. A sheet cleansing machine comprising a sectional frame wherein an upper section overlies and is vertically movable relative to a lower section, a plurality of sets of conveyor rolls journaled for operation between said sections, unitary spraying devices carried by said frame sections above and below the path of sheet travel between adjacent sets of said rolls, each of said devices comprising a flat plate-like body having on the outer face thereof a plurality of transverse hollow ribs constituting water chambers and being provided with jet openings for directing water from said chambers toward said path of sheet travel.

3. A sheet cleansing machine, including an upper and a lower member, a pair of spaced sheet feeding rolls carried by each member, the rolls of the upper member being superimposed upon the rolls of the lower member so as to support the upper member from the rolls of the lower member, means to mount the upper member for vertical movements, a pair of plates each having a series of hollow chambers carried thereby and having outlets, means to secure the plates to the respective members in the space between the rolls thereof, said plates being spaced to provide a fluid chamber therebetween, said outlets of the chambers of the respective plates confronting one another, means to supply a cleansing fluid to the members, and means to drive the rolls.

4. A sheet cleansing machine including an upper and a lower member, a pair of spaced sheet feeding rolls carried by each member,

the rolls of the upper member being engaged with the rolls of the lower member, a unitary combined sheet guide and fluid spraying plate element for each member disposed in the space between the rolls thereof, each plate element being perforated and having fluid receiving chambered portions on its rear in communication with the perforations, said plate elements being spaced to form a fluid confining chamber therebetween, means to supply fluid to said chambered portions, means to secure said elements to the inner sides of the members, and means to drive the rolls.

5. In a sheet cleansing machine, a frame, two sets of conveyor rolls spaced longitudinally of the frame, sheet spraying means composed of a pair of oppositely related elongated substantially flat members disposed in the space between said sets of rolls and being substantially closely spaced to conjointly form a fluid confining chamber therebetween, whereby to provide a bath through which the sheets pass from one set of rolls to the other set, and means to supply fluid to said chamber.

6. In a sheet cleansing machine, a frame, two sets of conveyor rolls spaced longitudinally of the frame, sheet spraying means composed of a pair of oppositely related elongated substantially flat members disposed in the space between said sets of rolls and being substantially closely spaced to conjointly form a fluid confining chamber therebetween, whereby to provide a bath through which the sheets pass from one set of rolls to the other set, means to mount one of the rolls of each set on one of the members for movement therewith, means to mount said one member for yielding vertical movement, and means to supply fluid to said chamber.

7. In a sheet cleansing machine, a frame, two sets of conveyor rolls spaced longitudinally of the frame, sheet spraying means composed of a pair of oppositely related elongated substantially flat members disposed in the space between said sets of rolls and being substantially closely spaced to conjointly form a fluid confining chamber therebetween, whereby to provide a bath through which the sheets pass from one set of rolls to the other set, said members each having a plurality of fluid inlets extending substantially the length and width thereof, and means to supply fluid to the inlets.

In testimony whereof we affix our signatures.

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CHARLES W. KINTER.