

Aug. 8, 1944.

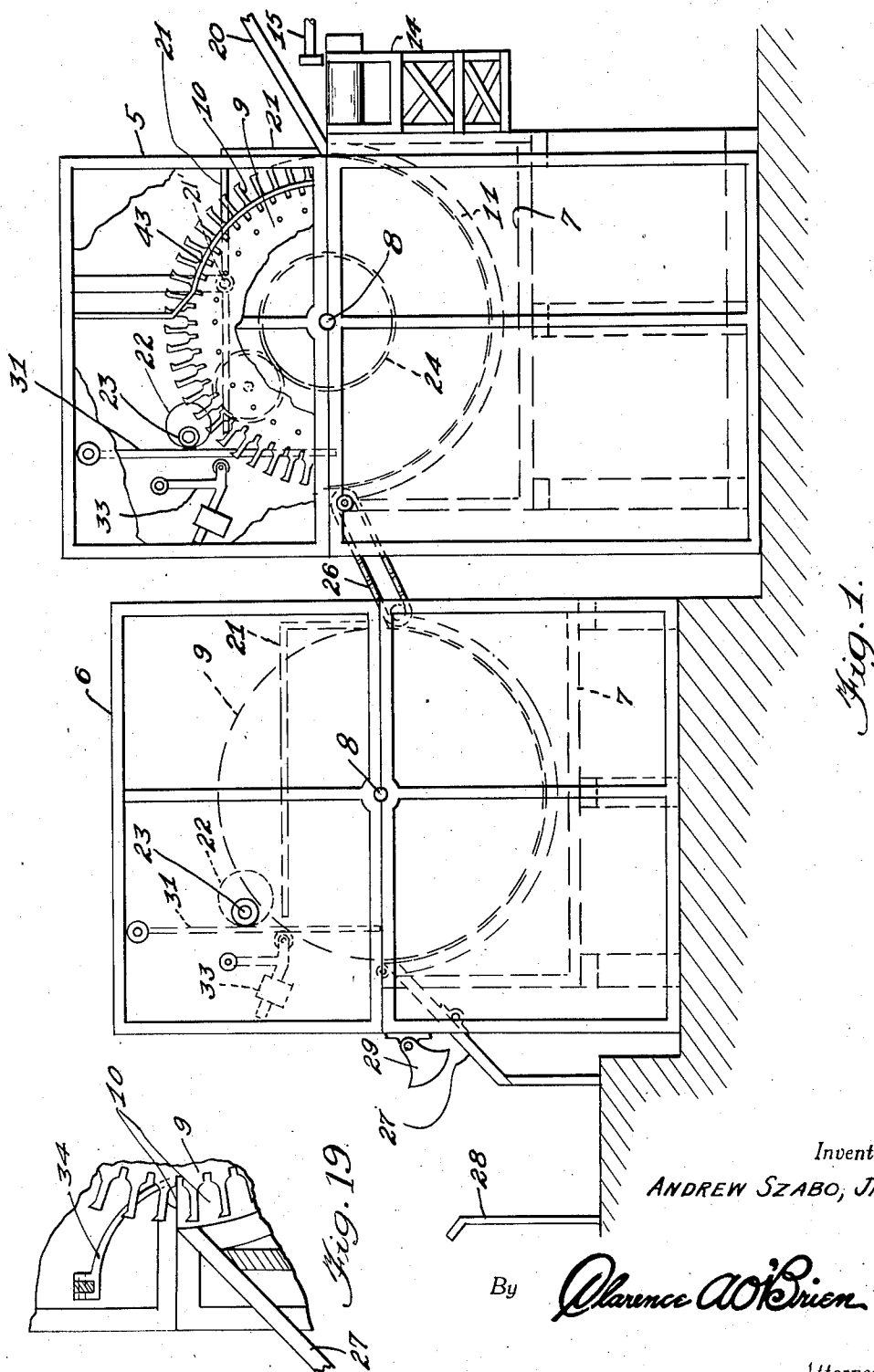
A. SZABO, JR

2,355,249

AUTOMATIC METAL TREATING MACHINE

Filed Sept. 19, 1940

7 Sheets-Sheet 1



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AUTOMATIC METAL TREATING MACHINE

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7 Sheets-Sheet 2

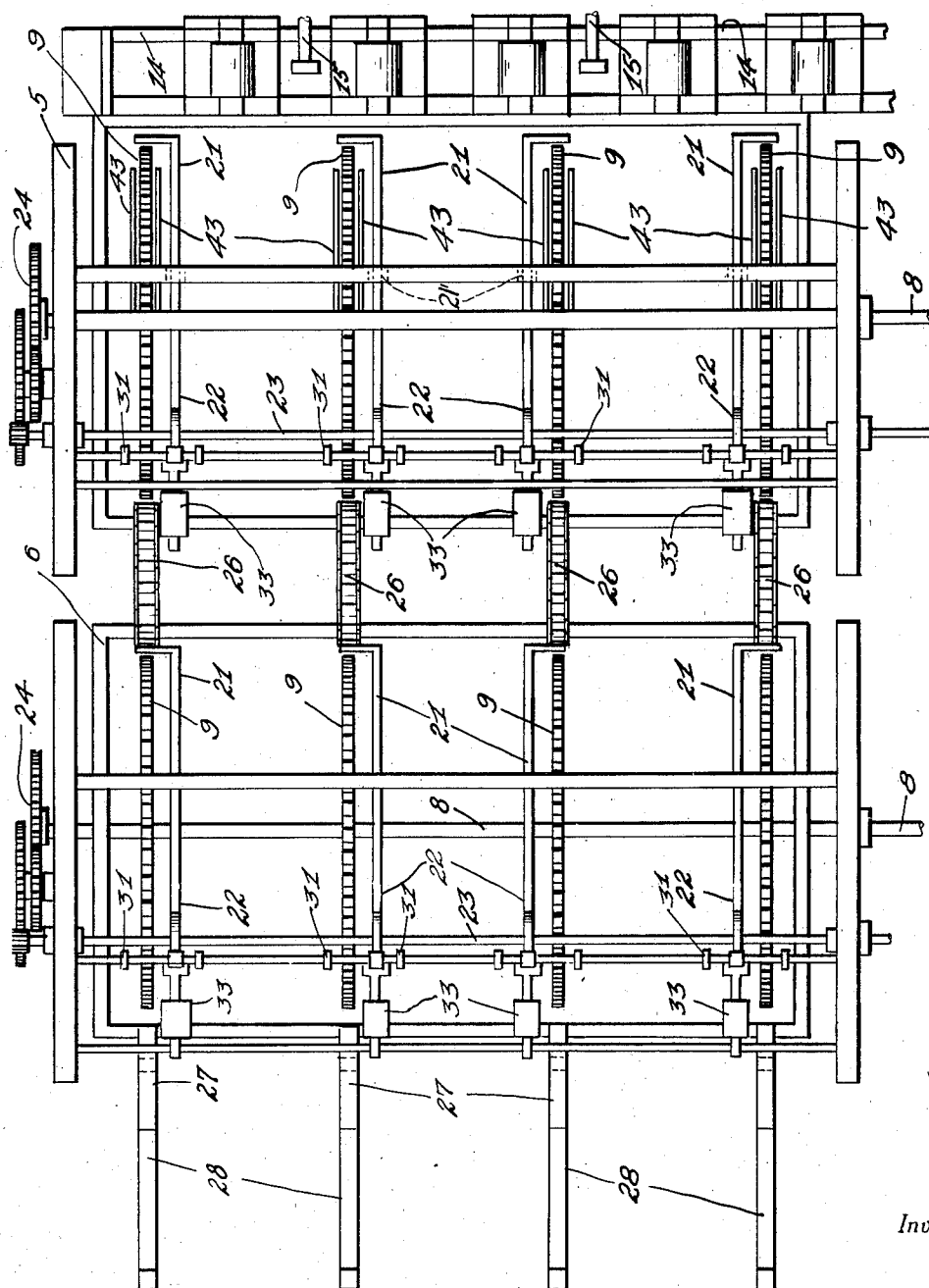


Fig. 2.

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7 Sheets-Sheet 3

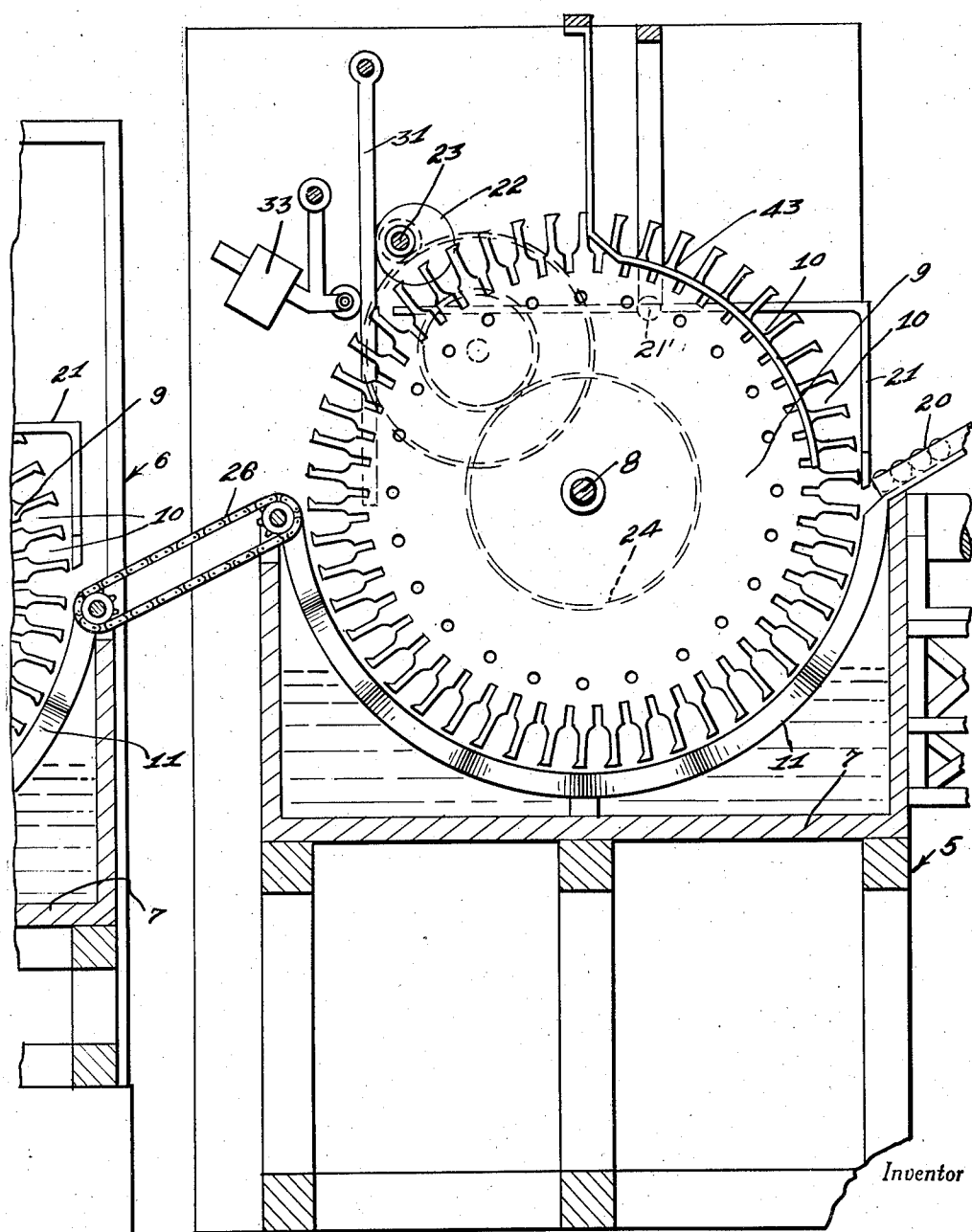


Fig. 3.

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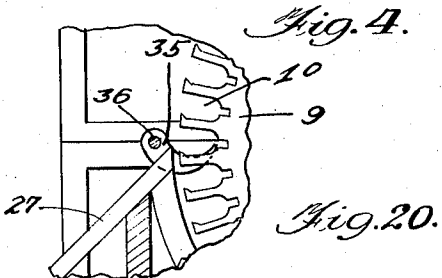
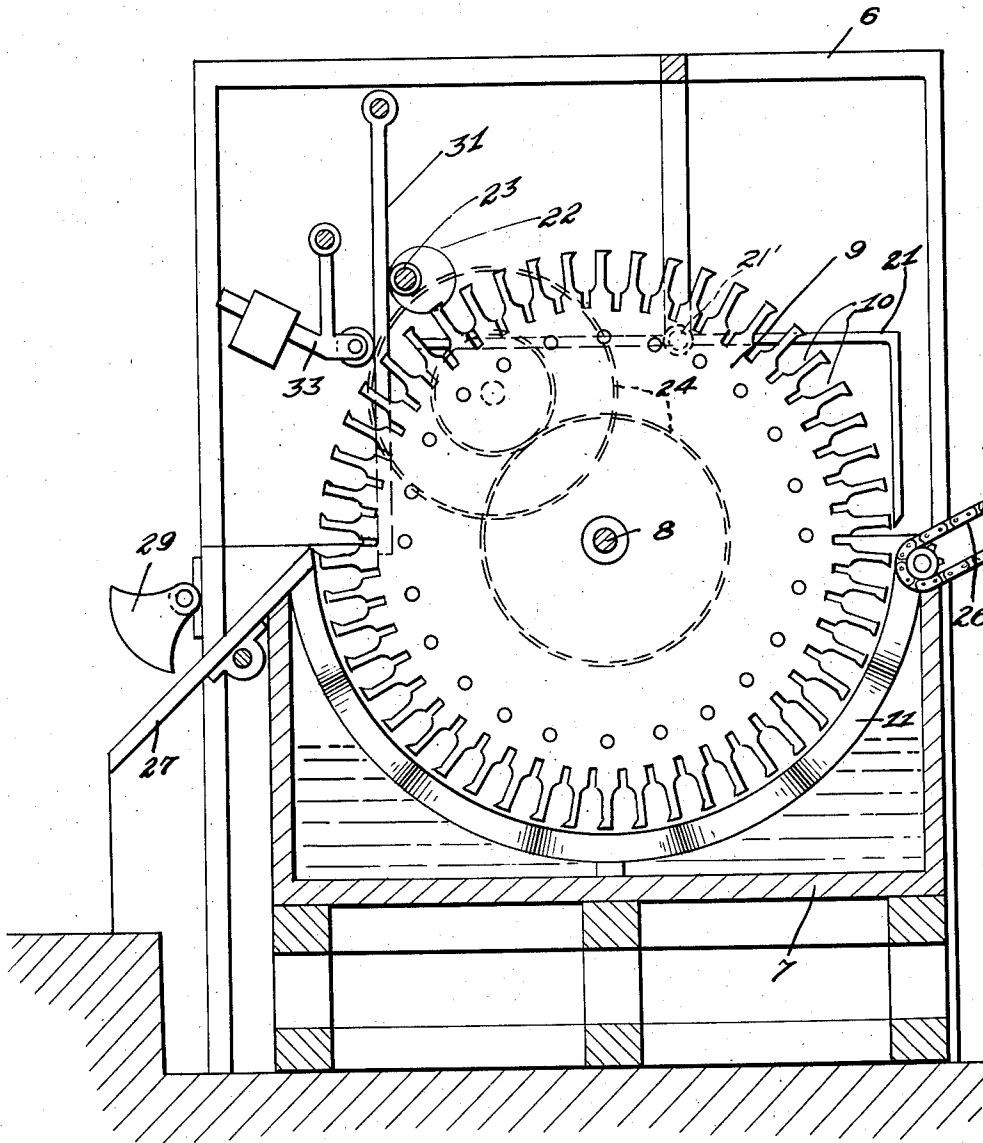
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7 Sheets-Sheet 4



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AUTOMATIC METAL TREATING MACHINE

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7 Sheets-Sheet 5

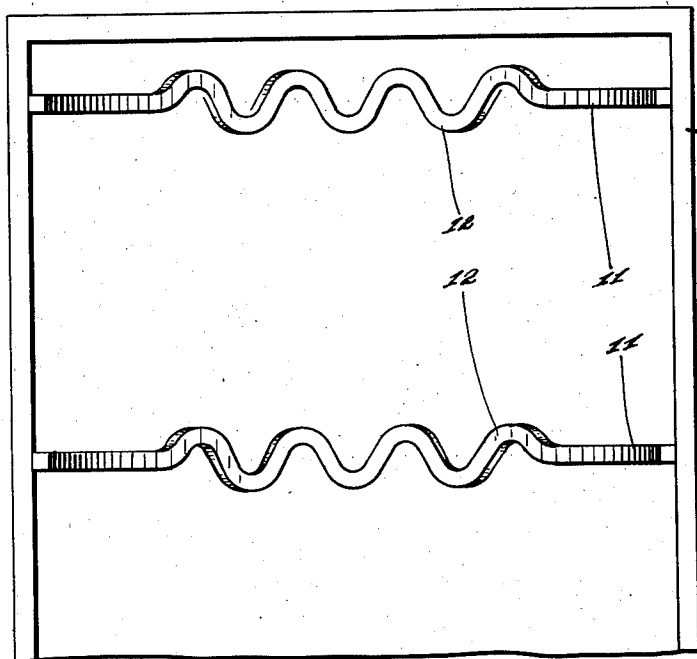


Fig. 5.

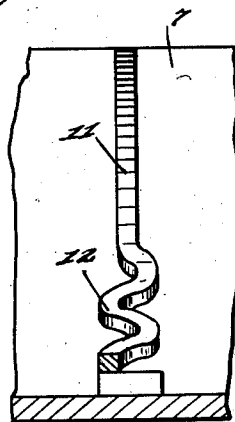


Fig. 6.

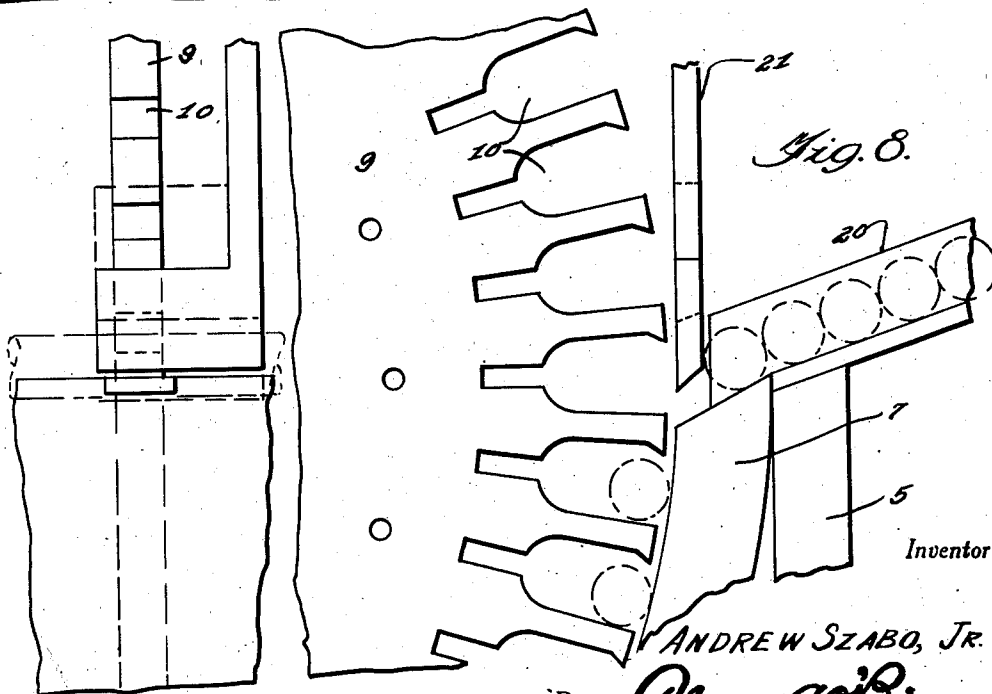


Fig. 7.

Fig. 8.

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7 Sheets-Sheet 6

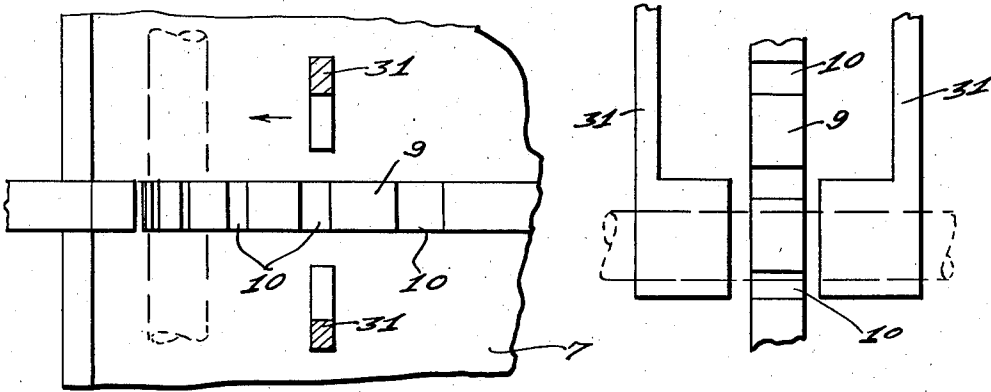


Fig. 9.

Fig. 10.

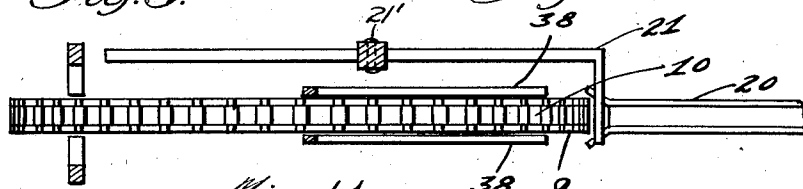


Fig. 11.

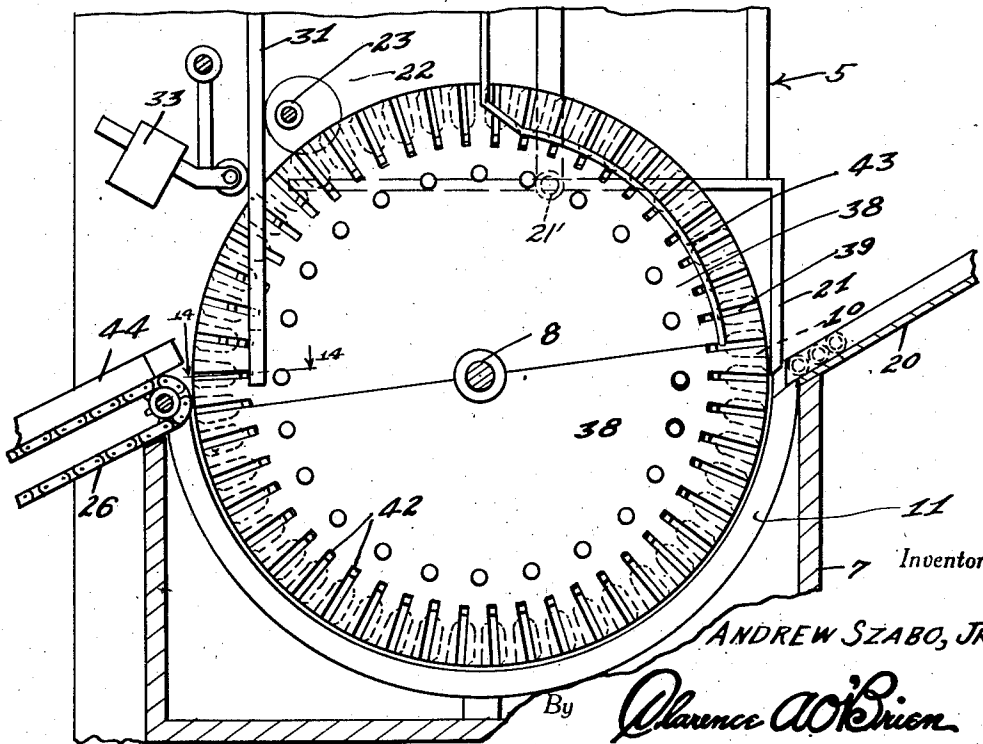


Fig. 12.

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7 Sheets-Sheet 7

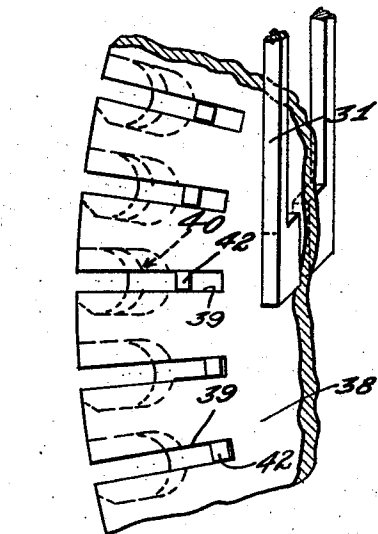


Fig. 13.

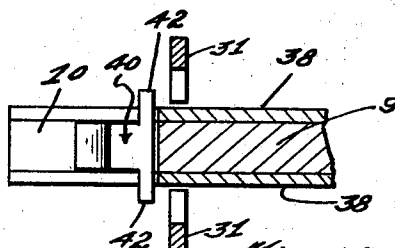


Fig. 14.

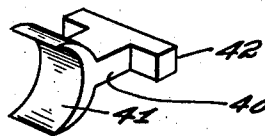


Fig. 15.

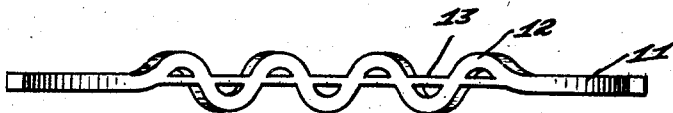


Fig. 16.

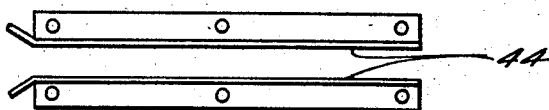


Fig. 17.

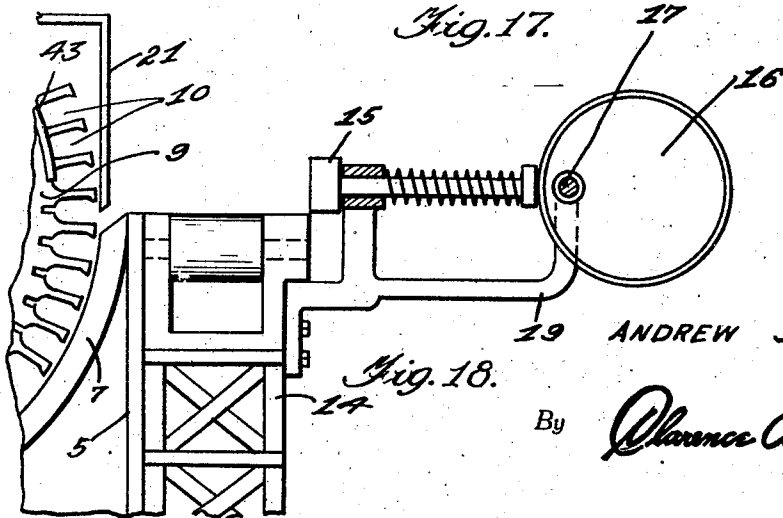


Fig. 18.

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UNITED STATES PATENT OFFICE

2,355,249

AUTOMATIC METAL TREATING MACHINE

Andrew Szabo, Jr., Lorain, Ohio

Application September 19, 1940, Serial No. 357,469

5 Claims. (Cl. 198—211)

This invention relates to an automatic metal treating machine especially adapted for galvanizing tubular metallic stock, pipe couplings, unions and other metallic fittings, and has for the primary object the provision of a device of this character which will carry the metallic stock or parts first through a galvanizing solution and then through a fixing solution and finally delivering the stock or parts ready for handling to store or for shipment.

Another object of this invention is the provision of means for dipping each part in the different baths for a specified length of time, being so arranged that the parts are subject to the baths both exteriorly and interiorly if of hollow formation and at the same time permitting air which may be trapped therein to escape whereby the coating will be free of air bubbles which may tend to form defects in the coating or galvanized finish of said parts.

With these and other objects in view as will become more apparent as the description proceeds, the invention consists in certain novel features of construction, combination and arrangement of parts as will be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which

Figure 1 is an end elevation partly broken away illustrating an automatic metal treating machine constructed in accordance with my invention.

Figure 2 is a top plan view illustrating the same.

Figure 3 is a transverse sectional view illustrating one part of the machine constructed to treat metallic stock and the like with a galvanizing bath and showing a portion of the other part of the machine for subjecting the metallic part to an affixing bath.

Figure 4 is a transverse sectional view illustrating the part of the machine for affixing the metallic parts or stock.

Figure 5 is a fragmentary plan view illustrating track or guide elements for the metallic stock or parts as they move through the baths.

Figure 6 is a fragmentary sectional view showing one of the guides.

Figure 7 is a fragmentary view showing one of the rotatable dipping discs or elements.

Figure 8 is a fragmentary side elevation illustrating a part of one of the dipping discs and a portion of the feed means associated therewith.

Figure 9 is a fragmentary top plan view partly

in section illustrating one of the dipping discs and the ejector arms therefor.

Figure 10 is a fragmentary edge view illustrating one of the dipping discs and the ejector arms associated therewith.

Figure 11 is a fragmentary plan view illustrating one of the dipping discs equipped to handle small parts.

Figure 12 is a transverse sectional view showing one of the dipping discs equipped for handling small parts and further illustrating the feed and discharge means for the small parts.

Figure 13 is a fragmentary side elevation showing the dipping discs equipped for handling small parts and showing the ejecting means for said small parts from the dipping discs.

Figure 14 is a fragmentary sectional view of the dipping discs equipped for the handling of small parts and showing associated therewith pusher elements.

Figure 15 is a perspective view illustrating one of the pusher elements.

Figure 16 is plan view illustrating a modified form of guide element.

Figure 17 is a top plan view illustrating side guide elements for a conveyor.

Figure 18 is a fragmentary side elevation, partly in section, illustrating a modified form of feed means specially constructed for feeding small parts of shapes that will not roll by gravity.

Figure 19 is a fragmentary end elevation partly in section illustrating a type of ejecting means used on the part of the machine which subjects the parts or stock to the affixing bath.

Figure 20 is a view similar to Figure 19 showing another form of ejecting means for the parts or stock from the machine which gives the affixing bath.

Referring in detail to the drawings, the numerals 5 and 6 indicate skeleton frame constructions preferably set at different elevations. Located in said frame constructions are tanks 7. The tank 7 in the frame 5 has therein a suitable galvanizing solution while the tank in the frame 6 has therein a suitable affixing solution. The solution in the tank of the frame 5 is heated to a desired temperature by some suitable means (not shown) and which forms no part of this invention while the solution in the tank 7 of the frame 6 is cooled by some suitable means (not shown).

Power driven shafts 8 are journaled in the frames 5 and 6 and extend endwise of the tanks 7 and have secured thereon dipping discs 9, any number of which may be employed, and each has

formed in the periphery thereof a plurality of notches or pockets 10 in which is received metallic stock or parts for carrying them by a dipping operation through the solution of the tanks and which will be hereinafter more fully described.

Said notches or pockets 10, it will be noted, are preferably V-shaped and are provided with a discharge throat, a trailing flat side, and an opposite or trailing side having an inwardly inclined generally foot-shaped tooth with the toe thereof extending towards the middle of the throat, which sides preferably curve at their inner end portions toward the narrow slot portion of each said pocket. Arcuately shaped guide elements 11 are mounted in the tanks directly in alignment with the dipping discs to prevent the stock or parts from moving out of the pockets during the dipping operation. It is preferable that the arcuate shaped members 11 have portions thereof of serpentine formation, as shown at 12, the purpose of which is to assist in preventing small parts from falling out of the pockets during the dipping operation. Also the arcuate shaped guide elements 11 may be shaped, as shown in Figure 16, which besides having the serpentine shaped portions 12 also may have fill-in strips 13 arranged between the bends of the serpentine parts. This construction will assure against small parts falling out of the pockets of the dipping discs.

A roller type conveyor construction, indicated by the character 14, is arranged at the front of the frame 5 for the purpose of feeding one at a time into the pockets of the dipping discs of the tanks 7 irregular or odd shaped parts that will not roll or move by gravity and to assist in moving the parts from the roller type conveyor plungers 15 are employed and are best shown in Figure 18 operated by cams 16 secured on a shaft 17 journaled in a bracket 19 carried by the conveyor construction. The plungers are spring influenced to maintain them in riding contact with the cams 16 and also are timed to shove the parts into the pockets of the dipping discs as said pockets move opposite to the top face of the conveyor construction, 14. It is to be understood that the conveyor construction 14 and plungers 15 are only employed for parts that will not move by gravity. However, when treating stock or parts that will move by gravity, it is preferable to employ on the front of the frame 5 a chute 20 and operating in conjunction therewith are gates 21 which are adapted to allow the passing of a single stock or part into each pocket of the dipping discs as they move opposite the discharge end of the chute 20. The gates are pivotally mounted, as shown at 21' and are operated by cams 22 secured on shafts 23 journaled in the frames 5 and 6. The shafts 23 and 17 are connected to the shafts 8 of the respective frames 5 and 6 by trains of gears 24 arranged exteriorly of the frames 5 and 6. It is to be understood that the gearing is of such ratio that the cams are rotated rapidly while the dipping discs rotate relatively slow.

An endless conveyor system 26 is employed between the frames 5 and 6 for the transfer of the stock or parts from one tank to another. The conveyor system 26 is driven in any well known manner and is preferably disposed at an inclination to assist the transfer of the parts or stock from the dipping discs of the frame 5 to the dipping discs of the frame 6.

A discharge chute 27 is connected with the frame 6 to receive the stock or parts as they are

discharged from the dipping discs of the frame 6 and associated therewith is a rack 28. Also pivotally mounted on the frame 6 and operating in conjunction with the chute 27 is a weighted stop 29 adapted to act as a temporary check for the movement of the parts or stock over the chute so that they will not move too rapidly and be subjected to damage.

Pivotally mounted on the frames 5 and 6 are ejector arms 31 operated by the cams 23 and kept in riding contact therewith by weighted pivotally mounted arms 33 carried by the frames 5 and 6. The ejector arms 31 are so arranged that as the pockets of the dipping discs complete their travel through the tanks 11 of the frames 5 and 6 the parts will be ejected either onto the conveyor system 26 or onto the chute 27.

In some instances it may be desirable not to employ the ejector arms 31 on the frame 6 and to employ in lieu thereof arcuately curved guide arms 34 suitably mounted on the frame 6 and so associated with the dipping discs that the parts or stock carried by the various pockets as they finish passing through the affixing bath will be caused to roll or move onto the chute 27. In other instances it may be desirable to employ ejectors 35, as shown in Figure 20, each of substantially hook-shape and secured on a shaft 36 driven by the shaft 8 of the frame 6 in timed relation to the movement of the pockets so as to remove from the pockets of the dipping discs of the tank of the frame 6 the part therein and deposit said part onto the chute 27.

In operation, it is to be understood that the parts are fed one at a time into the pockets of the dipping discs of the frame 5 for movement through the galvanizing bath. The feed means used depends entirely on the type of article being treated, either the chute 20 or the conveyor construction 14. As the parts move through the bath of galvanizing solution they are subject both interiorly and exteriorly to the solution so that all surfaces will be evenly or uniformly coated. When the parts complete their trip through the galvanizing solution the ejector arms 31 act to throw the parts onto the conveyor system 26 whence they are fed into the pockets of the dipping discs of the frame 6 for movement through the affixing bath. The parts besides having the galvanizing material affixed also will be cooled so that on finishing said bath the parts will be discharged onto the chute 27 from the pockets of the dipping discs of the frame 6 by either the ejector arms 31, arcuately shaped guide members 34 or the hook shaped ejectors 35. The type of ejecting means employed depends entirely on the type of article being treated.

The parts when leaving the galvanizing bath are hot and sticky and naturally to remove such parts from the pockets of the dipping discs it is essential that the power driven ejector arms 31 be employed.

When small parts are to be taken through the machine and given the galvanizing and affixing baths, auxiliary discs 38 are employed in conjunction with the dipping discs and are secured to the shafts 8 at opposite sides of the dipping discs. The auxiliary discs 38 are spaced at a selected distance from opposite sides of the dipping discs by suitable spacers on the shaft 8 and are provided with slots 39 which open outwardly through the peripheries thereof and match the pockets of the dipping discs. Operating in the pockets at this time are pushers 40 having arcu-

ately curved heads 41 to engage with the parts in the pockets and include oppositely extending lugs 42 slidable in the slots 39 of the auxiliary discs 38 to be engaged by the ejector arms when said parts have completed their baths.

Arcuately curved guide members 43 are supported by the frames 5 and 6 for the purpose of engaging the lugs 42 of the pushers for restoring them to their innermost positions within the pockets when the pushers are traveling with the dipping discs after the discharge of parts therefrom so that they will be in proper position to receive parts to be treated from the feed mechanisms.

When small parts are being treated and transferred from one bath to another the conveyors 26 will have associated therewith side guide plates 44 of angle iron construction, as shown in Figure 16, for the purpose of guiding the small parts from one tank to the other by the conveyors 26. Also it is to be understood that when small parts are being fed into the pockets of the dipping discs comparatively narrow chutes are employed as suggested in Figure 10 providing that the parts are of such shape that they will roll by gravity. Otherwise, they will be fed into the pockets by the mechanism 14 and the plungers or ejectors 15.

From the foregoing description taken in connection with the accompanying drawings, it is believed that a good conception of the construction and operation of this machine will be obtained and further it will be seen that the construction of the machine will permit rapid treatment of the parts or stock with a uniform treatment both interiorly and exteriorly of the parts if of hollow formation and while I herein specify that certain types of stock and parts are to be treated by this machine, it is to be understood that any metallic object that is to be galvanized and the galvanized coating affixed can be successfully and rapidly treated by the device.

While I have shown and described the preferred embodiment of my invention, it will be understood that minor changes in construction, combination and arrangement of parts may be made without departing from the spirit and scope of the invention as claimed.

Having thus described my invention, what I claim is:

1. In a machine of the character described wherein articles are adapted to be treated, article handling and article ejection means, a frame having a power driven shaft journaled therein, said shaft having secured thereto a vertically rotatable disc having formed in the periphery thereof a plurality of notches, each said notch being generally Y-shaped, the trailing side of each said notch being provided with a forwardly extending tooth at the throat thereof and restricting its width, a feed mechanism associated with said disc delivering articles into said notches just prior to their movement to confronting relation to the most rearward portion of an arcuately shaped guide element disposed closely adjacent a substantial arcuate portion of the lowermost peripheral surface of said disc and in alignment therewith, ejector means pivotally mounted on said frame, said ejector means being in riding contact with cam means secured on a second shaft journaled in said frame, said second shaft being connected to said power driven shaft by gear means and thus driven thereby, said ejector means discharging the articles retained therein during continued rotation of the

disc at a particular discharge point position adjacent the ejector means, said guide element preventing the articles from leaving the notches during rotation of said disc before reaching said discharge position.

2. In a machine of the character described wherein articles are adapted to be treated, article handling means comprising a vertical rotatable disc having a plurality of notches adjacent the periphery of said disc and an arcuate article guide disposed closely adjacent to a substantial arcuate portion of the lowermost peripheral surface of the disc, each said notch being generally Y-shaped, the trailing side of each said notch being provided with a forwardly extending tooth at the throat thereof and restricting its width whereupon when a feed mechanism associated with said disc delivers articles into the said notches just prior to their movement to confronting relation to the most rearward portion of the guide, said articles are removably retained within the notch by said tooth during continued rotation of the disc when carried thereby beyond the most forward end of said guide, an ejector arm associated with said disc at the discharge end thereof being adapted to eject said articles from the notches of the disc, auxiliary disc means adapted to be laterally mounted with respect to the said first named disc as to cooperate therewith in the lateral retention of said articles within said notches, said auxiliary disc means being provided with peripheral slots of relatively lesser width than that of said notches in said first named disc and each of said slots being positioned in substantially lateral alignment with respect to each said disc notch, pusher elements normally seated in the yoke of said notch and having lugs extending therefrom, said lugs slideable in said slots in said auxiliary disc means and engageable by said ejector means whereby articles carried in said notches forwardly of the said pusher elements are displaced therefrom as they approach a discharge point adjacent said ejector means.

3. In a machine of the character described wherein articles are adapted to be treated, article handling means comprising a vertical rotatable disc having a plurality of notches adjacent the periphery of said disc and an arcuate article guide disposed closely adjacent to a substantial arcuate portion of the lowermost peripheral surface of the disc, the trailing side of each said notch being provided with a forwardly extending tooth at the throat thereof and restricting its width whereupon when a feed mechanism associated with said disc delivers articles into the said notches just prior to their movement to confronting relation to the most rearward portion of the guide, said articles are removably retained within the notch by said tooth during continued rotation of the disc when carried thereby beyond the most forward end of said guide, an ejector arm associated with said disc at the discharge end thereof being adapted to eject said articles from the notches of the disc, auxiliary disc means adapted to be laterally mounted with respect to the said first named disc as to cooperate therewith in the lateral retention of said articles within said notches, said auxiliary disc means being provided with peripheral slots of relatively lesser width than that of said notches in said first named disc and each of said slots being positioned in substantially lateral alignment with respect to each said disc notch, pusher elements normally seated in the yoke of said

notch and having lugs extending therefrom, said lugs slideable in said slots in said auxiliary disc means and engageable by said ejector means whereby articles carried in said notches forwardly of the said pusher elements are displaced therefrom as they approach a discharge point adjacent said ejector means.

4. In a machine of the character described wherein articles are adapted to be treated, article handling means comprising a vertical rotatable disc having a plurality of notches adjacent the periphery of said disc and an arcuate article guide disposed closely adjacent to a substantial arcuate portion of the lowermost peripheral surface of the disc, each said notch being generally Y-shaped, the trailing side of each said notch being provided with a forwardly extending tooth at the throat thereof and restricting its width whereupon when a feed mechanism associated with said disc delivers articles into the said notches just prior to their movement to confronting relation to the most rearward portion of the guide, said articles are removably retained within the notch by said tooth during continued rotation of the disc when carried

thereby beyond the most forward end of said guide, said guide element having portions thereof of laterally serpentine formation.

5. In a machine of the character described wherein articles are adapted to be treated, article handling means comprising a vertical rotatable disc having a plurality of notches adjacent the periphery of said disc and an arcuate article guide disposed closely adjacent to a substantial arcuate portion of the lowermost peripheral surface of the disc, the trailing side of each said notch being provided with a forwardly extending tooth at the throat thereof and restricting its width whereupon when a feed mechanism associated with said disc delivers articles into the said notches just prior to their movement to confronting relation to the most rearward portion of the guide, said articles are removably retained within the notch by said tooth during continued rotation of the disc when carried thereby beyond the most forward end of said guide, said guide element having portions thereof of laterally serpentine formation.

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