

J. A. LAMP & S. C. STINER.  
 APPARATUS FOR THE MANUFACTURE OF TIN PLATE.  
 APPLICATION FILED MAY 1, 1909.

956,981.

Patented May 3, 1910.

3 SHEETS—SHEET 1.

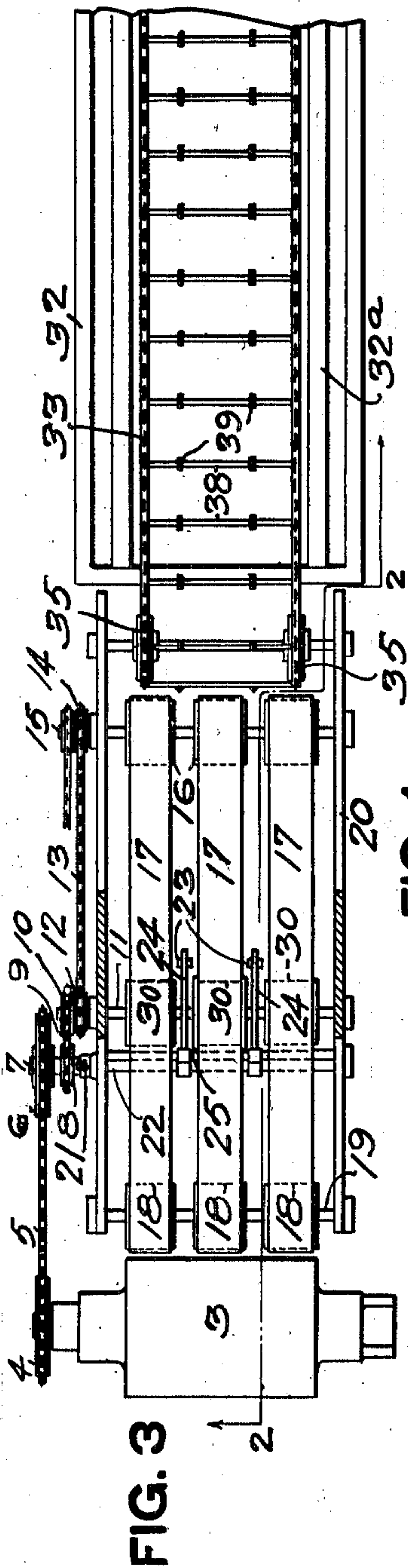


FIG. 3

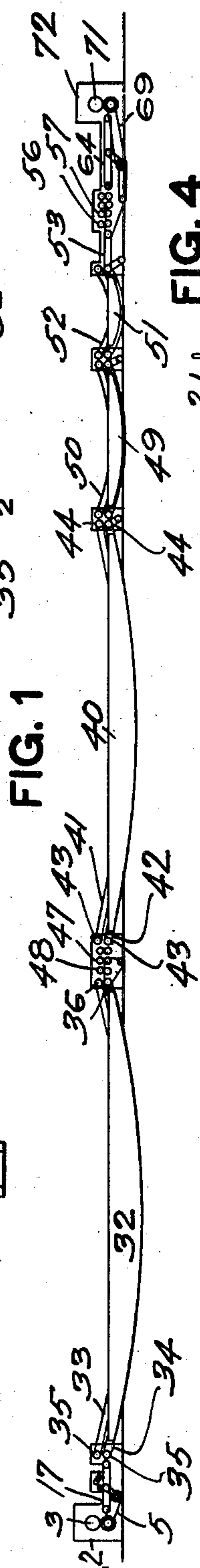


FIG. 1

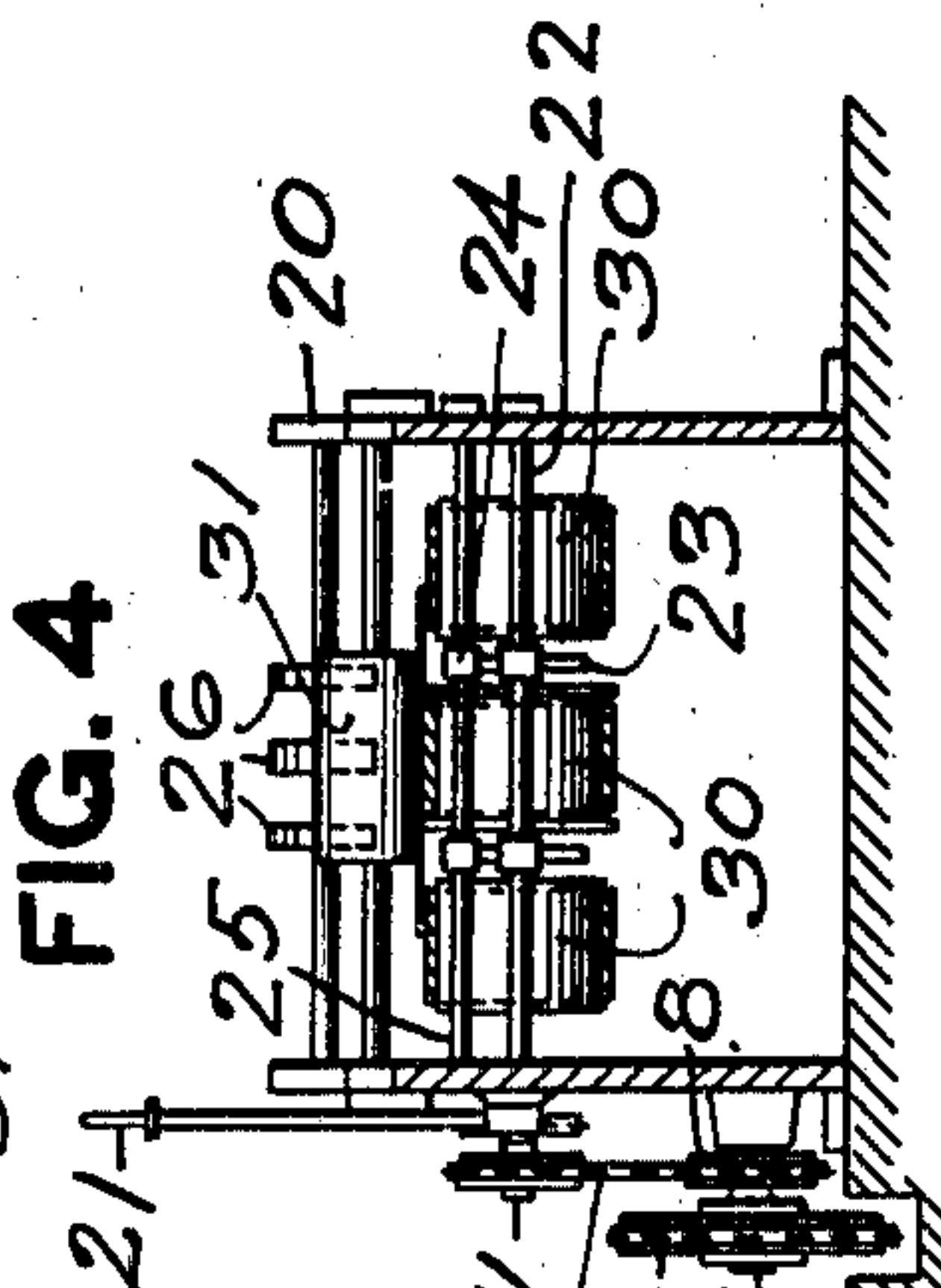


FIG. 4

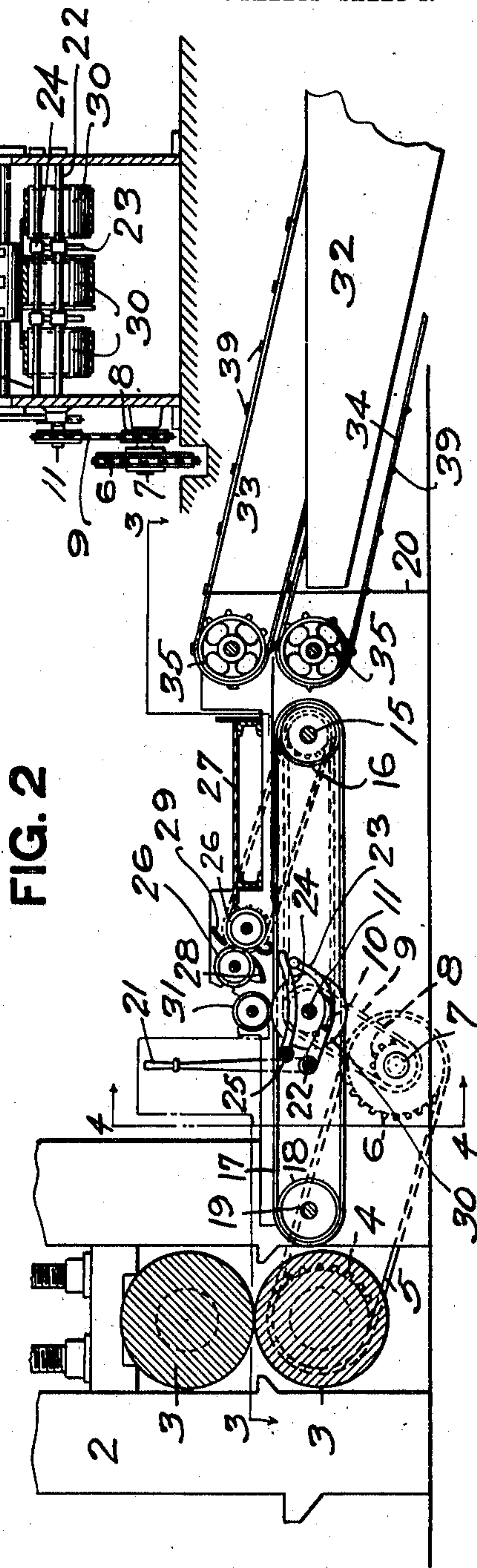


FIG. 2

WITNESSES.  
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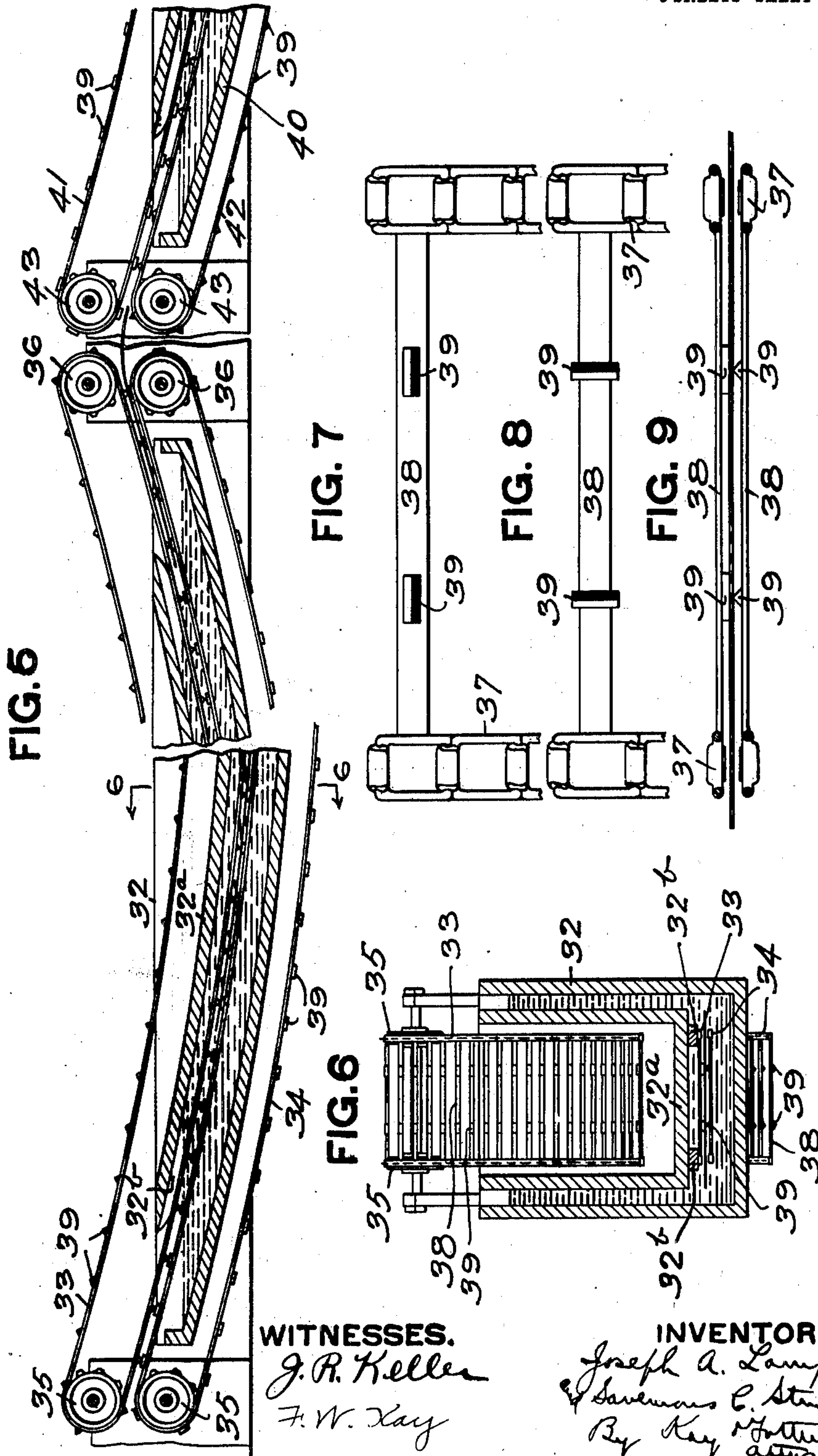
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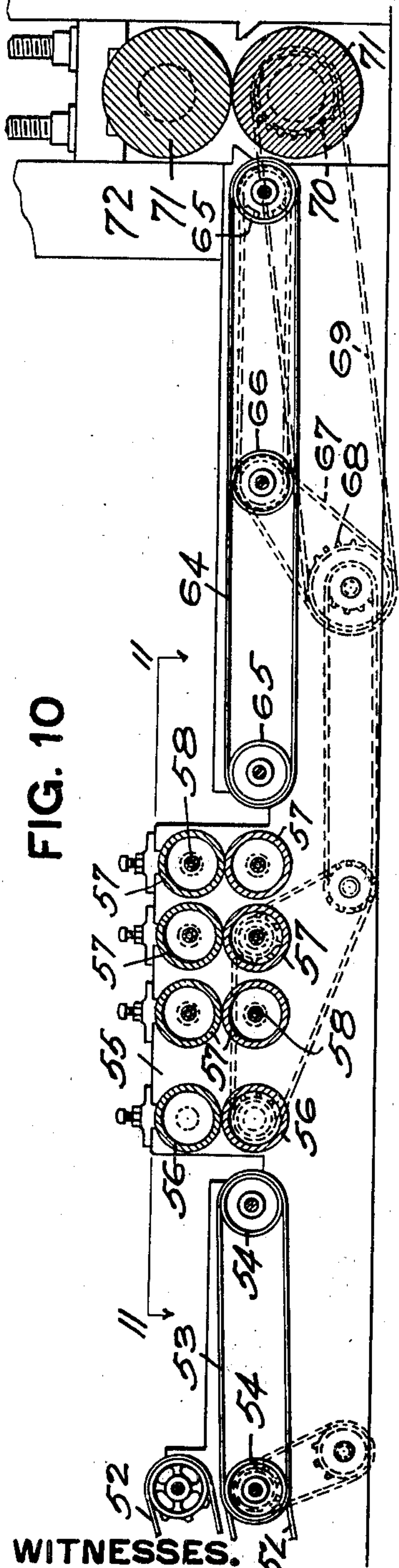
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3 SHEETS—SHEET 3.

FIG. 10



WITNESSES.  
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FIG. 11

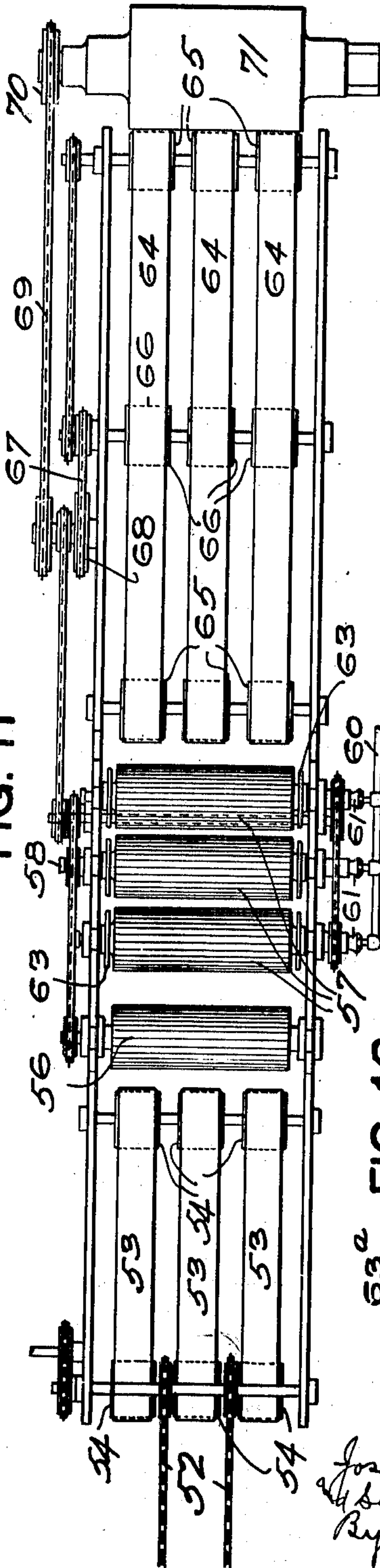
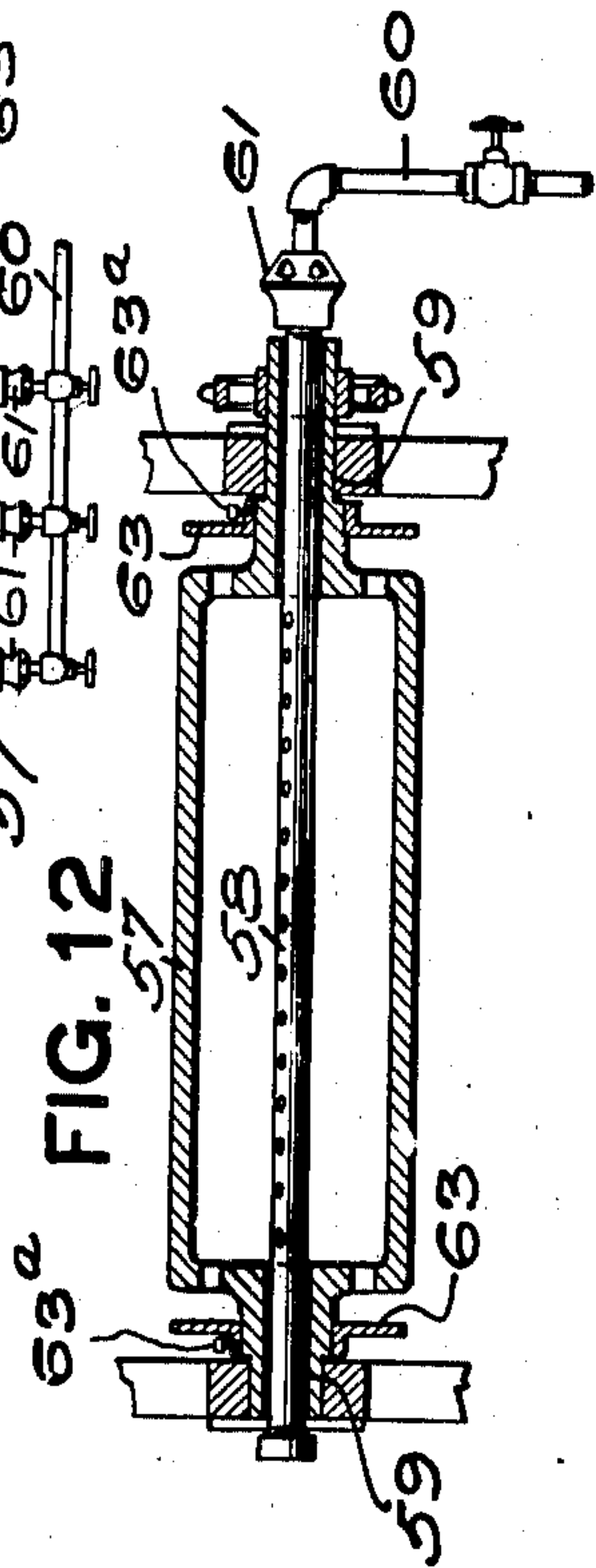


FIG. 12



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# UNITED STATES PATENT OFFICE.

JOSEPH A. LAMP AND SAVENIOUS C. STINER, OF McKEESPORT, PENNSYLVANIA.

APPARATUS FOR THE MANUFACTURE OF TIN-PLATE.

956,981.

Specification of Letters Patent.

Patented May 3, 1910.

Application filed May 1, 1909. Serial No. 493,418.

*To all whom it may concern:*

Be it known that we, JOSEPH A. LAMP and SAVENIOUS C. STINER, residents of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for the Manufacture of Tin-Plate; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to apparatus for making tin or coated plates and has reference more especially to the apparatus employed in the treatment of the plates preparatory to the tinning or coating.

The object of our invention is to provide apparatus by which the operation may be carried on continuously, the plates being fed in at one end of the apparatus in succession and removed from the opposite end, having been properly treated and ready for white or finish annealing preparatory to the tinning or coating operation.

In the drawings Figure 1 is a diagrammatic view in elevation of our improved apparatus; Fig. 2 is an enlarged detail view partly in section of the rolls for loosening the scale, and the mechanism for feeding the plates through the first pickling bath; Fig. 3 is a plan view of the same; Fig. 4 is a section on the line 4-4, Fig. 2; Fig. 5 is an enlarged sectional view of the pickling vats showing the conveyer chains for holding the plates in carrying them through the pickling vats; Fig. 6 is a section on the line 6-6, Fig. 5; Figs. 7, 8 and 9 are detail views of the conveyer chain; Fig. 10 is an enlarged detail of the drying and heating apparatus; Fig. 11 is a plan view thereof; and Fig. 12 is an enlarged detail view of the heating rolls.

In the drawings the numeral 2 designates suitable housings for the cold rolls 3 employed for loosening the scale from the sheets. The upper of these rolls is adjustable by means of the ordinary adjusting screws so that the heavy pressure may be brought to bear upon the sheet being rolled and this heavy pressure will act to break up the scaly surface of the sheet and loosen the scale preparatory to the passage of the sheet through the pickling bath. These rolls are driven from any suitable source of power, and connected up to the combination roll coupling and sprocket is the sprocket wheel 4 which is connected up by the chain 5 to the sprocket wheel 6 on the shaft 7. The

shaft 7 has the sprocket wheel 8 which is connected up by the chain 9 to the sprocket wheel 10 on the shaft 11. The shaft 11 has the sprocket wheel 12 which is connected up by the chain 13 with the sprocket wheel 14 on the shaft 15. This shaft 15 carries the belt pulleys 16 arranged at suitable intervals apart and conveyer belts 17 connect said pulleys 16 up with the pulleys 18 on the shaft 19. The shaft 15 is journaled in suitable bearings in the housings or frame 20.

A lever 21 is connected to the rock-shaft 22 mounted in the frame 20 and secured to said rock-shaft are the arms 23. These arms 23 are adapted to engage the rocker arms 24 on the shaft 25. These rocker arms 24 work in the spaces between the belts 17 and are employed for the purpose of directing the wasters or imperfect sheets up into the rolls 26 to be delivered onto the platform 27. Deflectors 28 are employed for directing the sheet up into the rolls 26 and a deflector 29 above said rolls acts to direct the sheet onto the platform 27.

The drums 30 on the shaft 11 act in connection with the small rolls 31 to feed the plate so that when a defective plate is to be directed up between the rolls 26 said plate will be positively fed to properly accomplish this result.

A pickling vat 32 is formed of wood, concrete or metal which will resist the action of the acid and the sheets are carried down to said vat by means of the conveyer chains 33 and 34. These chains pass around the sprocket wheels 35 at one end of said vat and at the opposite end pass around the sprocket wheels 36 which may be connected up to any suitable source of power to drive said chains at the same rate of speed.

In order to take up space within the vat and reduce the amount of pickling acid, we employ the filler 32<sup>a</sup>. Secured to the bottom of said filler are the strips or guides 32<sup>b</sup> with which the upper chain engages while the bottom chain is drawn up snugly against the top chain. The filler 32<sup>a</sup> thus acts as a guide for the chains and the upper chain moves in contact with said guide while the lower chain is drawn up in such a way as to hold the plate securely between the chains in the manner hereinafter set forth. By this construction the acid is given full opportunity to attack the plate. These chains 34 are made of metal which will resist the action of the acid and the links 37 of said



chains are connected by the cross-bars 38. Contact-lugs 39 are carried by the bars 38, said lugs being preferably knife-edged, as indicated, so as to present as small a contact point as possible to engage the surface of the plates. The contact-lugs 39 of the one chain are arranged at right angles to the contact-lug on the other chain, and said lugs on said chain are arranged the same distance apart so as to coincide with each other when brought around in position to engage the plates, as indicated in Fig. 2. These chains 33 and 34 pass down into the pickling vat 32 and carry the plates supported thereby through the pickling acid.

Just ahead of the pickling vat 32 is a second pickling vat 40 similar in construction to the one just described and chains 41 and 42 are mounted on sprocket wheels 43 and 44. In the case of the chains 41 and 42, however, the contact lugs 45 and 46 are arranged the reverse of the contact-lugs 39 of the chains 33 and 34 for the purpose fully hereinafter set forth. Intermediate the pickling vats 32 and 40, however, may be interposed the brushes 47 for loosening the scale still adhering to the plates as they emerge from the pickling vat 32. These brushes may be driven by power obtained from the sprocket shaft 36. Rolls 48 may be employed for feeding the plates through the brushes and into the conveyer chains 40 and 42 of the pickling vat 40. Forward of the pickling vat 40 is the cold water vat 49 for cleaning the plates and said cold water vat has the conveyers 50 for feeding the plates through said vat.

The plates pass from the cold water vat 49 to the hot water vat 51, which is used for washing the plates as well as heating the same preparatory to drying. A suitable conveyer chain 52 is likewise employed for carrying the plates through said hot water vat. Just in front of the hot water vat 51 is the belt conveyer 53 which is mounted on the rolls 54.

Mounted in the frame 55 are the rolls 56 which are closely adjusted for squeezing the water from the plates and in advance of said rolls are the heating rolls 57. Three sets of these heating rolls are illustrated although any desired number may be employed. These rolls are connected up and driven from one of the rolls 56. These heating rolls, as illustrated in Fig. 12, are hollow rolls with a perforated pipe 58 passing through the hollow journals 59, said pipe being connected up with a suitable gas pipe 60 and provided with the mixer 61. This is the construction where gas is employed to heat the rolls but we do not wish to limit ourselves to any particular manner of heating the same. Guards 63 are secured to the journals 59 by means of the set screw 63<sup>a</sup>, said guards being employed to protect the

outer ends of the journals from the heat of the rolls. These guards may be formed of asbestos or any other suitable material.

Beyond the heating rolls is the belt conveyer 64 which receives the sheets from the heating rolls, said belt being mounted on the rolls 65. Intermediate rolls 66 driven by the chain 67 from the sprocket wheel 68 connected up by the chains 69 to the sprocket wheel 70 on the lower roll 71 of the cold rolls which are mounted in the housings 72.

In the use of our improved apparatus the plates are fed singly to the cold rolls 3 and the scale is loosened by the passage through said rolls. The operator stands in a convenient position where he can view the plate as it leaves the rolls and if for any reason said plate should be defective so that it is not desired to feed it to the pickling vat the operator, by moving the lever 21, throws the rocker arms 23 up in position to engage the forward end of the plate and lift it up in such position as to cause it to strike the deflector 28 and be directed up between the rolls 26. The plate, on passing from the rolls 26, is directed by the deflector 28 onto the table 27 to be removed therefrom. If, on the other hand, the plate contains no defect as it leaves the rolls 3, said plate is carried along on the belts 17 and is delivered to the chains 33 and 34. The chains 33 and 34 are so arranged as to speed, travel, etc., that the contact lugs on one chain will contact with the contact lugs on the opposite chain so that when the plate is fed to said chains, said chains will engage opposite faces of the plates with the lugs and said plate will be securely held and carried positively through the acid of the pickling vat 32. The knife edges of the contact lugs being the only parts of said lugs in contact with the plate all the surfaces of the plate are subjected to the action of the acid with the exception of such parts of the plates as are covered by the contact-edges of the contact-lugs and in this manner the plates are delivered and carried one in succession through the pickling vat 32. As the plates emerge from the pickling vat 32 they are fed by the rolls 48 to the brushes 47 where such brushes are employed and the scale is removed by said brushes. The plate is then engaged by the chains 41 and 42, and owing to the reversal of the position of the contact lugs on said chains 41 and 42 from that on the chains 33 and 34 the plates are held at new points of contact and the old points of contact are exposed so that as the plate is fed through the vat 40 the acid has an opportunity to reach that portion of the plates not acted on by the acid of the vat 32. The plates continue in succession through the vat 40 and as they emerge therefrom they pass down into the water of the vat 49 where they are washed and they then pass into the hot water vat 51 where



the plates are further washed and heated. In passing from the hot water vat 51 the plates are fed to the rolls 56 which act to squeeze the water from the plates, and they then pass between the heated rolls. These rolls are heated to about one thousand degrees Fahrenheit and act to thoroughly dry the plates and heat the same. The plates are then carried by the conveyer belts 64 to the cold rolls.

By our improved apparatus the plates are fed continuously and successively, thereby saving a great deal of time and labor. The sheets are held and carried positively through the pickling vats in such a manner that all parts are exposed to the action of the acid and there is no handling of the plates from the time they enter the cold rolls 3 until they pass from the cold rolls 71. The drying of the plates is accomplished by the heated rolls 57 and this drying does away with the black annealing which is necessary in the process ordinarily practiced in the treatment of the plate. This black annealing required a number of hours and caused great delay in the treatment of the plates and involved extra handling of the plates and consequent labor and expense attending the same, not to mention the cost of the annealing boxes themselves.

By the term "knife edges," as used in the claims, we wish to convey the idea of a contact lug with edges of such a character which will have a small point of contact and we do not wish to limit ourselves to a sharp knife-like edge in that sense of the word.

What we claim is:

1. In apparatus for treating plates preparatory to coating, the combination of a vat, traveling chains therein, elongated contact lugs on said chains arranged at an angle to each other and adapted to engage opposite faces of the plate.

2. In apparatus for treating plates preparatory to coating, the combination of a vat, traveling chains therein, contact lugs on said chains having knife edges arranged at an angle to each other adapted to engage opposite faces of the plate.

3. In apparatus for treating plates preparatory to coating, the combination of a vat, traveling chains therein, elongated contact lugs on said chains arranged at right angles to each other and adapted to engage opposite faces of the plate.

4. In apparatus for treating plates preparatory to coating, the combination of a vat, traveling chains therein, contact lugs on said chains having knife edges arranged at right angles to each other and adapted to engage opposite faces of the plate.

5. In apparatus for treating plates preparatory to coating, the combination of a vat, traveling chains therein, elongated contact lugs on said chains engaging opposite

points on the faces of said plate, a second vat, traveling chains therein, elongated contact lugs on said chains at right angles to the lugs of the first mentioned chains.

6. In apparatus for treating plates preparatory to coating, the combination of a vat, traveling chains therein, contact lugs having knife edges on said chain at an angle to each other adapted to engage the plate at opposite points on the faces thereof, a second vat, traveling chains in said vat, contact lugs having knife edges arranged reversely to the contact lugs on said first mentioned chain.

7. In apparatus for treating plates preparatory to coating, the combination of a vat, mechanism for feeding the plate thereto, means for delivering the plates to said mechanism, and deflecting means preceding said vat in the path of the travel of the plate.

8. In apparatus for treating plates preparatory to coating, the combination of a vat, mechanism for feeding the plates thereto, means for delivering the plates to said mechanism, and deflecting arms preceding said vat in the path of the travel of the plate.

9. In apparatus for treating plates preparatory to coating, the combination of a vat, mechanism for feeding the plates thereto, means for delivering the plates to said mechanism, deflecting means, and feed rolls cooperating with said deflecting means.

10. In apparatus for treating plates preparatory to coating, the combination of a vat, mechanism for feeding the plates thereto, endless belts for feeding the plates to said mechanism, deflector arms between said belts, means for lifting said arms, and feed rolls cooperating with said deflector arms.

11. In apparatus for treating plates preparatory to coating, the combination of a vat, mechanism for feeding the plates thereto, endless belts for delivering the plates to said mechanism, deflector arms between said belts, arms engaging said deflector arms, a lever, connections between said arms and said lever for raising said deflector arms, and feed rolls cooperating with said deflector arms.

12. The combination of a vat, means for conveying plates through the same and drying rolls in the path of said plates after they leave said vat.

13. The combination of a vat, traveling chains therein, cross bars on said chains, and contact lugs on said cross bars.

14. The combination of a vat, traveling chains therein, cross bars on said chains, and contact lugs on said cross bars for engaging opposite points on the opposite faces of a plate.

15. The combination of a vat, traveling chains therein, cross bars on said chains, contact lugs on said cross bars, the contact lugs on the bars of one chain being arranged at an angle to the contact lugs of the bars of



the other chain, said contact lugs adapted to engage a plate at opposite sides thereof.

16. The combination of a vat, traveling chains therein, cross bars on said chains, contact lugs on said cross bars, the contact lugs on one chain arranged at right angles to the contact lugs of the opposite chain, and adapted to engage opposite sides of a plate at the same points.

17. The combination of a vat, traveling chains therein, cross bars on said chains, contact lugs having knife edges on said cross bars, the contact lugs on one chain arranged at right angles to the contact lugs of the opposite chain, and adapted to engage opposite sides of a plate at the same points.

18. The combination of a vat, endless chains arranged to travel through the same, means for holding plates between said chains, and a guide in said vat with which the upper chain is adapted to engage.

19. The combination of a vat, endless chains arranged to travel through the same,

means for holding plates between said chains, a guide in said vat, projections on said guide with which the upper chain is adapted to engage.

20. The combination of a vat, endless chains arranged to travel through the same, means for holding plates between said chains, a guide in said vat, and strips on said guide with which the upper chain is adapted to engage.

21. The combination of a vat, a filler therein, endless chains passing through said vat, the upper chain engaging the lower face of said filler and means for holding plates to be treated between said chains.

In testimony whereof, we, the said JOSEPH A. LAMP and SAVENIOUS C. STINER have hereunto set our hands.

JOSEPH A. LAMP.

SAVENIOUS C. STINER.

Witnesses:

JAMES G. JENKINS,

JOHN N. HARTMAN, Jr.