(No Model.) 3 Sheets—Sheet 1.

J. GOULD, Jr.

PROCESS OF TINNING PLATE.

No. 467,800. Patented Jan. 26, 1892.

Fig. 4

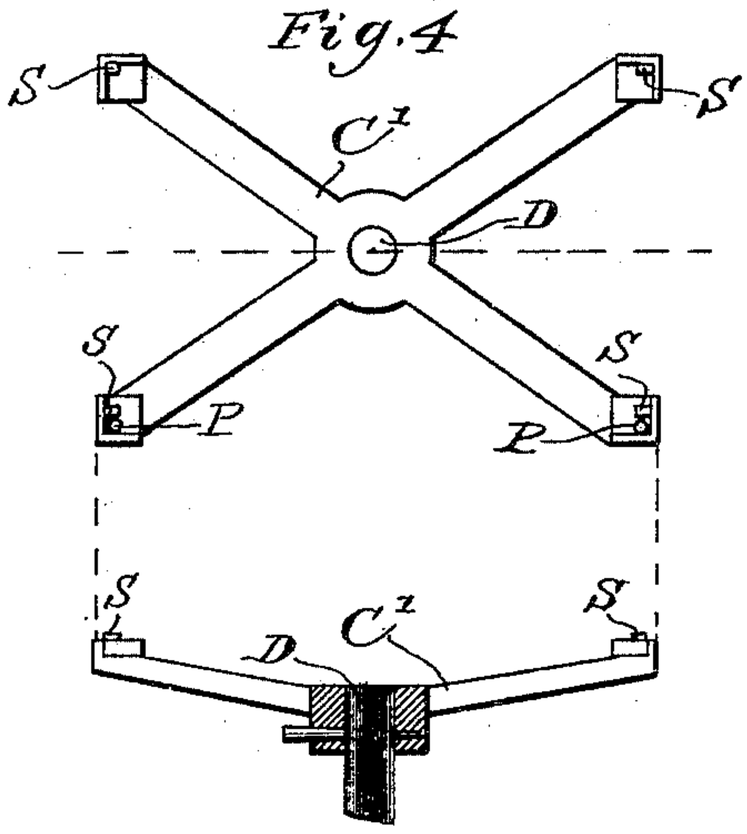


Fig. 5

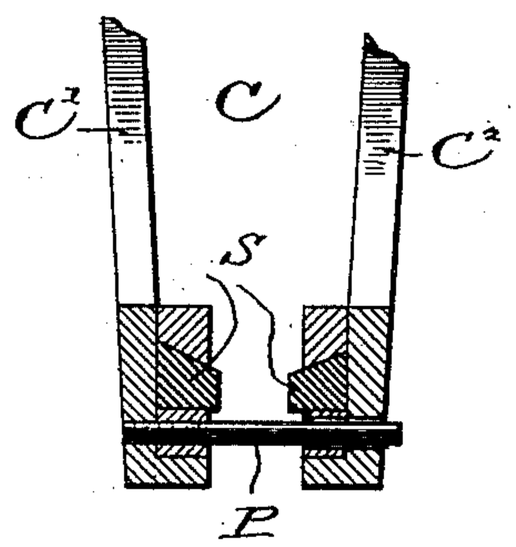


Fig. 6.

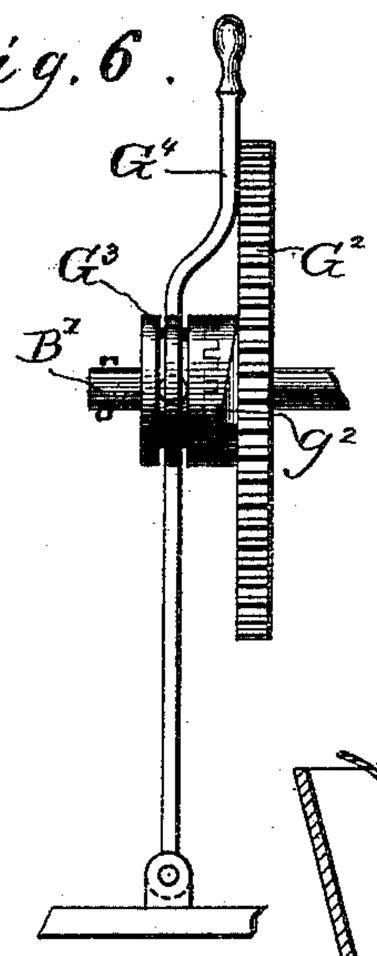
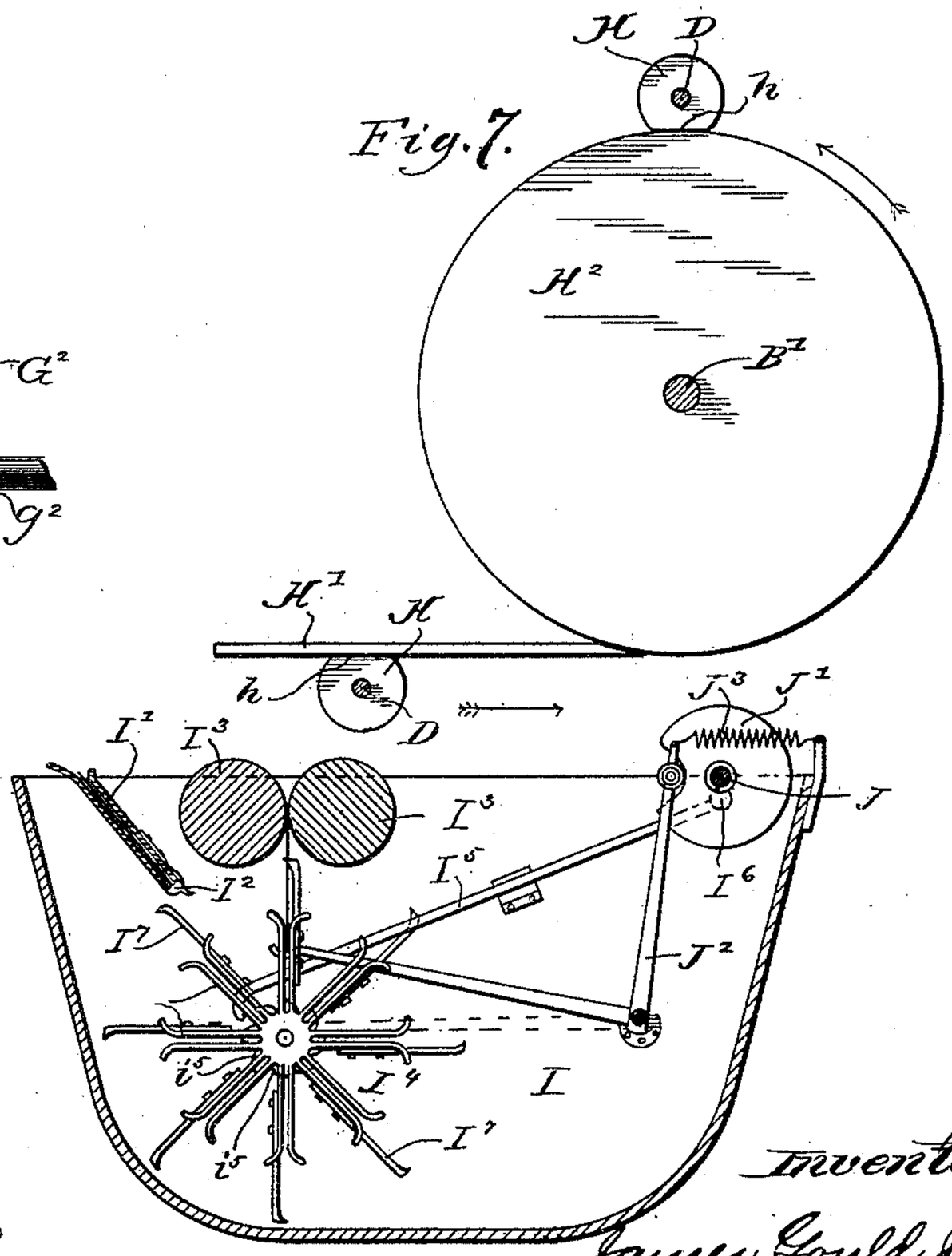


Fig. 1.

Fig. 7.



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Inventor:
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By Cyrus Kehr. Atty

(No Model.) 3 Sheets—Sheet 2.

J. GOULD, Jr.

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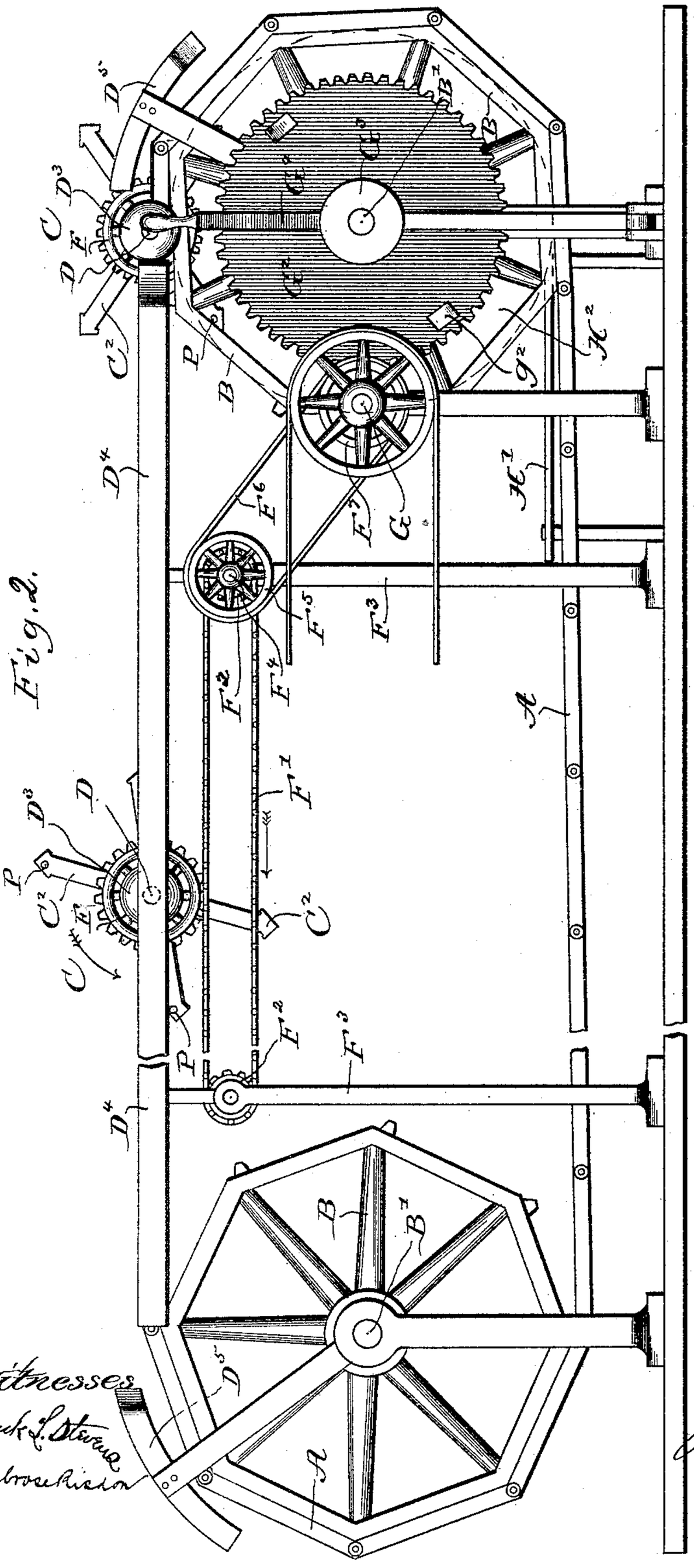

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

J. GOULD, Jr.

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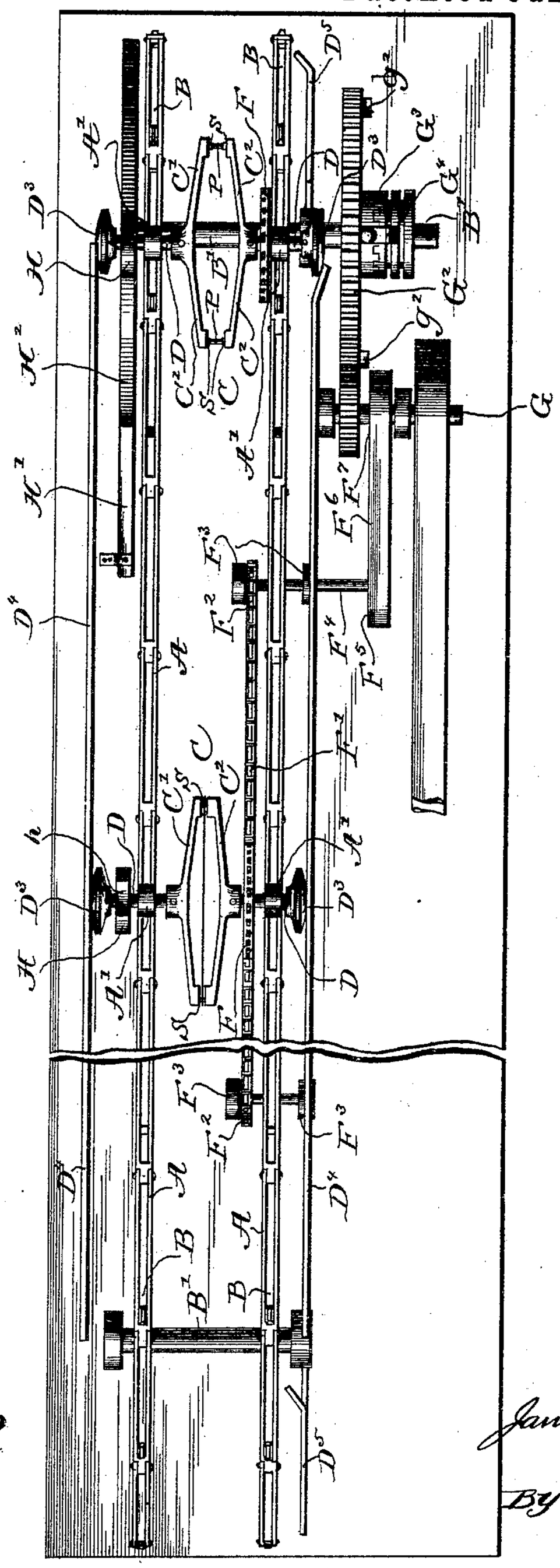

Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES GOULD, JR., OF MAYWOOD, ILLINOIS.

PROCESS OF TINNING PLATE.

SPECIFICATION forming part of Letters Patent No. 467,800, dated January 26, 1892.

Application filed May 4, 1891. Serial No. 391,568. (No model.)

To all whom it may concern:

Be it known that I, JAMES GOULD, Jr., a citizen of the United States, residing at Maywood, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tinning; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of the invention is to prevent tin from forming upon the plate in uneven thicknesses. In other words, it is sought to apply the tin to the sides of the metal plates in such manner as to prevent the tin from settling to or toward one edge of the plate. It is a fact that, so far as I am informed, all the tin-plate now made has an excessive quantity of tin along one margin (called by the trade the "selvage edge") of the plate when the latter has been completed. This results from the fact that when the plates are taken from the bath they are set on edge. At this time the tin received by the plate in passing through the bath is not sufficiently cooled to be hardened. Consequently more or less of the tin settles to or toward the lower margin of the plate, so that when the plate is cooled its faces along the lower margin have along them considerably more tin than is required, the upper portion of the plate being correspondingly robbed of tin, so that it has an insufficient coating of tin unless the plate has been put through the bath in such manner as to apply to it more tin than would be required were the distribution even.

In the accompanying drawings, Figure 1 is a sectional elevation of the ordinary bath through which the metal plates are passed to receive the coating of tin. Fig. 2 is a side elevation of an apparatus for treating the plates after they leave the bath. Fig. 3 is a plan of the same. Figs. 4 and 5 are details of plate-holders constituting a part of said apparatus. Fig. 6 is a detail of the means for throwing the machine into and out of operation. Fig. 7 is a detail of means for controlling the plate-holders.

In Fig. 1, I is the bath of tin. I′ is a feed-tube. I^2 is a latch, and I^3 I^3 delivery-rolls. I^4 is a rotating plate-receiver moved progressively by a hook I^5 and the crank I^6, acting upon the teeth i^5 around the hub of said plate-receiver. The latch I^2 is disconnected by an arm I^7 as the latter passes said latch, so that the plate in the feed-tube will slide into the receiver I^4. The hook I^5 is reciprocated by a crank I^6 on the shaft J. J′ is a cam arranged to oscillate a bell-crank J^2, having one of its arms extending to a point above the hub of the plate-receiver and below the lower edge of the plates as the latter are turned into a vertical position below the rolls I^3 I^3. When one of said plates is brought to this vertical position, the cam J′ is so turned as to bring its depression opposite the bell-crank J^2, and the spring J^3 then tilts said bell-crank so as to lift the metal plate in engagement with the rolls I^3. When this has been accomplished, the extended portion of said cam reverses said bell-crank, so that the horizontal line of the latter descends to its lower limit to make room for another of the metal plates. When the plates are engaged by the rolls I^3, said plates are passed upward between said rolls and then placed into mechanism which alternates the elevation of the edges of said plates until the molten metal upon their surfaces has cooled sufficiently to harden. Said apparatus will be next described.

A A, Figs. 2 and 3, are parallel endless chains separated a suitable distance and extending around the vertical wheels B B, which wheels are supported by shafts B′ B′.

C C are plate-holders adapted to receive the metal plates as they come from the bath. Said plate-holders are supported in a vertical plane, each section of each of said holders being attached to a horizontal shaft D, and such shaft being supported by one of the chains A in a bearing A′ in said chain. The outer end of each shaft D has a button-head D^3, and at the outer side of the upper portion of each of said chains A and at the outside of said button-heads is a stationary bar D^4, such bars being sufficiently near each other to bear against the outer sides of said button-heads and press said shafts D toward each other, thus pressing the sections C′ and C^2 of the plate-holders C tightly against each other.

At the point at which it is desired to have the plate-holders open to discharge the plates the bars C^4 cease or diverge. The drawings show this as being at the left end of the machine, and at such point suitably-supported bars D^5 should engage the inner faces of the button-heads D^3, so as to separate the sections of the plate-holders, and such bars D^5 may or may not extend along the lower portion of the machine to and around the right end thereof to the point at which the bars D^4 engage said button-heads. Short bars D^5 may be placed at the right end of the machine, so as to insure the opening of the holders, and the bar or bars D may be located at only one side. Thus the sections of each plate-holder are separated at the time of the discharge of a plate and are separated when a new plate is to be inserted, and after such plate has been inserted the holder is closed, so as to grasp said plate, and this latter condition continues until the holder has carried the plate to the left end of the machine. It will be seen that the same result may be accomplished by thus moving only one of the sections of the plate-holders C in a direction transverse to the chains A. This is the form shown by the drawings, the sections C′ being arranged to travel constantly in the same plane, while the bar D^5 at the front of the machine draws the sections C^2 away from the other sections, and the bar C^4 forces said sections C^2 toward the sections C′. The inner faces of the sections C′ and C^2 should be provided with points S of slate or other material, which is repellent to tin. Furthermore, a pin P should extend through both sections of the holder at two adjacent corners of the latter and be secured to one of said sections and lie loosely in the other, as illustrated in Figs. 2, 3, 4, and 5. The edge of the holder bearing these points is to stand lowermost when the plate is inserted, so that said plate may be allowed to rest upon said points until the holder is clasped or closed. Automatic means for bringing this edge of each holder into the lowermost position at the point in the machine at which the plates are to be inserted will be hereinafter described.

Provision must be made for rotating the holders C upon the shafts D while said holders contain plates. In the construction illustrated the chains A A are normally stationary, so that the plate-holders are normally not progressing, but they rotate upon their axes after leaving the right end of the machine. To this end a sprocket or other suitable wheel F is located upon one of the shafts D of each plate-holder, and above or below said wheel is located an endless sprocket-chain F′, parallel to the chain A and at such height as to engage the sprocket-chain. Said sprocket-chain F′ is supported by sprocket-wheels F^2, which sprocket-wheels are in turn supported by standards F^3, rising from the floor or from the bed of the machine. Said sprocket-chain is driven continuously by a belt or chain F^6, applied to a wheel F^5, mounted upon the shaft F^4 of one of the wheels F^2. Said belt or chain is in turn driven from the power-shaft G by means of a sprocket or other wheel F^7, mounted upon said shaft G. The sprocket-chain F′ is preferably made to progress in the direction indicated by the arrow.

From the foregoing it will be seen that each plate-holder having its wheel F engaged by the sprocket-chain F′ will be continuously rotated upon its axis, though it may be making no progress with reference to the path of the chains A. Thus an empty and open plate-holder opening at the upper portion of the right end of the machine may be stationary at the right end of the machine, in order that a plate may be more conveniently inserted, and yet plates newly inserted in other holders and having the molten metal upon them not yet hardened from cooling will not be stationary, so as to allow the molten metal to settle to one edge of the plate.

It is desirable always to direct the same edge of the plate-holders upward at the part of the machine at which the plates are inserted. This is accomplished by means of segment-wheels H, located upon the shafts D of the plate-holders, and a guide H′, beginning near the middle of the lower portion of the machine and extending upward around the right end of the latter to the highest portions of the adjacent wheels B. The guide H′ is so placed as to be partially in the path of the segment-wheels H, preferably above the middle line of said path, so that when said segment-wheel is carried to the end of said guide by the chains A the upper portion of the segment-wheel will be met by the lower face of the guide H′ and pressed downward, and as said chain progresses said segment-wheel will roll upon said guide until the straight edge *h* of said segment-wheel falls upon said guide. The said segment-wheel will slide upon and in contact with the lower face of said guide and no longer rotate, so that the holder to which said segment-wheel is applied no longer rotates. The straight edge *h* of said segment-wheel is properly located radially to the shafts D to bring the two points P of the holder parallel to the chains A A and toward a line extending through the axes of the wheels B. The guide H′ extending around the right end of the machine at a proper distance from the axis of the wheels B to preserve the engagement of the straight edge *h* of the segment-wheel H, the holder C must arrive at the top of the machine with the points P downward, as indicated in Fig. 7. The guide H may be a continuous stationary bar, or the curved portion of it may consist of a wheel H^2, located upon the shaft B′ and having its periphery meeting the horizontal portion of said guide, so that as the cam-wheel H reaches said curved portion it will slide upon the periphery of said wheel

H^2 and be carried with the latter around the shaft B′ to the point at which the chains A leave the wheels B.

After the insertion of each plate the chains A may be progressed manually a sufficient distance to bring the next holder into position to receive a new plate; but I have devised means for effecting such intermittent progression by the power used to drive the chain F′. For this purpose a spur-gear G′ is located on the power-shaft G and made to intermesh with a larger spur-gear G^2, located loosely upon the adjacent shaft B′. The power-shaft G being rotated continuously, it follows that the wheel G must rotate continuously, and to rotate the shaft B and progress the chains A A it is only necessary to effect a temporary engagement between the wheel G^2 and the shaft B′. This is done by means of a clutch G^3, one member of which is attached to the wheel G^2 and the other member feathered in the well-known way to the shaft B′ and provided with a hand-lever G^4 for shifting the second section of said clutch. As is obvious from an inspection of the drawings, the engagement of the wheel G^2 with the shaft B′ is effected by throwing the upper end of the lever G^4 toward the wheel G^2. When the operator has placed a tin-plate into the holder C, he throws said lever toward the wheel G^2, so that the clutch G^3 is set into engagement, and the chains A A are thereby set into motion and all the plate-holders progressed. The operator may throw the lever away from the wheel G^2 when the next holder C has been carried to the position for receiving the plate; but I have provided for an automatic reversal of said lever, to the end that the operator may turn from the machine as soon as he has set said lever into the operative position. This is effected by putting upon the outer face of the wheel G^2 lugs g^2, extending into the path of said lever when the latter is in the operative position, and being located at suitable points upon said wheel to engage and force said lever outward out of engagement as often as one of the holders reaches the point at which it is to receive a plate.

I claim as my invention—

1. The herein-described method of tinning, which method consists in immersing the plate to be tinned in a bath of molten tin, then passing said plate out of said bath and pressing the excess of the molten tin back into the bath at the surface of the latter, and then placing such plates in a vertical plane and alternating the elevation of the edges of said plates while in such vertical plane until the tin upon the faces of the plates has hardened, substantially as shown and described.

2. The herein-described method of tinning, which method consists in immersing the plate to be tinned in a bath of molten tin, then passing said plate out of said bath and pressing the excess of the molten tin back into the bath at the surface of the latter, and then placing said plates in a vertical plane and rotating them in such plane upon a horizontal axis extending through said plate until the tin upon the faces of said plates has hardened, substantially as shown and described.

3. The herein-described method of tinning, which method consists in immersing the plate to be tinned in a bath of molten tin, then passing said plate out of said bath and pressing the excess of the molten tin back into the bath at the surface of the latter, and then placing said plates in a vertical plane and rotating and progressing said plates in such vertical plane until the tin upon the faces of said plates has hardened, substantially as shown and described.

In testimony whereof I affix my signature, in presence of two witnesses, this 27th day of April, 1891.

JAMES GOULD, JR.

Witnesses:

CYRUS KEHR,

AMBROSE RISDON.