

No. 681,255.

Patented Aug. 27, 1901.

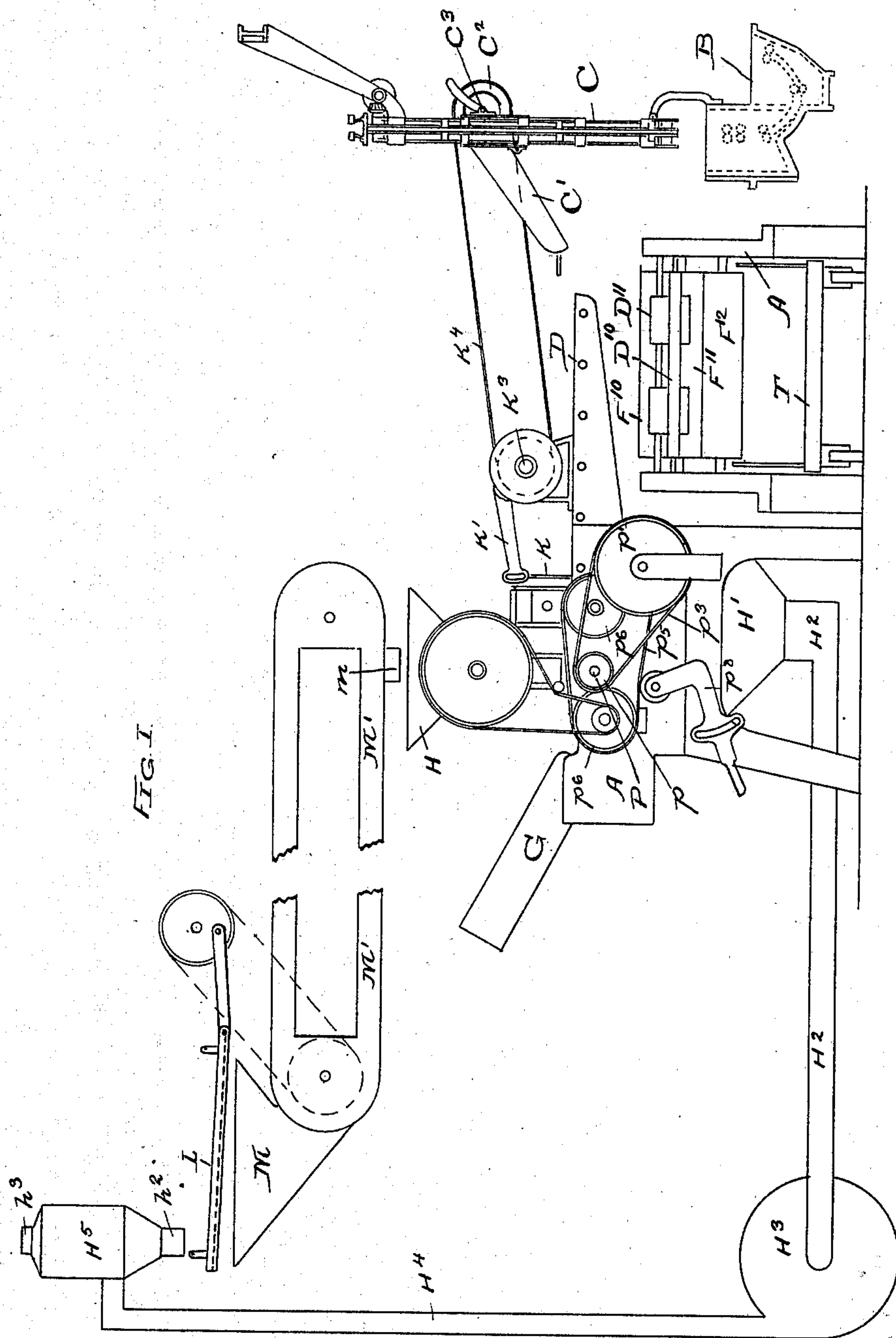
H. N. NORTON.

APPARATUS FOR MANUFACTURING TIN PLATE.

(Application filed Dec. 2, 1895.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES:

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A. M. Munday

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By Munday, Everts & Adcock,

HIS ATTORNEYS.

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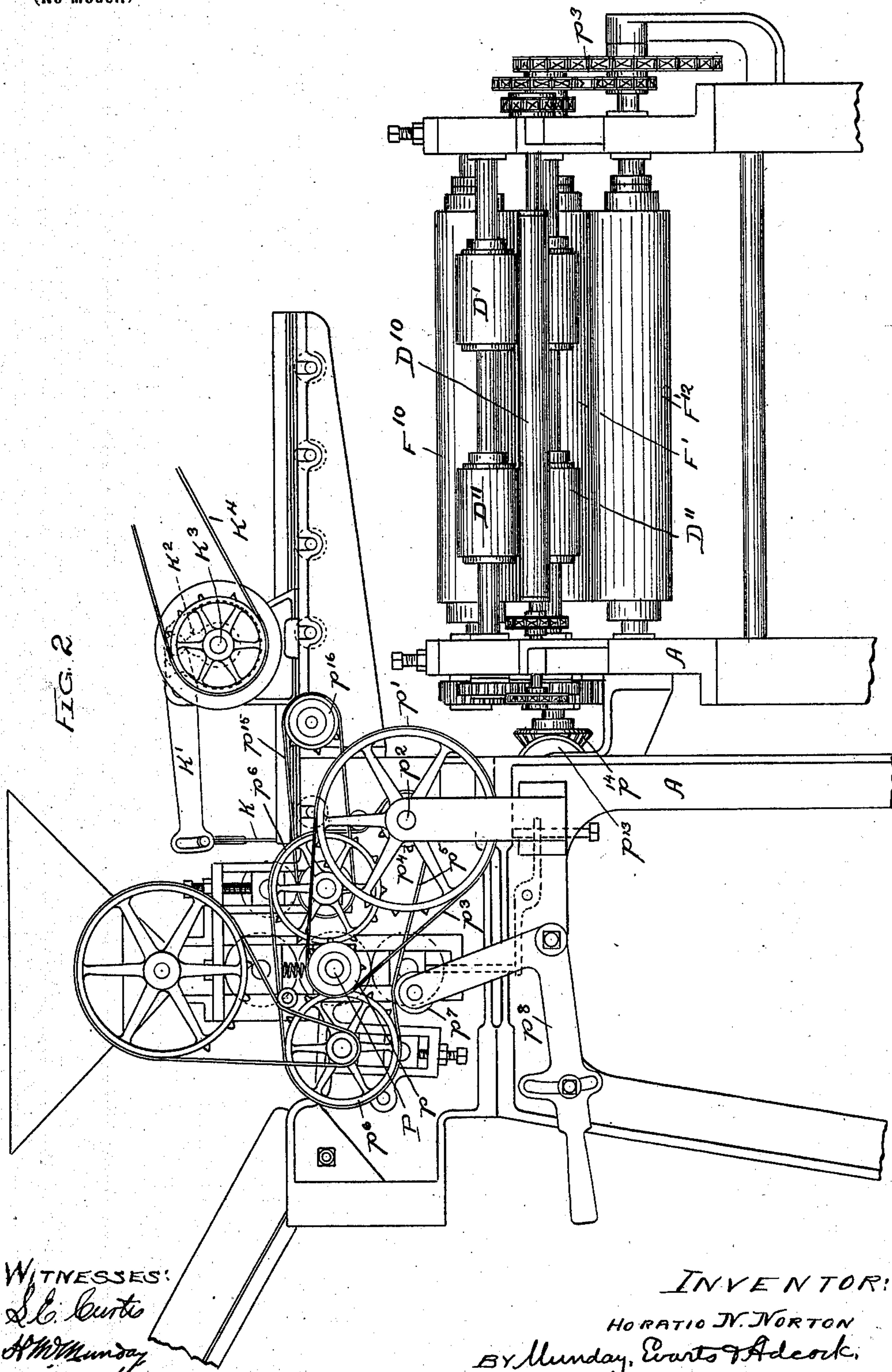
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(No Model.)

4 Sheets—Sheet 2.



WITNESSES:
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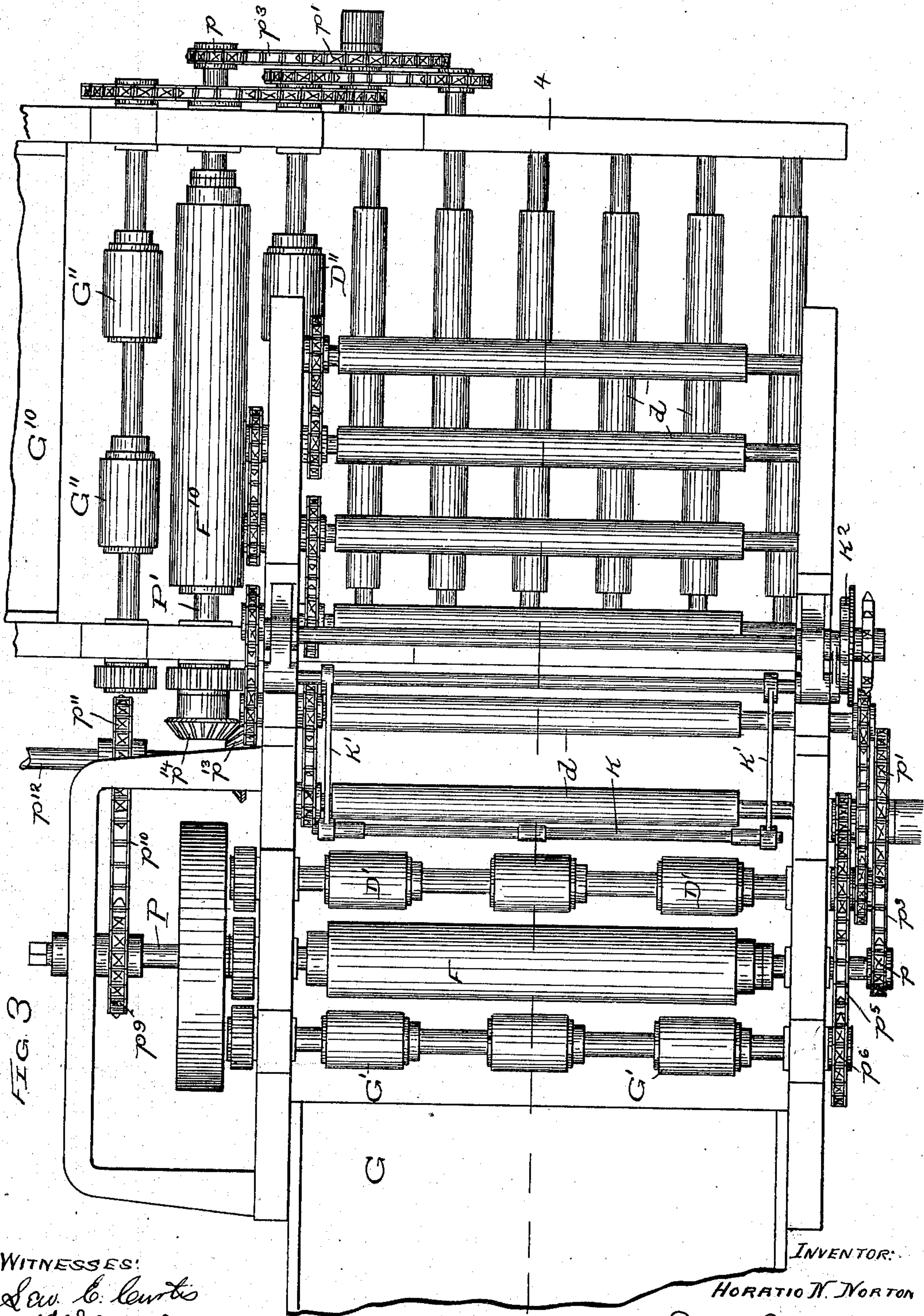
H. N. NORTON.

APPARATUS FOR MANUFACTURING TIN PLATE.

(Application filed Dec. 2, 1895.)

(No Model.)

4 Sheets—Sheet 3.



WITNESSES:

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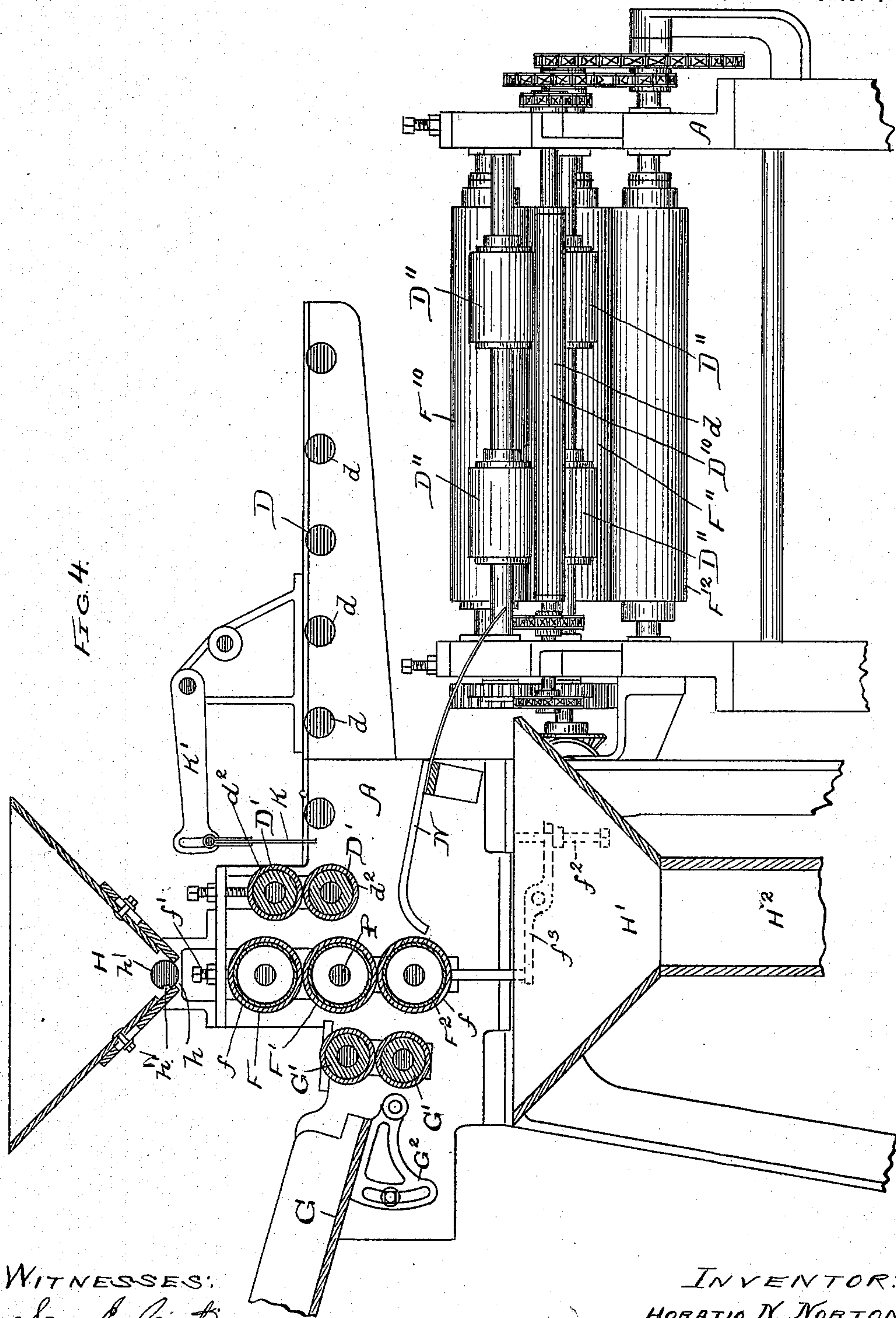
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(Application filed Dec. 2, 1895.)

(No Model.)

4 Sheets—Sheet 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MANUFACTURING TIN-PLATE.

SPECIFICATION forming part of Letters Patent No. 681,255, dated August 27, 1901.

Application filed December 2, 1895. Serial No. 570,826. (No model.)

To all whom it may concern:

Be it known that I, HORATIO N. NORTON, a citizen of the United States, residing in Oakpark, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Apparatus for Manufacturing Tin-Plate, of which the following is a specification.

This invention relates to apparatus for the manufacture of tin-plate, and more particularly to mechanism for automatically cleaning and polishing the freshly-tinned sheets after issuing from the tinning-pot and after they are discharged by the lifter.

The present invention is an improvement upon the apparatus for automatically manufacturing tin-plate shown and described in Letters Patent of the United States No. 535,395, of March 12, 1895.

The object of the present invention is to simplify the construction and increase the efficiency in operation of the mechanism shown and described in said patent for cleaning the oil from the freshly-tinned sheets as they issue warm or hot from the tinning-bath.

In the present invention the freshly-tinned sheets are cleaned by passing them first in one direction—for example, in the direction of the length of the sheets—between cleaning-rollers covered with sheepskin, felt, or like material and to which bran or other cleaning material is supplied at regular intervals, the cleaning-rollers revolving at a different surface speed from that at which the sheet is fed or passed between them, so as to produce a rubbing action on the sheet, and then passing the sheet in another direction—that is to say, in the direction of the width of the sheet—through another set of cleaning or cleaning and polishing rollers. The surface of each sheet thus receives two rubbing actions, the second transversely to the first, thus insuring perfect cleaning of the whole surface of the sheet with greater certainty and uniformity than can be accomplished by the rubbing action of successive rollers operating all in one direction upon the sheet—as, for example, that of its length—and by feeding the bran or cleaning material to the rollers continually at regular intervals the cleaning-rollers are always uniformly supplied with

cleaning material, which renders their action much more uniform and perfect than could otherwise be accomplished. In order to use the same bran or cleaning material over and over again and at the same time keep it of a uniform character in respect to cleanness or freedom from greasy or oil-saturated particles or lumps, I pass it through a fan or air-blast conveyer or other conveyer to a separator by which the greasy or lumpy particles are separated from the remainder and by a suitable conveyer return the bran to the hopper. By subjecting the sheets throughout their whole surface to rubbing action of rapidly-revolving cleaning-rollers supplied continually with clean bran while the freshly-tinned sheets are hot and before the oil upon their surfaces becomes congealed I am enabled to clean the sheets very rapidly and perfectly. To square or straighten the sheets up in position parallel to the feed-rollers and cleaning-roller as they are automatically delivered upon the feed-table from the tinning mechanism, I provide the feed-table or passage leading to the rollers with a movable stop or gate, against which the front edge of the sheet strikes before passing forward to the feed-rollers, the gate or stop being then automatically lifted or moved out of the path of the sheet.

The invention also consists in the novel construction of parts and devices and in the novel combination of parts and devices herein shown and described, and specified in the claims.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a side elevation of an apparatus embodying my invention. Fig. 2 is an enlarged detail side elevation. Fig. 3 is a plan view, and Fig. 4 is a section on the line 4 4 of Fig. 3.

In the drawings, A represents the frame of the machine or apparatus; B is the tinning-pot, furnished with the usual tinning-rolls, and C is the lifter or device for lifting or conveying the sheets successively one by one as they issue from the tinning-pot and supporting or suspending the same in a substantially vertical position by their edges a sufficient length

of time to allow the molten tin upon their surfaces to become set or cooled to the extent necessary to prevent marring of the hot sheets by their subsequent contact with the discharge-chute C' of the lifter and with the feed-rollers of the cleaning mechanism. The tinning pot or mechanism and the lifter may be of any suitable construction known to those skilled in the art, but are preferably made substantially in accordance with the specification and drawings of United States Patent No. 535,394, of March 12, 1895, or of the United States Patent No. 535,395, before referred to.

D is the feed table, chute, or passage along which the sheets are passed or fed between the first pair of cleaning-rollers F F' and upon which the hot and freshly-tinned sheets are discharged from the chute or passage C' of the lifter. The feed-table D is preferably furnished with or its bed made up of a series of revolving rollers d , which thus serve not only to feed or pass the sheets along, but also to diminish the friction or rubbing action between the hot and freshly-tinned sheets and the feed-table as they pass over the same.

D' D' are the feed-rollers by which the sheets are fed between the cleaning-rollers F F'. The feed-rollers D' D' are covered with yielding material d^2 to prevent marring of the sheets. The feed-rollers are driven at a comparatively slow speed, while the cleaning-rollers F F' are driven at a different and preferably a comparatively high speed, so that they will produce a rubbing action upon the sheets passing between them, the feed or forward movement of the sheets being of course controlled by the feed-rollers.

G is a second feed-table, preferably somewhat inclined, upon which the sheets are discharged after leaving the first pair of cleaning-rollers F F' and by which the sheets are fed or returned in the opposite direction to the second pair of feed-rollers G' G', and thence between the second pair of cleaning-rollers F' F², the second pair of cleaning-rollers being preferably constituted of the lower roller F' of the first pair and the third roller F², the roller F' thus acting upon the sheet in conjunction with both of the rollers F and F². The feed-chute G is preferably attached to an adjustable or swinging hinged bracket G², so that its inclination may be adjusted as required to cause the sheets to feed or slide down by their gravity into the bite of the feed-rollers G' G'.

H is the feed-hopper for the bran or other equivalent absorbent granular cleaning material. It is located, preferably, directly above the upper cleaning-roller F, and it is provided at its discharge-opening a with a movable feed device or gate h' , preferably consisting of a continuously-revolving feed-roller provided with a longitudinal channel or groove h^2 . This channel or groove h^2 fills with bran at each revolution of the roller h' , and thus a measured quantity of bran is fed or dis-

charged to the cleaning-rollers at every revolution. By this means a uniform and continuous supply of bran is furnished to the cleaning-rollers, so that their operation may be uniform upon all the sheets. The cleaning-rollers F F' F² are each furnished with a covering of sheepskin or other suitable material f , which will operate more or less to retain the bran between the fibers and to give the proper rubbing action upon the sheets to remove the oil from their surfaces and clean them.

K is the feed stop, gate, or device for regulating or controlling the feed or passage of the sheets to the feed-rollers D' D'. It is moved up or down to close or open the path for the sheet to the feed-rollers D' D' preferably by means of a vibrating lever K', operated by a cam K². It serves to square or straighten the sheets up in relation to the feed-rollers, so that they will pass along in a straight path between the rollers.

Beneath the bran-hopper H and the cleaning-rollers F F' F² there is a second or collecting hopper H', into which the bran falls after dropping down on the cleaning-rollers and the sheets passing between them and from which the bran is returned again to the hopper H through a suitable conveyer or conveyers. The conveyer mechanism preferred consists of a conductor-pipe H², connected at one end with the hopper H' and at the other end communicating with the fan or air-blast device H³, connected by a pipe H⁴ with a centrifugal separator device or chamber H⁵, which is furnished with a discharge orifice or opening h^2 , through which the bran or cleaning material is discharged upon the vibrating screen or riddle L. The centrifugal chamber or separator H⁵ has a discharge orifice or opening h^3 at its upper end through which the air separated from the bran by action of the separator device H⁵ is allowed to escape. To produce the centrifugal separating action in the chamber or vessel H⁵, the air-blast pipe H⁴ is connected to said chamber or vessel H⁵ tangentially. The vibrating screen or riddle L serves to permit the separate and comparatively clean particles of bran to fall through its meshes, while the greasy or oil-saturated particles which tend to adhere together in lumps are made to pass over the edge of the screen and are thus separated with other refuse matter from the bran, which is returned to the hopper H'. The new and fresh bran which is from time to time added to the mass of cleaning material in the machine is, by operation of the air-blast and separating-chamber, evenly and uniformly mixed with the mass of bran, so that its action as an absorbent and cleaning agent upon the sheets is at all times kept uniform throughout the whole mass of the bran or cleaning material, thus making its action upon each and every sheet and upon the whole surface of each sheet substantially uniform. The

machine is thus enabled to do uniform and perfect work at all times and turn out a uniform and perfectly clean product.

M is a hopper below the screen L, and M' is a conveyer of any suitable construction for conveying the cleaned or separated bran from the hopper M to the feed-hopper H. Where a number of tinning-pots and of these combined longitudinally and transversely acting cleaning-machines are set side by side in a plant, the conveyer M' is ordinarily arranged transversely to the direction indicated in Fig. 1 and furnished with a number of discharge-spouts *m*, one for each feed-hopper H, so that one and the same conveyer M' will serve to return the bran back to all the feed-hoppers H of all the different machines, and in like manner I usually employ one air-blast or conveyer mechanism H² H³ H⁴ for the entire number of machines set side by side.

N is a chute or passage-way upon which the sheets are delivered as they leave the second pair of cleaning-rollers F' F² and by which the sheets are delivered upon the transverse feed-table D¹⁰ of the second and transversely-arranged set of feed-rollers D¹¹ D¹¹ and cleaning-rollers F¹⁰ F¹¹ F¹², so that the sheets while passing through the first set of rollers F¹⁰ F¹¹ F¹² in the direction, for example, of the length of the sheet will pass through this second and transverse set of rollers in the direction of the width of the sheets.

G¹⁰ is the inclined feed-table, and G¹¹ G¹¹ the feed-rolls for the transversely-acting set of cleaning-rolls. By thus combining two sets of cleaning-rollers arranged at right angles to each other in one machine, so that the sheets while they are still hot from the tinning pot or bath will be rubbed or acted upon both in the direction of the length of the sheet and in the direction of the width of the sheet, any streakiness or inequality of action produced by the first set of cleaning-rolls will be compensated for by the second and transversely-acting set of rollers, thus uniformly and perfectly cleaning the entire surface of each and all of the sheets. As the second and transversely-arranged cleaning mechanism is precisely similar in construction and operation to the first set above described in detail, it is of course not necessary to repeat or duplicate the description just above given of the first set, and for this reason in the drawings detail views are made of only one set; but these detail views show indifferently either the first or longitudinally-acting set of cleaning-rollers, feed-rollers, feed-table, and chutes and the second or transversely-acting set of cleaning-rollers, feed-rollers, feed-table, and chutes. The feed gate or stop K is only necessary and employed upon the first or longitudinally-acting mechanism, and the hopper H and device for feeding bran or other absorbent pulverulent cleaning material to the rollers are only employed on the first or longitudinally-acting mechanism.

To regulate the pressure of the cleaning-rollers F F' F² upon the sheets, the boxes or journals of the upper and lower rollers are made movable and furnished with adjusting-screws *f'* *f*², the adjusting-screw *f*² acting upon a lever *f*³, connected at its inner end with the box or journal of the lower roller. Motion may be communicated to the several rollers and other moving parts by any suitable mechanism. The gearing, however, which I prefer to employ for driving the rollers consists of a series of sprocket-wheels and chains, as illustrated in the drawings.

P is the main driving-shaft of the machine, being also the shaft of the middle cleaning-roller F'. The upper and lower rollers F and F² are driven by contact with the roller F'. To drive the feed-rollers D' D' at a slower speed than the rubbing or cleaning rollers, the driving-shaft P is furnished with a small sprocket-wheel *p*, from which motion is communicated to the large wheel *p'* on the counter-shaft *p*² by the chain *p*³, the counter-shaft *p*², having also a small sprocket-wheel *p*⁴, connected by the chain *p*⁵ with the larger sprocket-wheels *p*⁶ *p*⁶ on the shafts of the feed-rollers D' D' G' G'.

*p*⁷ is a belt-tightener pulley mounted on the adjustable lever *p*⁸. Motion is communicated from the main driving-shaft P of the longitudinally-acting roller F' to the corresponding shaft P' of the transversely-acting roller F¹¹ by means of a sprocket-gear *p*⁹, connected by a chain *p*¹⁰ with a similar gear *p*¹¹ on the counter-shaft *p*¹², which is furnished with a bevel-gear *p*¹³, that meshes with a bevel-gear *p*¹⁴ on the shaft P' of the transversely-acting roller F¹¹. The rollers *d d* of the feed-table have motion communicated to them from one of the rollers D' by means of a sprocket-chain *p*¹⁵, which meshes with sprocket-wheels *p*¹⁶ on the shafts of said rollers *d d*.

T represents a truck upon which the sheets are finally delivered as they are discharged from the last pair of transversely-acting cleaning or polishing rollers.

In order to enable this longitudinally-acting and transversely-acting cleaning mechanism to coöperate with the tinning device and its lifter and to take the freshly-tinned sheets successively as they issue hot from the tinning-pot, the gate or stop device K for opening and closing the path of the sheets leading to the first pair of feed-rollers D' D' is operated directly from the lifter—that is to say, the shaft K³ of the gate-operating cam K² has motion communicated to it by a chain K⁴, which is driven by a pulley-wheel C² on the shaft C³, which controls the discharge of the sheets from the lifting mechanism C. By this means the cleaning mechanism is made to automatically coact with the tinning and lifting devices or mechanisms, and the passage of one or more sheets on top of one another or of one more or less overlapping another through the cleaning-

rollers is prevented. The first or longitudinally-acting set of cleaning-rollers $F F' F^2$, to which bran is supplied, serve chiefly to clean or remove the oil and dirt from the sheets, while the second or transversely-acting set of rollers $F^{10} F^{11} F^{12}$ operate rather as buffing-rollers and serve to polish the surfaces of the sheets, while at the same time supplementing the cleaning action of the first or longitudinally-acting set of rollers.

By use of the terms "longitudinally-acting" cleaning-rollers and "transversely-acting" cleaning-rollers I wish to be understood as meaning that one set of these rollers are arranged transversely or at an angle to the others, so that one set rubs the sheet in a direction at an angle to that in which the other set rubs the sheet, and it is obviously immaterial whether the sheet in fact passes in the direction of its length or in the direction of its width or breadth through the first set of rollers, which for the purpose of distinguishing I have termed the "longitudinally-acting" set of rollers.

I claim—

1. The combination with an inclined discharge-chute, of a feed-table extending in the same direction as the discharge-chute upon which the sheets are delivered from said discharge-chute and by which their forward motion is continued, a longitudinally-acting set of cleaning-rollers to which the sheets are delivered from said feed-table, and a transversely-acting set of cleaning-rollers, substantially as specified.

2. The combination with a discharge-chute, of a feed-table extending in the same direction as said chute and upon which the sheets are delivered from said discharge-chute and by which their forward motion is continued, a longitudinally-acting set of cleaning-rollers and a transversely-acting set of cleaning-rollers, and a feed gate or stop for opening and closing the path of the sheets to said first-mentioned set of cleaning-rollers, substantially as specified.

3. In a tin-plate-cleaning machine, the combination with the feed-table and pair of feed-rollers, of a first pair and a second pair of cleaning-rollers, a second feed table or chute and a second pair of feed-rollers at the opposite side of the cleaning-rollers from said first-mentioned feed-table and pair of feed-rollers, whereby after the sheet is passed forward through the first pair of cleaning-rollers it is returned or passed backward through the second pair of cleaning-rollers, and a feed gate or stop for opening and closing the path of the sheets to said first-mentioned pair of feed-rollers, substantially as specified.

4. In a tin-plate-cleaning machine, the combination with the feed-table and pair of feed-rollers, of a first pair and second pair of cleaning-rollers, a second feed table or chute and a second pair of feed-rollers at the opposite side of the cleaning-rollers from said first-mentioned feed-table and pair of feed-rollers, whereby after the sheet is passed forward through the first pair of cleaning-rollers it is returned or passed backward through the second pair of cleaning-rollers, a transversely-arranged feed-table and a pair of feed-rollers, and a transversely-arranged set of cleaning-rollers, substantially as specified.

5. In a tin-plate-cleaning machine the combination with a roller feed-table, of a chute extending at an angle to the feed-table to deliver the sheets upon the same, a pair of feed-rollers, a first pair and a second pair of cleaning-rollers, a second feed table or chute and a second pair of feed-rollers at the opposite side of the cleaning-rollers from said first-mentioned feed-table and pair of feed-rollers, whereby after the sheet is passed forward through the first pair of cleaning-rollers it is returned or passed backward through the second pair of cleaning-rollers, a feed-hopper and means for automatically feeding regular and uniform quantities of the bran or cleaning material to said set of cleaning-rollers, and means for returning the bran from the collecting-hopper to the feed-hopper, substantially as specified.

6. In a tin-plate-cleaning machine, the combination with a set of cleaning-rollers, of a pair of feed-rollers and a feed-table D, furnished with a series of revolving rollers $d d$, and a chute extending at an angle thereto for delivering the sheets upon the feed-table, substantially as specified.

7. In a tin-plate-cleaning machine, the combination with a set of cleaning-rollers, of a pair of feed-rollers and a feed-table D, furnished with a series of revolving rollers $d d$, and an automatically-operated feed stop or gate, and a chute extending at an angle thereto for delivering the sheets upon the feed-table, substantially as specified.

8. In a tin-plate-cleaning machine, the combination with a set of cleaning-rollers, of a pair of feed-rollers and a feed-table D, furnished with a series of revolving rollers $d d$, and an automatically-operated feed stop or gate, and a chute extending at an angle thereto for delivering the sheets upon the feed-table, a feed-hopper for the bran or cleaning material, and a device for feeding the bran or cleaning material regularly and uniformly to the cleaning-rollers, substantially as specified.

9. In a tin-plate-cleaning machine, the combination with a set of cleaning-rollers, of a pair of feed-rollers and feed-table D, furnished with a series of revolving rollers $d d$, and an automatically-operated feed stop or gate, and a chute extending at an angle thereto for delivering the sheets upon the feed-table, a feed-hopper for the bran or cleaning material, and a device for feeding the bran or cleaning material regularly and uniformly to the cleaning-rollers, consisting of a revolving roller closing the feed-orifice of the hopper and provided with a channel or receptacle, substantially as specified.

10. The combination with cleaning-rollers of a feed-table therefor, a discharge-chute extending at an angle thereto along which and the feed-table the sheets pass to the rolls without reversing their direction of movement, and a movable stop or gate to square the sheets in respect to the cleaning-rollers, substantially as specified.

11. In a tin-plate-cleaning machine, the combination with a set of three longitudinally-acting cleaning-rollers F, F', F^2 , between which the sheet passes first forward and then backward, with a transversely-acting set of three cleaning-rollers F^{10}, F^{11}, F^{12} between which the sheet passes first forward and then backward, and feed-rollers and feed tables or chutes for passing the sheets forward and backward through both of said sets of cleaning-rollers, substantially as specified.

12. The combination with a tinning mechanism, of cleaning-rollers for cleaning the sheets by a rubbing action, feed-rollers having a slower surface speed than the cleaning-rollers, means for supplying bran or cleaning material to the cleaning-rollers, and means for delivering the hot sheets issuing from the tinning mechanism to the cleaning-rollers; whereby the sheets are rubbed clean while they are still hot and before the oil upon their surface becomes congealed, substantially as specified.

13. The combination with a tinning mechanism of cleaning-rollers for cleaning the sheets by a rubbing action, means for supplying bran or cleaning material to the cleaning-rollers, and means for delivering the hot sheets issuing from the tinning mechanism directly to the cleaning-rollers; and feed-rollers having a different surface speed from the cleaning-rollers for causing the sheets to pass between the cleaning-rollers at a different surface speed from the cleaning-rollers to produce the rubbing action of the cleaning-rollers upon the sheets; whereby the sheets

are rubbed clean while they are still hot and before the oil upon their surface becomes congealed, substantially as specified.

14. In a tin-plate-cleaning machine, the combination with cleaning-rollers, of a roller feed-table for the sheets, a chute extending at an angle thereto for delivering the sheets upon the same in the direction they are fed forward thereby, and a movable stop or gate for closing the path of the sheets to the cleaning-rollers at intervals and straightening the position of the sheets so that they will pass properly between the rollers, substantially as specified.

15. In a tin-plate-cleaning machine, the combination with cleaning-rollers, of a roller feed-table for the sheets, a chute extending at an angle thereto for delivering the sheets to the feed-table in the direction they are fed forward thereby, and a movable stop or gate for closing the path of the sheets to the cleaning-rollers at intervals and straightening their position so that they will pass properly between the rollers, and a pair of feed-rollers between said stop or gate and the cleaning-rollers and revolving at a different surface speed from that of the cleaning-rollers, substantially as specified.

16. In a tin-plate-cleaning machine, the combination with the cleaning-rollers, of a feed-hopper for the bran or cleaning material, a conveyer mechanism for continuously returning the bran or cleaning material to the feed-hopper, a roller feed-table for the sheets and a movable stop or gate to adjust the position of the sheets and cause them to pass properly between the rollers, feed-rollers, and a chute for delivering the sheets upon the feed-rollers, substantially as specified.

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Witnesses:

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