A. SUNDH.

MACHINE FOR TREATING METAL STRIPS.

APPLICATION FILED MAR. 3, 1920.

1,380,437.

Patented June 7, 1921.

3 SHEETS—SHEET 1.

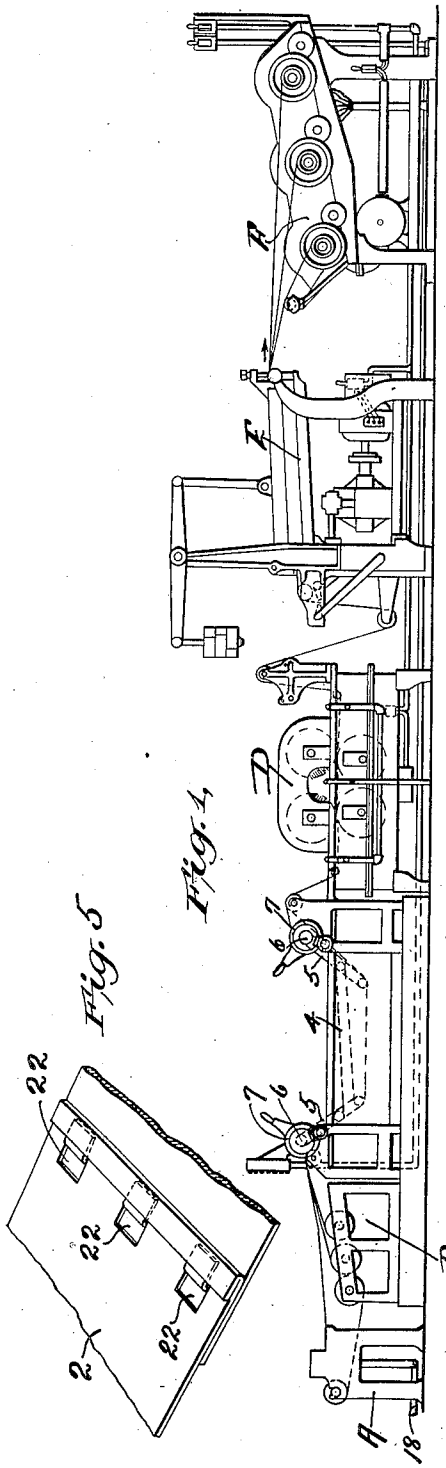


Fig. 1.

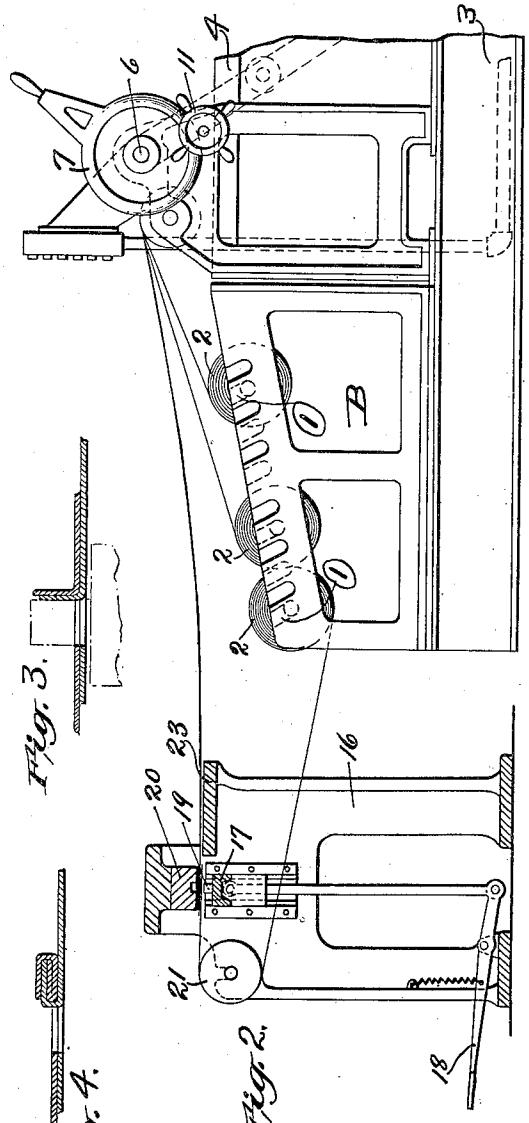


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

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By his Attorneys
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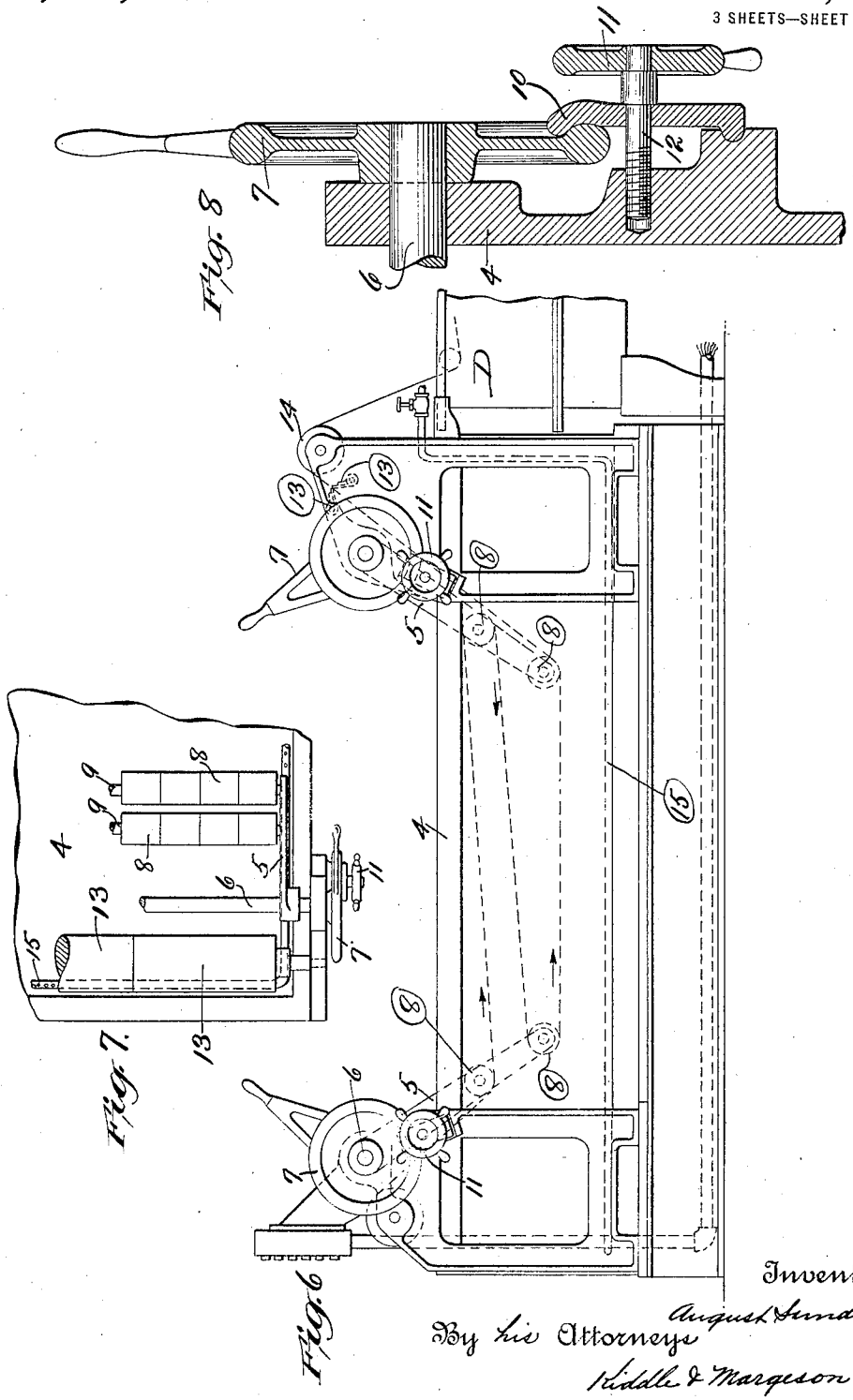


Fig. 8

Fig. 7.

Fig. 6

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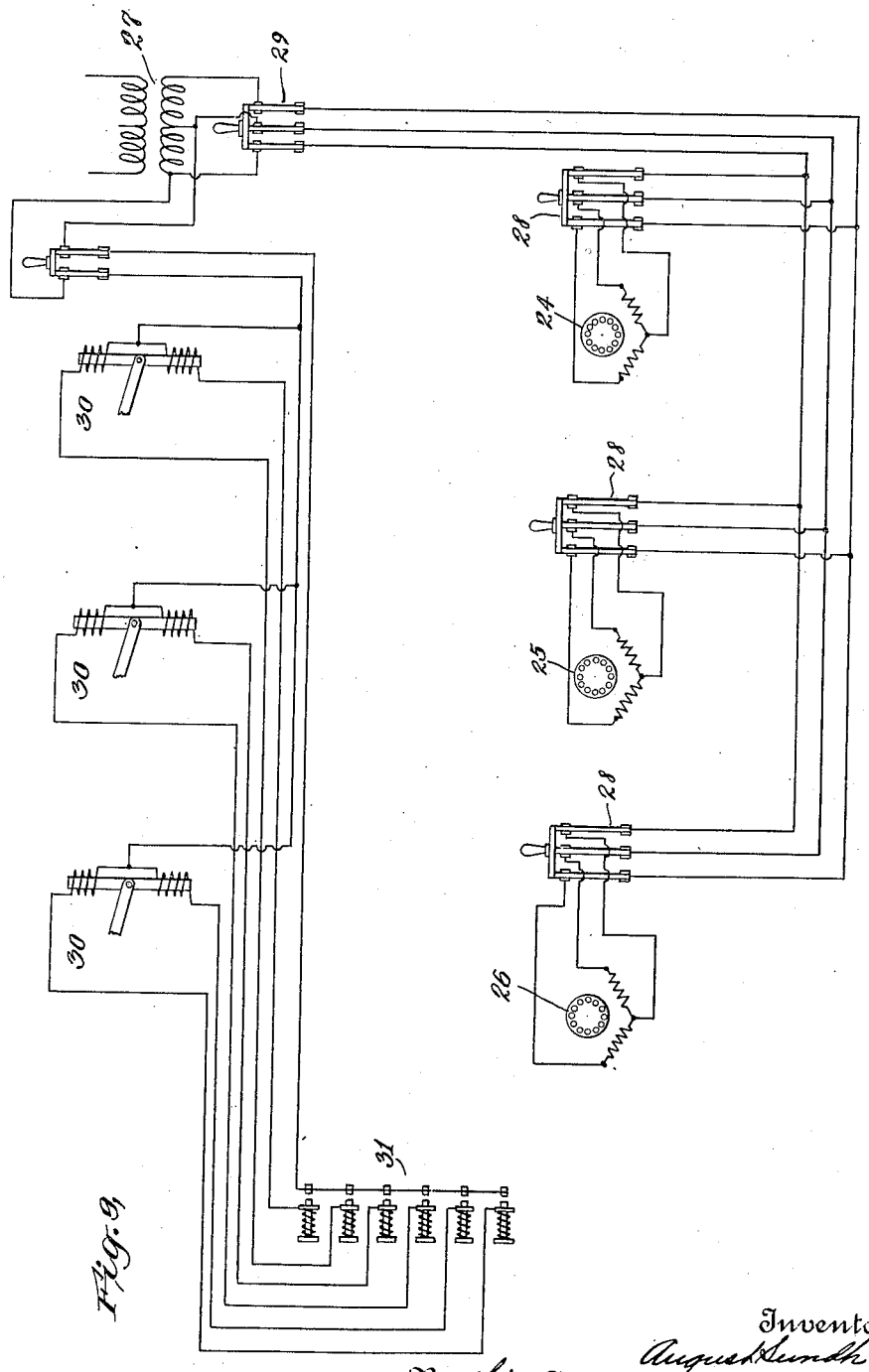


Fig. 9.

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UNITED STATES PATENT OFFICE.

AUGUST SUNDH, OF HASTINGS-UPON-HUDSON, NEW YORK, ASSIGNOR TO SUNDH ENGINEERING AND MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MACHINE FOR TREATING METAL STRIPS.

1,380,437. Specification of Letters Patent. **Patented June 7, 1921.**

Original application filed December 20, 1917, Serial No. 208,070. Divided and this application filed March 3, 1920. Serial No. 362,899.

To all whom it may concern:

Be it known that I, AUGUST SUNDH, a citizen of the United States, and a resident of Hastings-upon-Hudson, county of Westchester, State of New York, have invented certain new and useful Improvements in Machines for Treating Metal Strips, of which the following is a specification.

This invention broadly considered has reference to the treating of metal strips, whereby strips as they come from the annealing oven are pickled, cleaned, dried and straightened and finally wound up into rolls in a thoroughly cleaned condition.

It is desirable in such a machine to provide means whereby several strips may be treated simultaneously, and to accomplish this end I provide a plurality of winding drums which are capable of drawing a plurality of strips through the machine simultaneously, and inasmuch as the various treating means making up the machine have been provided with this idea in mind, it is possible to stop any one of the winding drums without stopping work on the other strips. For the same reason I have provided the guides for the strips, which guide the strips in their passage, independently operable.

The present application is a division of my copending application, Serial No. 208,070, filed December 20, 1917, and is directed specifically to that portion of the machine whereby successive strips passing through the same may be spliced to each other readily, and wherein the strips are pickled, it being understood that a number of strips may be treated simultaneously, and as the rear end of each strip is reached, it is stopped without disturbing the others, and another strip spliced or joined to it, this last strip then being drawn through the machine and treated. As heretofore mentioned the whole machine is so constructed as to make this possible.

Referring now to the drawings wherein I have illustrated an embodiment of my invention,—

Figure 1 shows in elevation a machine embodying the novel features making up my invention;

Fig. 2 shows in part sectional elevation the means provided for splicing the strips together, the holders for the coils of strips to be treated and a part of the means for pickling the strips;

Figs. 3, 4 and 5 show in section and plan the strip-splicing operation;

Fig. 6 is an elevation of the pickling means;

Fig. 7 is a fragmentary plan of a portion of the apparatus of Fig. 6;

Fig. 8 is an enlarged section of the means for holding the parts of the pickling means in adjusted position, and

Fig. 9 is a wiring diagram.

In order that a thorough understanding may be had of my invention I will describe briefly the entire machine as illustrated in Fig. 1, describing the details of construction illustrated in the other figures later on.

The strips are placed in a coil on the machine at B, from which the end of a strip, or all of the strips if more than one is being treated simultaneously, is led through a pickling reservoir where the strip is subjected to a pickling operation. The strip next passes to D where it is washed and scrubbed and freed of dirt and scale, next passing to E. Here the strip is dried and straightened, next passing to winding drums designated F where the strip is wound up in a thoroughly cleaned condition. It is understood that as many strips may be treated simultaneously as may be desired, the number to be treated being limited only by the space available for installation of the machine. I have shown three strips being treated.

At B, I have provided a number of holders for the supply of metal strips, these holders being in the form of slots 1, as many as may be desirable, adapted to receive mandrels or the like on which the metal coils 2 are placed. The frames in which the slots 1 are formed are mounted on a bed 3, and adjacent an end of a pickling reservoir 4. This reservoir as it contains a pickling acid is preferably lead lined throughout to withstand the corrosive action of the acid.

Mounted on the reservoir 4 at each end thereof are pivoted carriers or levers 5, a pair at each end of the reservoir, these carriers being supported by transversely extending shafts 6, which shafts carry at one end a rotatable hand wheel 7. Mounted on the carriers are strip-guiding sectional rollers 8, supported in the carriers by rods 9 of

brass or other non-corrosive material, the rollers themselves being preferably made of porcelain. By rotating the hand wheels 7 to the left or right as the case may be the rollers 8 and carriers 5 may be raised and lowered.

In order that the hand wheels may be locked, I have provided plates 10 one for each wheel, adapted to be brought into and out of engagement with the wheel by a hand wheel 11 mounted on a stub shaft 12 having a screw-threaded connection with the side of the pickle reservoir.

The strips are passed from the supply coils over a sectional roller 13 at the end of the pickle reservoir, and from thence they pass under the upper sectional rollers 8, at the left hand end of the reservoir, through the pickle in the reservoir over sectional rollers 8 at the right hand end of the reservoir, back through the pickle, around the lower set of sectional rollers 8, and back through the pickle once more to the right hand end of the reservoir. From these rollers the strips are led at an incline upwardly betweeen wipers 13 at the end of the reservoir, around sectional rollers 14, from which they pass through the remaining portions D and E of the machine and are wound on the drums or blocks at F.

It will be seen that the rollers 8 in the reservoir are so disposed that each strip is caused to pass through the pickle several times so as to be thoroughly pickled. Inasmuch as the rollers 8 are mounted on the carriers 5 it will be seen that these carriers and rollers are well adapted to take the stress on the strips as they pass through.

The wipers 13 are located as they are for the purpose not only of removing the pickle from the strips which would otherwise be carried over to the washing and scrubbing apparatus at D, but to return the pickle removed from the strips to the pickling reservoir thereby conserving the pickle supply. I have found that a saving in pickle of as high as 80% may be obtained in this manner.

In order that it may not be necessary for the operator to place his hands in the pickle at any time I have provided the hand wheels 7, rotation of which will raise the strips passing through the reservoir out of the pickle, the hand wheels then being locked by the mechanism already described until it is desired to resume operations.

In order that the contents of the pickle reservoir may be heated which I have found desirable, I provide steam pipes 15 of some non-corrosive material such as lead.

As it is usually desirable to coil the finished strips in greater lengths than they come to the machine, I have provided the splicing mechanism already briefly referred to and designated A. This mechanism comprises a frame 16, carrying a punch head 17 adapted to be reciprocated vertically by a foot pedal 18. As many of these punch heads are provided as there are strips to be simultaneously treated. The punch 19 carried by the head 17 coöperates with a die plate 20.

In Fig. 2 I have shown a new strip being spliced to a strip passing through the machine, from which figure it will be observed that the end of the coil of new strip is led from the strip holder passed around the roller 21 and passed under the rear end of the strip already in the machine. It will be understood of course that the strip in the machine must be at rest at this time, and I will explain presently how this is accomplished without stopping the operation of the entire machine. The pedal 18 is now depressed to punch three holes through the strip as indicated at 22 in Fig. 5. The strip is then passed to the anvil 23 and hammered down to the form indicated in Fig. 4. It will be observed that the finished splice has no sharp edges to catch in the machine as the strips pass through, which is of importance as heretofore much trouble has been experienced from the strips catching.

The wiring diagram for the machine is shown in Fig. 9, and it will be seen from this figure that the motor 24 for driving the winding drums together with the motors 25 and 26 for the straightening and drying apparatus and the washing and scrubbing apparatus all receive their power from a common source 27, each motor being independently controllable by switches 28 or centrally controllable by a switch 29. The motor 24 for the winding drums is connected to each drum by independently operable clutch mechanism 30 controlled by a bank of push buttons 31, so that each drum may be started and stopped independently of the others in order that the splicing operation may be performed without effecting operation on the other strips passing through the machine.

What I claim is:

1. In mechanism of the class described, the combination of a plurality of strip holders, means for drawing a strip from each of said holders simultaneously and operable to hold one strip stationary while the other is moving, and manually operable mechanism for splicing the end of a new strip to the end of a preceding strip as the latter remains stationary.

2. In mechanism of the class described, strip pickling means, independently operable rollers for guiding a plurality of strips passing simultaneously through the pickling means, rollers for guiding each strip as it leaves the pickling means, the first rollers mentioned being disposed so as to cause each strip to pass through the pickling means

more than once, and means for wiping each strip as it passes from the pickling means, the rollers last mentioned being so arranged that the pickle removed by the wipers will be returned to the pickling means.

3. In mechanism of the class described, the combination of a pickle reservoir, guides for causing a metal strip to pass through pickle in said reservoir, and means coöperating with said guides for raising the strip out of the pickle.

4. In mechanism of the class described, the combination of a pickle reservoir, guides for causing a metal strip to pass through pickle in said reservoir, and means operable exterior of the reservoir for raising said guides to raise the strip out of the pickle.

5. In mechanism of the class described, the combination of a pickle reservoir, guides disposed to cause a strip to pass several times through pickle in said reservoir, and means for raising said guides to raise the strip out of the pickle, and means for maintaining said guides in such raised position.

6. In mechanism of the class described, the combination of a pickle reservoir, guides disposed to cause a strip to pass several times through pickle in said reservoir, means for raising said guides to raise the strip free of the pickle in the reservoir, and means for locking the guides in both their raised and their lowered position.

7. In mechanism of the class described, the combination of a pickle reservoir, strip guiding rollers, a plurality of carriers for said rollers, supports for the carriers, and means for actuating the supports to raise and lower the carriers and rolls out of and into the pickle in the reservoir.

8. In mechanism of the class described, the combination of a pickle reservoir, a plurality of rollers arranged in groups for conveying strips of metal through pickle in the reservoir, and levers forming bearings for the rollers and adapted to take the stress of the strips as they pass over the rollers.

9. In mechanism of the class described, the combination of a pickle reservoir, a plurality of strip supporting and guiding rollers of non-corrosive material the rollers for each strip being independent of the rollers for the other strips, the rollers being arranged to cause the strips to pass through pickle in the reservoir more than once.

10. In mechanism of the class described, the combination of a pickle reservoir, holders for metal strips at one end of the reservoir, rollers for guiding strips from said holders through pickle in the reservoir, the rollers being positioned so as to cause the strips to pass through the pickle more than once, levers carrying said rollers, and operable to raise the rollers and strips out of the pickle.

11. In mechanism of the class described, the combination of a pickle reservoir, groups of independently operable rollers in the reservoir for supporting and guiding several metal strips simultaneously through pickle in the reservoir, and wipers for engaging each strip after leaving the pickle but before leaving the reservoir to remove pickle from the strips and return the pickle thus removed to the reservoir.

12. In a machine of the class described, a pickling means, strip supply means adjacent the pickling means, means for drawing a plurality of strips simultaneously from the supply means through the pickling means, and means for splicing a strip to a strip already in the machine without stopping operation on the remaining strips in the machine.

13. In a machine of the class described, a pickling reservoir, strip guiding rollers therein, carriers for said rollers movable to raise and lower said rollers, said rollers being so disposed as to cause each strip to pass through the pickle in the reservoir several times, and means for heating the pickle.

This specification signed this 27th day of February, 1920.

AUGUST SUNDH.