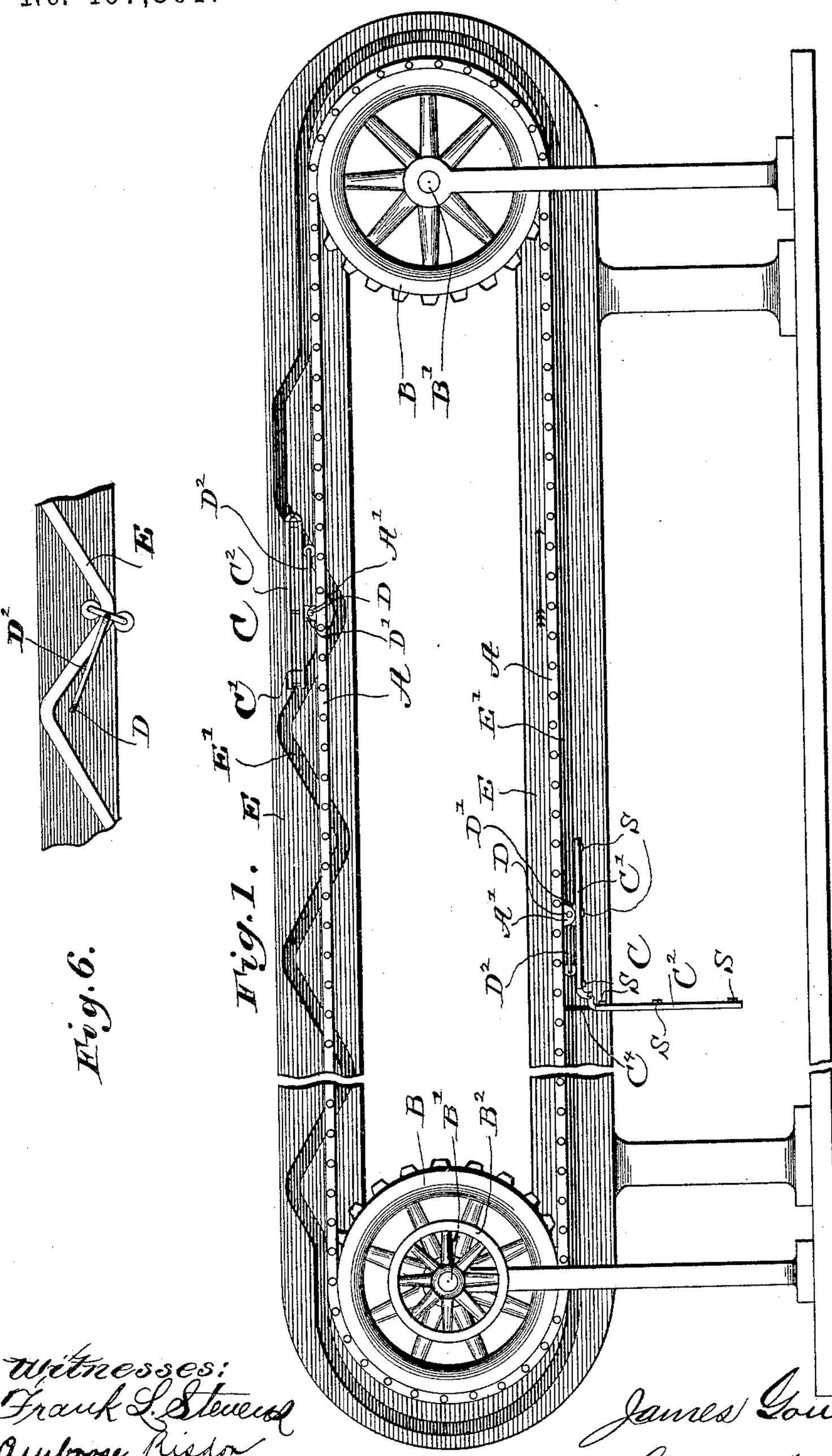
(No Model.)

5 Sheets—Sheet 1.

# J. GOULD, Jr.

## TINNING.

No. 467,801. Patented Jan. 26, 1892.




Witnesses:
Frank L. Stevens
Ambrose Kisdon

Inventor
James Gould Jr.
By Cyrus Kehr Atty

(No Model.)

5 Sheets—Sheet 2.

# J. GOULD, Jr.

## TINNING.

No. 467,801. Patented Jan. 26, 1892.

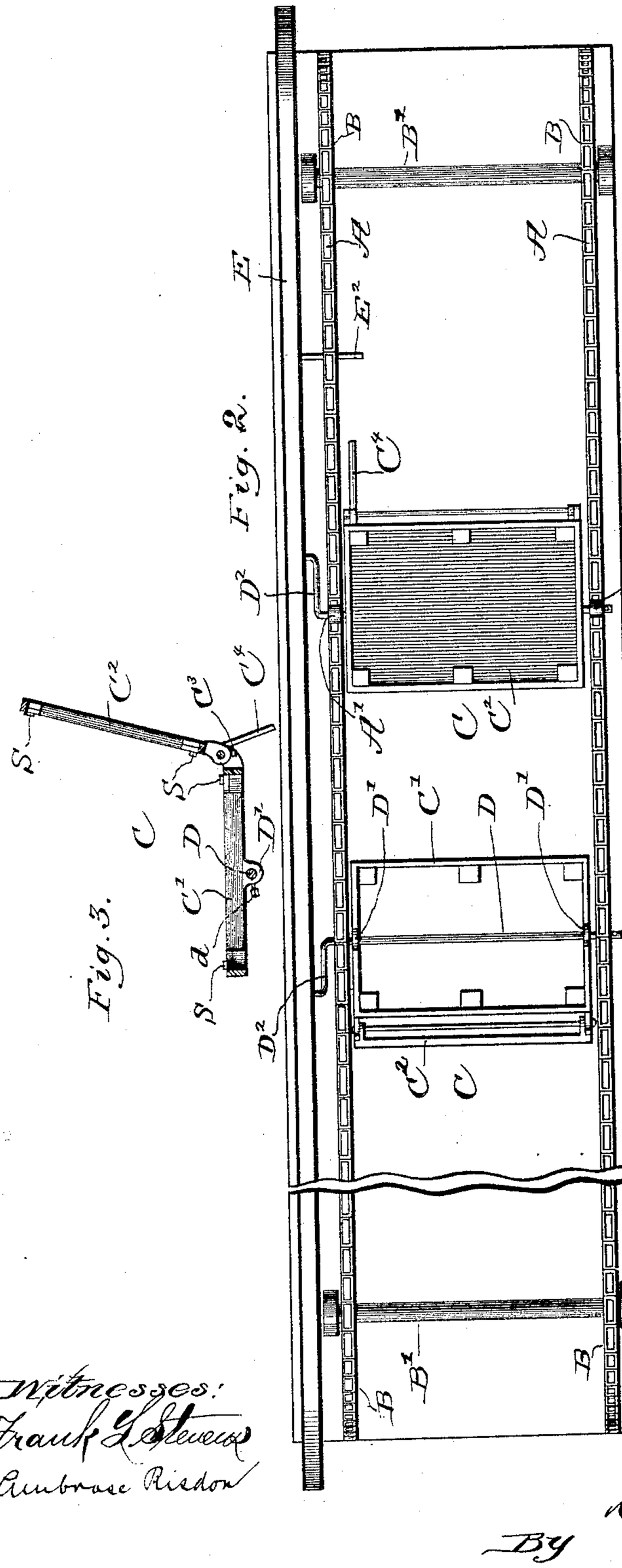



Fig. 2.

Fig. 3.

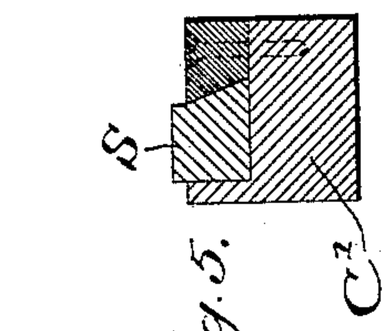



Fig. 5.

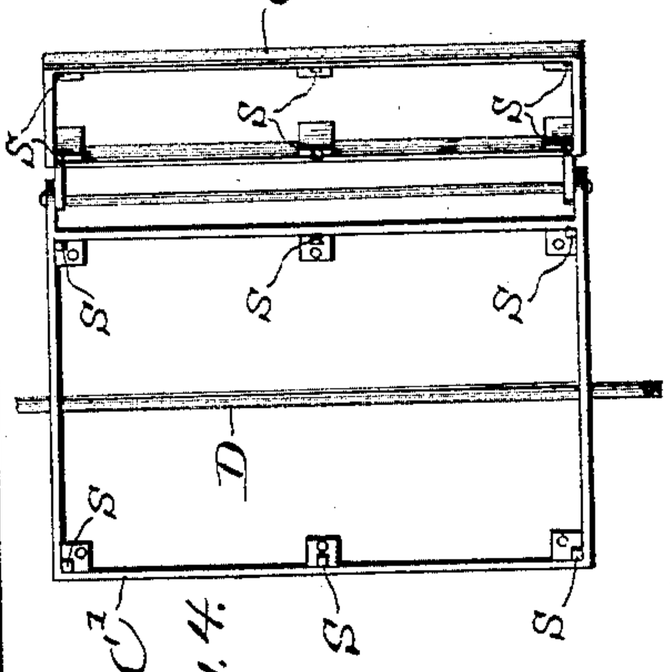



Fig. 4.

Witnesses:
Frank L. Stevens
Ambrose Risdon

Inventor
James Gould Jr.
By Cyrus Keller.
Atty

(No Model.) 5 Sheets—Sheet 3.

# J. GOULD, Jr.

## TINNING.

No. 467,801. Patented Jan. 26, 1892.

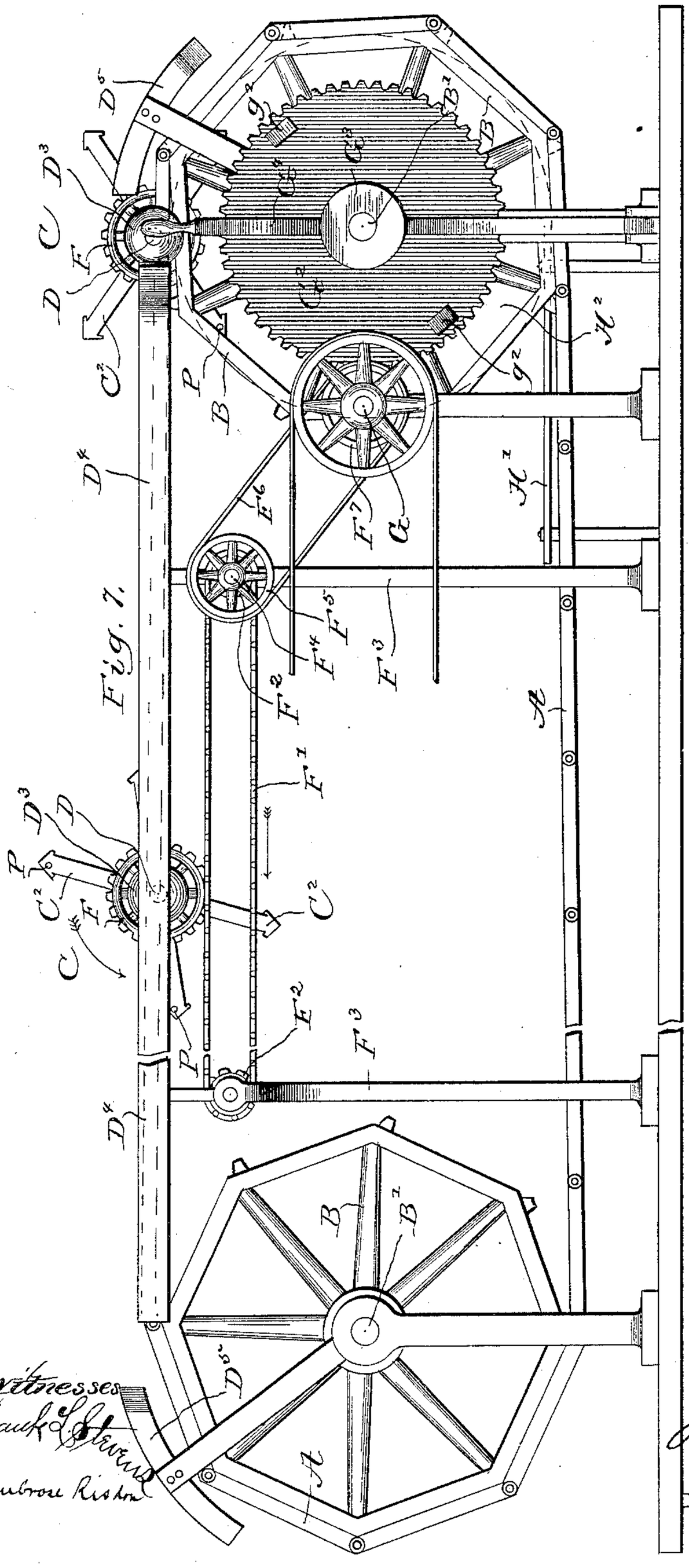



Fig. 1.

Witnesses
Frank L. Stevens
Ambrose Kiston

Inventor
James Gould Jr.
By Cyrus Kehr.
Atty

(No Model.) 5 Sheets—Sheet 4.

# J. GOULD, Jr.

## TINNING.

No. 467,801. Patented Jan. 26, 1892.

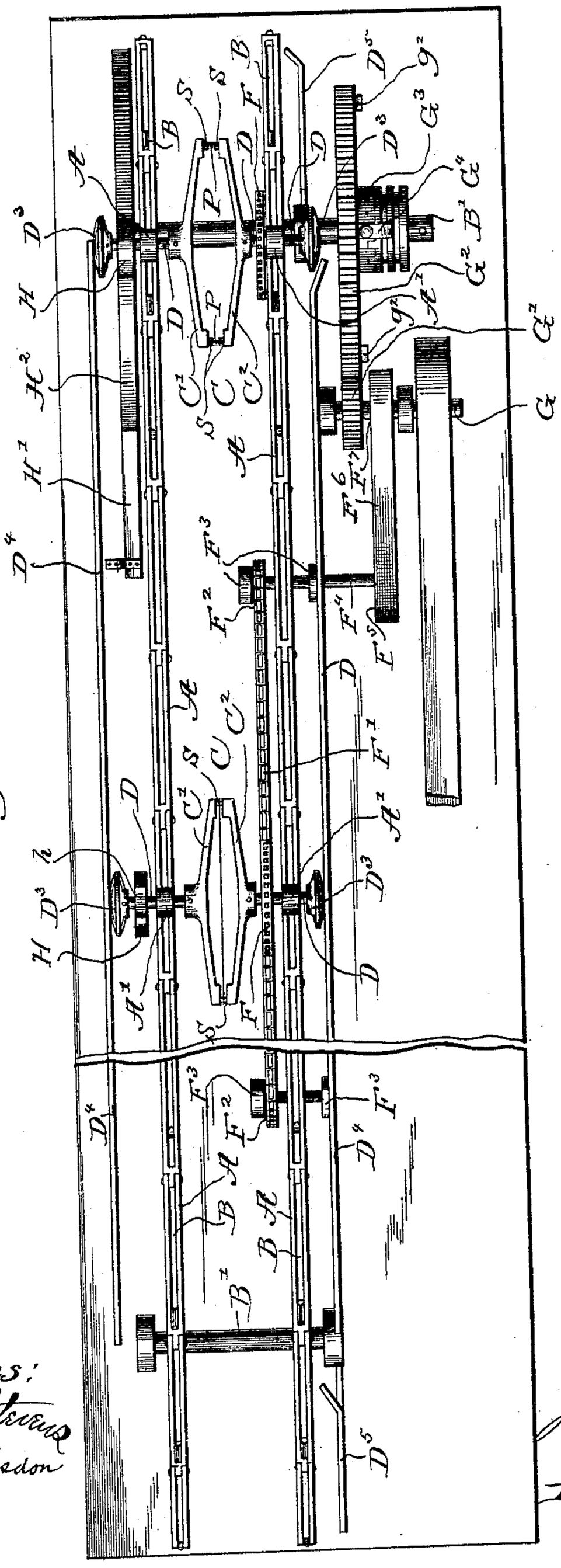


Fig. 8.

Witnesses:
Frank L. Stevens
Ambrose Risdon

Inventor
James Gould Jr.
By Cyrus Rolph
Atty

(No Model.) 5 Sheets—Sheet 5.

# J. GOULD, Jr.

## TINNING.

No. 467,801. Patented Jan. 26, 1892.

Fig. 9.

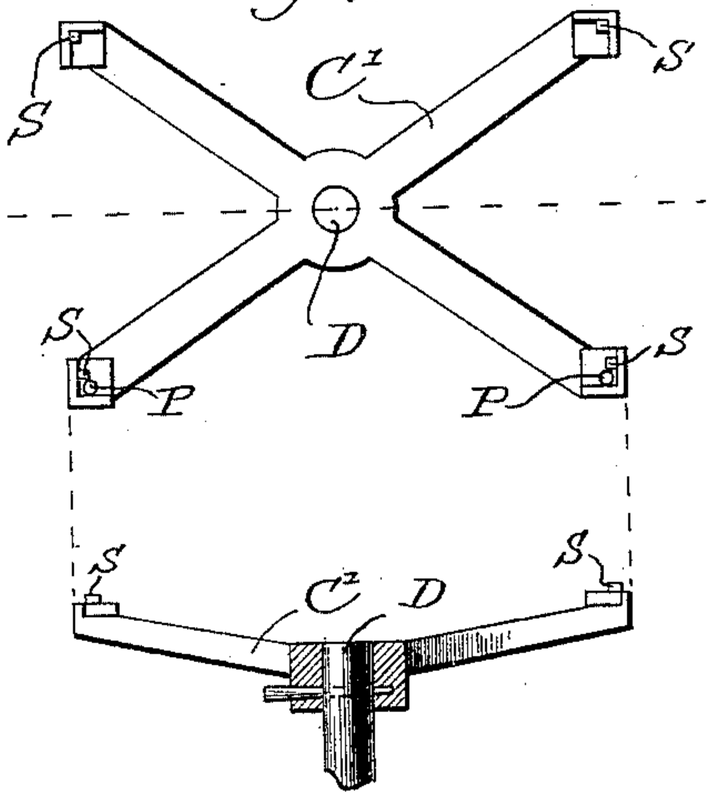



Fig. 10.

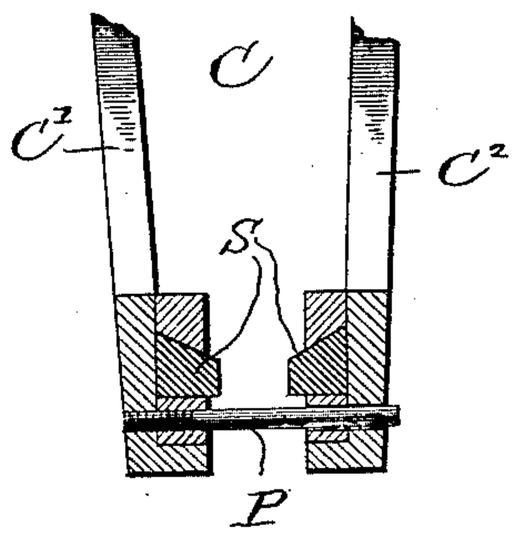



Fig. 11.

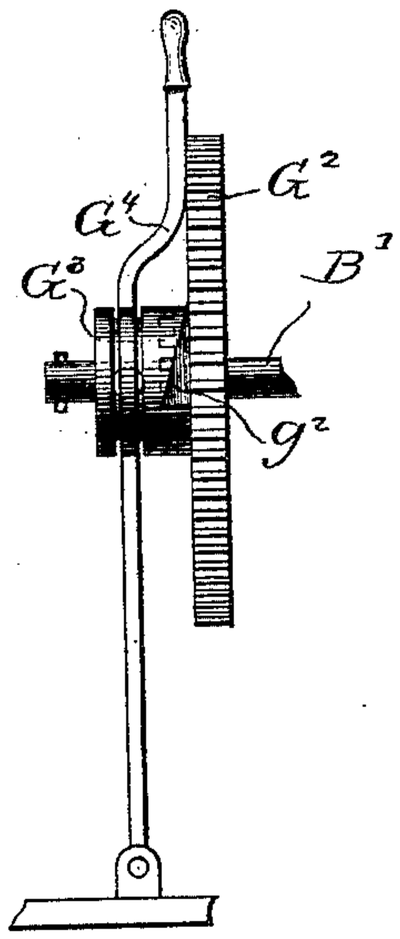
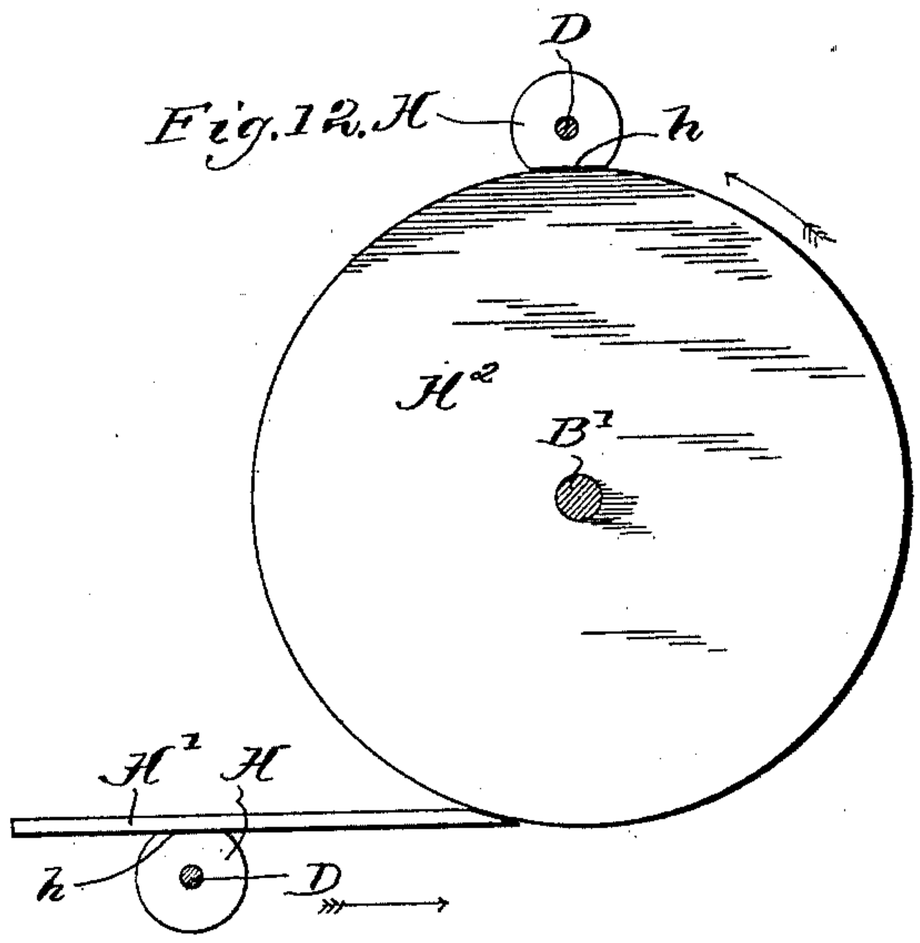



Fig. 12.




Witnesses:
Frank L. Stevens
Ambrose Kidon

Inventor
James Gould Jr.
By Cyrus Keller.
Atty

By

# UNITED STATES PATENT OFFICE.

JAMES GOULD, JR., OF MAYWOOD, ILLINOIS.

## TINNING.

SPECIFICATION forming part of Letters Patent No. 467,801, dated January 26, 1892.

Application filed May 4, 1891. Serial No. 391,569. (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.

This invention relates, particularly, to mechanism for treating tin-plate after it has been removed from the ordinary bath of molten tin.

The object of the invention is to provide means for preventing the tin from forming upon the plate in uneven thicknesses. In other words, it is sought to prevent the tin from settling to or toward one edge of the plate after the latter has been removed from the bath and before the tin taken by said plate in the bath has become cooled sufficiently to harden. 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. This uneven distribution of the coating of tin is objectionable, because it makes the plate itself defective. Such plate is difficult to work. In stamping can or box ends from such plate the dies cannot encroach upon the selvage edge of the plate. Hence there is waste of the plate, and if the dies do encroach upon such selvage edge they are frequently strained and broken, and if they are not broken the burr or flange formed on the end cut from the plate is made too long, and this extra length of burr then interferes more or less with the easy working of the end in the subsequent steps leading to the complete can or other piece of tinware made from the plate. In view of the foregoing, consumers of tin-plate have found it necessary to feed the plates into the stamping-machine in such manner as to leave the selvage edge uncut; but operatives frequently make the mistake of presenting the selvage edge to the stamping-dies and then there is trouble. To make sure of forestalling these accidents some consumers cut the entire selvage off before attempting to use the plates. Furthermore, when this selvage edge is allowed to form the quantity of tin required to sufficiently cover the body of the plate is much greater than would be required were the distribution even. The commercial value of tin is high, and this excess required for properly coating the plate by this defective process involves a great loss to the manufacturer. I overcome this difficulty by alternating the elevation of the edges of the plates during the period of time intervening between the withdrawal of the plates from the bath and the cooling of the tin upon the plates sufficiently to harden, as will appear hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of an apparatus embodying my improvement. Fig. 2 is a plan of the same. Figs. 3, 4, and 5 are details of the plate-holders. Fig. 6 shows an alternate form of guide for the plate-holders. Figs. 7, 8, 9, 10, 11, and 12 show a modification of the mechanism.

A A, Figs. 1 and 2, are parallel endless chains separated a suitable distance and extending around the vertical wheels B B, supported on shafts B′ B′.

C C are plate-holders adapted to receive the metal plates as they come from the bath. These plate-holders may be formed in a variety of ways; but I deem it necessary to show only one form. C′ is the lower section of said holder, and $C^2$ is the upper section of said holder. These sections are each in the form of a parallelogram, and each has on the face which is to meet the other, preferably along the margin, several points S, of slate or other material which is repellent to molten tin, rising equal distances above the other portions of said sections. The sheet when com-

ing from the bath is laid upon the slate points S of the section C′, and the section $C^2$ is then folded upon the section C′ so that the slate points S of the section $C^2$ bear upon the plate above the slate points of the section C′, as shown in the upper portion of Fig. 1. The object of the repellent points S is to prevent the adhesion of the molten tin to any portion of the holders. I prefer to so place said points that they will bear only upon the margins of the tin-plate, to the end that the tin coating upon the body of the sheet may not be disturbed. The impressions made by said points at the margins or edges of the plate will usually be cut away as waste in working the plate into sheet-metal ware. Another reason for so placing said points as to bear upon the edges of the plate is that the plate is thus the better supported. Tin-plates are usually thin, and if they were not thus held by the edges, but by the middle instead, they would collapse or fold upon each other. Each holder rests between the chains A A, and is supported thereon by a shaft D, extending into bearings A′ in the chain A.

It is obvious that instead of extending the shaft B from one chain A continuously to the other of said chains short sections of said shaft may be attached one to each side of the lower section of the holder C and extended into or through the bearing-links A′ of the chain A. This is the same in principle, the lower section of said holder becoming in effect a part of the shaft D. When the shaft D is made distinct from said section, it may be attached to said section in any suitable manner, as by extending it through ears D′, extending downward from the lower side of said section, as shown in the drawings. In this case the said section C′ should be prevented from rotating upon the shaft D by set-bolts $d^2$, extending through said ears D′ or otherwise.

The chains A are preferably continuously in motion in the direction indicated by the arrows by power suitably supplied, as by a band-wheel $B^2$, mounted upon the shafts B′ of the wheels B, and while the chains are thus in motion the holders C should continuously change their inclination until the plates carried thereby are cooled sufficiently to harden.

At one side of the pair of chains A is located a rack E, having in its side toward said chains a channel E′, which is undulating, particularly opposite the upper portion of said chains, and from the adjacent end of the shaft D a crank $D^2$ extends rearward and outward into the channel E′. It will be seen that the outer end of said crank will move up and down as the holders progress, whereby the holder is oscillated. When the holder has passed over the upper portion of its circuit, it turns with its mouth downward in going around the wheels B until the section C′ of the holder is turned bottom side up and the section $C^2$ has fallen away from the section C′ into a vertical position, as shown in Fig. 1. By this automatic opening of the holder the tin-plate is discharged. Said section $C^2$ remains in its vertical position until the holder passes around the wheels at the opposite end of the machine, and then in going around said wheels it assumes the position shown in Fig. 3, it being prevented from falling backward by a lug $C^3$ or otherwise. When the holder has assumed this position, it is ready to receive a new plate, and when such plate has been placed upon such lower section the upper section is to be thrown forward manually or automatically.

The drawings show an arm $C^4$, extending downward from the section $C^2$ below the hinge by which said section is joined to the lower section, and a stop $E^2$ is mounted upon the rack E so as to extend into the path of said arm a little before the section C′ is changed from the horizontal position at the right end of the machine, whereby said arm is tripped and the section $C^2$ thrown forward upon the plate lying upon the section C′.

At the right end of the machine the upper portion of the channel E′ is to be horizontal and of proper elevation to hold the extension C′ in the horizontal position, in order that said holder may receive the plate. If the plate be placed upon the holder with the edge coming last out of the bath directed rearward, the channel E′ should then rise and proceed a short distance in the horizontal position, so as to elevate the crank $D^2$ and the rear edge of the tin-plate a sufficient length of time to reverse the flow of tin upon the plate. Thereafter the channel E should reach above and below the height required for bringing the holder into the horizontal position until the left end of the machine is reached.

It is to be understood that the guide for controlling the inclination of the plate-holder is not necessarily in the form of a channel. It may be a flange or bar with two wheels supported by the crank $D^2$, bearing on each side of said flange or bar, as shown in Fig. 6.

In the form of mechanism illustrated by Figs. 7, 8, 9, 10, 11, and 12 the endless parallel chains A A are used as in the other form, and they are mounted upon wheels B B, supported by shafts B′ B′; but the plate-holders C C are arranged in a vertical instead of a horizontal 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 said 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 of the machine, so as to draw the holder-sections at one side only. 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, as described of the holders illustrated in Figs. 1 and 2. Furthermore, a pin P should extend through both sections of the holders 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. 8, 9, and 10. The edge of the holder bearing these points is to stand lowermost when the the plate is inserted, so that said plate may be allowed to rest upon said pins until the holder is clasped or closed. Thus said pins constitute rests between said sections. Automatic means for bringing this edge of each plate-holder into the lowermost position, as 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 by Figs. 7, 8, 9, 10, 11, and 12 the chains A A are normally stationary, so that the plate-holders are normally non-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 F is located an endless sprocket-chain F′, parallel to the chain A and at such height as to engage the sprocket-wheel F. 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 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 to always 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 shaft 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 axes 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 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 C 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 upon 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 $G^2$ 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 sheet of 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 $G^4$ away from the wheel $G^2$ when the next holder C has been carried to the position for receiving a 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 C reaches the point at which it is to receive a plate.

I claim as my invention—

1. A holder for treating a metal plate coated with molten metal, said holder being of proper size to extend to the several edges of the plate and having opposing slate points along its margins only to bear upon said plate at its edges, substantially as shown and described.

2. A holder for treating a metal plate coated with molten metal, said holder being of proper size to extend to the several edges of the plate and having opposing slate points to bear upon said plate at its edges, substantially as shown and described.

3. A holder for treating metal plate coated with molten metal, which holder consists of two separable sections having opposing slate points along their edges only, substantially as shown and described.

4. In a machine for treating metal plates coated with molten metal, the combination of a holder for receiving and retaining such a plate, said holder being of proper size to extend to the several edges of the plates and having opposing points to bear upon said plate at its edges, and means for alternating the elevation of the edges of said holder, whereby the edges of said plate are alternately elevated, substantially as shown and described.

5. In a machine for treating metal plates coated with molten metal, the combination of a holder for receiving and retaining such a plate, said holder being of proper size to extend to the several edges of the plates and having opposing points to bear upon said plate at its edges, means for alternating the elevation of the edges of said holder, whereby the edges of said plate are alternately elevated, and means for simultaneously progressing said holder and alternating the elevation of its edges, substantially as shown and described.

6. In a machine for treating metal plates coated with molten metal, the combination of a holder composed of two separable sections for receiving and retaining such a plate, said holder being of proper size to extend to the several edges of the plates and having opposing points to bear upon said plate at its edges, and means for alternating the elevation of the edges of said holder, whereby the edges of said plate are alternately elevated, substantially as shown and described.

7. In a machine for treating metal plates coated with molten metal, the combination of holders for said plates, said holders being of proper size to extend to the several edges of the plates and having opposing points to bear upon said plate at its edges, an endless carrier supporting and carrying said holders, and means for alternating the elevation of the edges of said holders, substantially as shown and described.

8. In a machine for treating metal plates coated with molten metal, the combination of holders for receiving the plates, such holders being composed of separable sections, said holders being of proper size to extend to the several edges of the plates and having opposing points to bear upon said plate at its edges, means for closing the sections together after receiving the plate, and means for separating said sections to discharge the plates, substantially as shown and described.

9. In a machine for treating metal plates coated with molten metal, the combination of holders for receiving said plates, an endless carrier supporting and carrying said holders, and means for turning and retaining said holders in a chosen radial position at the beginning of the circuit which they traverse and thereafter alternating the edges of said holders, substantially as shown and described.

10. In a machine for treating metal plates coated with molten metal, the combination of the holder composed of two separable vertical sections mounted in horizontal bearings, said

holder being of proper size to extend to the several edges of the plates and having opposing points to bear upon said plate at its edges, and means for rotating said holder, substantially as shown and described.

11. In a machine for treating metal plates coated with molten metal, an endless carrier, vertical rotatable holders having suitably-spaced points for bearing upon the edges of the metal plate, and means for rotating said holders, substantially as shown and described.

12. In a machine for treating metal plates coated with molten metal, the combination of holders for receiving the plates, such holders being composed of vertical separable sections supported in horizontal bearings, said holders being of proper size to extend to the several edges of the plates and having opposing points to bear upon said plate at its edges, means for closing the sections together after receiving the plate, and means for separating said sections to discharge the plates, substantially as shown and described.

13. In a machine for treating metal plates coated with molten metal, the combination of holders for receiving said plates, and an endless carrier supporting and carrying said holders, and means for turning and retaining said holders in a chosen radial position at the beginning of the circuit which they traverse and thereafter rotating said holders, substantially as shown and described.

14. In a machine for treating metal plates coated with molten metal, the combination of a holder for receiving and retaining such a plate, means for intermittently progressing said holder, and means for alternately rotating said holder and turning the same into a chosen radial position, substantially as shown and described.

15. In a machine for treating metal plates coated with molten metal, the combination of holders for said plates, an endless carrier supporting and carrying said holders, and means for rotating said holders independently of the movement of said carrier, substantially as shown and described.

16. In a machine for treating metal plates coated with molten metal, the combination of holders for receiving the plates, such holders being composed of separable sections, an endless carrier rotatably supporting and carrying said holders, guides located adjacent to said endless carrier for pressing said sections together when the plates are inserted into said holders, an endless traveling chain for turning said holders on their axes, and means for intermittently progressing said carrier, substantially as shown and described.

17. In a machine for treating metal plates coated with molten metal, the combination of holders for receiving the plates, such holders being composed of separable sections, an endless carrier rotatably supporting and carrying said holders, and an endless continuously-moving chain arranged to enter into suitable engagement with said holders to rotate the latter, substantially as shown and described.

18. In a machine for treating metal plates coated with molten metal, the combination of holders for receiving the plates, such holders being composed of separable sections, an endless carrier rotatably supporting and carrying said holders, an endless continuously-moving chain arranged to enter into suitable engagement with said holders to rotate the latter, and means for intermittently progressing said endless carrier, substantially as shown and described.

19. In a machine for treating metal plates coated with molten metal, the combination of holders for receiving the plates, such holders being composed of vertical separable sections joined to each other at one side by yielding means, an endless carrier supporting said holders in horizontal bearings, means for securing said holders with the open portions upward at a chosen point in their circuit, means for closing said holders upon the metal plates, and means for thereafter rotating said holders independently of said endless carrier, substantially as shown and described.

20. In a machine for treating metal plates coated with molten metal, the combination of holders for receiving the plates, an endless carrier rotatably supporting and carrying said holders, means for engaging and rotating said holders during a portion of the circuit of said endless carrier, and means for turning said holders on their axes into a chosen position prior to reaching said portion of said circuit, substantially as shown and described.

21. In a machine for treating metal plates coated with molten metal, the combination of holders for receiving the plates, said holders having opposing points for engaging the sides of the plates and having at one side rests for supporting said plates before the latter are engaged by said opposing points, an endless carrier rotatably supported and carrying said holders, means for engaging and rotating said holders along a portion of the circuit of said endless carrier, and means for engaging and turning said holders upon their axes to bring said rests into the desired position in advance of said portion of said circuit, substantially as shown and described.

22. In a machine for treating metal plates coated with molten metal, the combination of holders for receiving said plates and an endless carrier supporting said holders, gears on the axes of said holders, and an endless traveling gear extending into a portion of the path of the gears on the axes of said holders, substantially as shown and described.

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

JAMES GOULD, JR.

Witnesses:
CYRUS KEHR,
AMBROSE RISDON.