No. 725,429. PATENTED APR. 14, 1903.

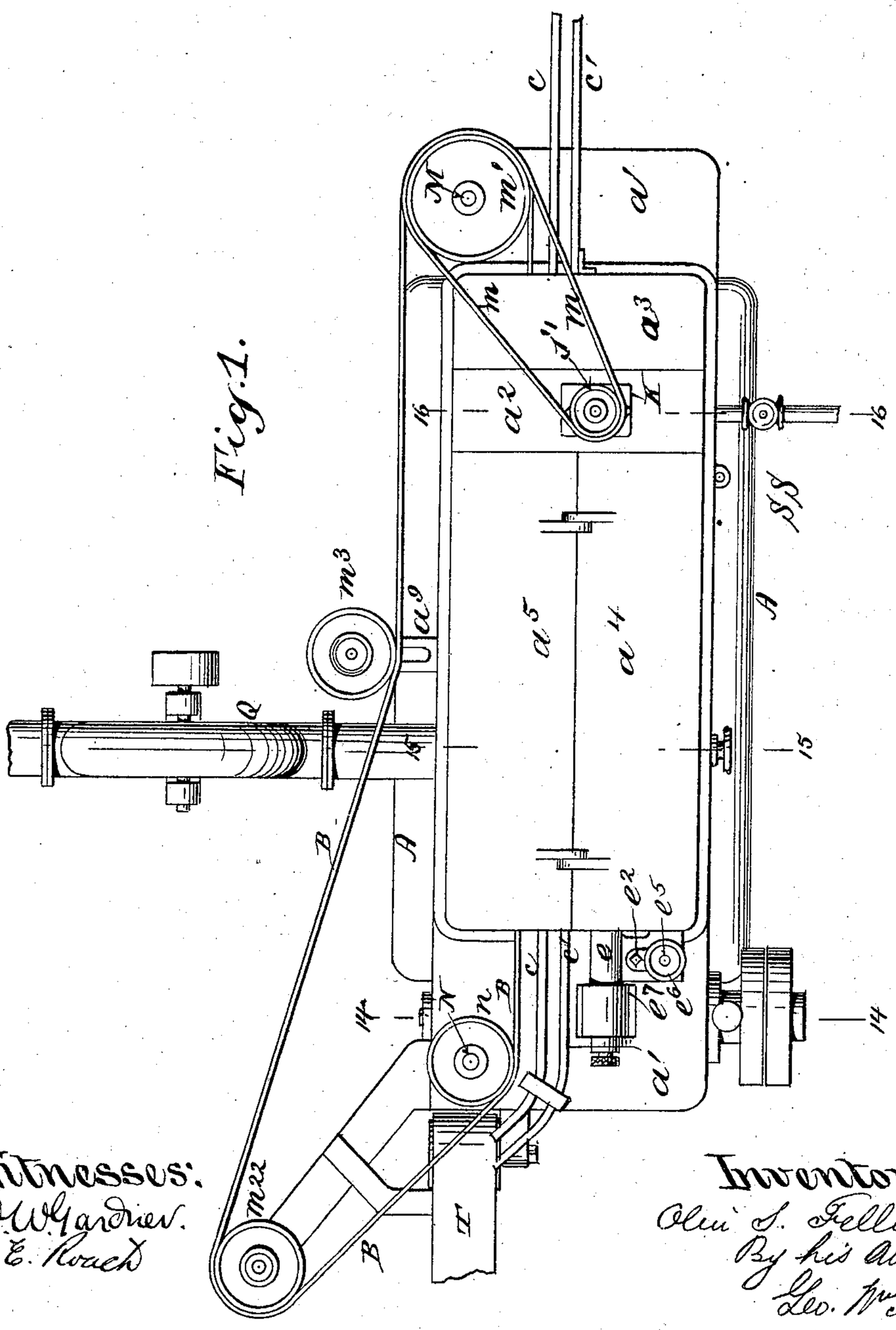
O. S. FELLOWS.

MEANS FOR REMOVING SUPERFLUOUS SOLDER FROM SHEET METAL CANS.

APPLICATION FILED OCT. 17, 1902.

NO MODEL. 7 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
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F. E. Roach

Inventor:
Olin S. Fellows
By his Attorney
Leo. Wm. Matt

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NO MODEL. 7 SHEETS—SHEET 2.

Fig. 4.

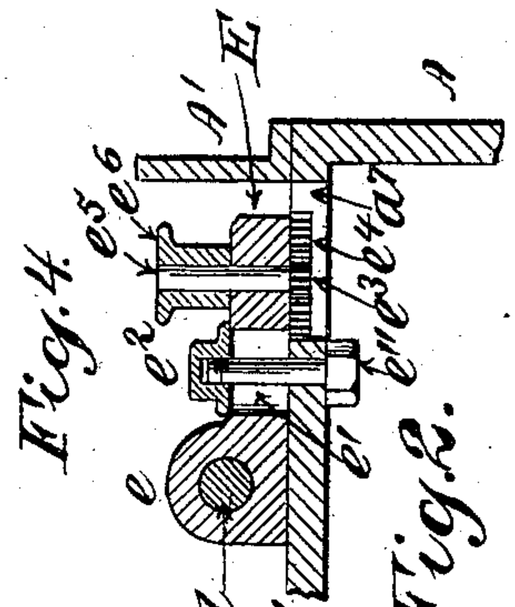
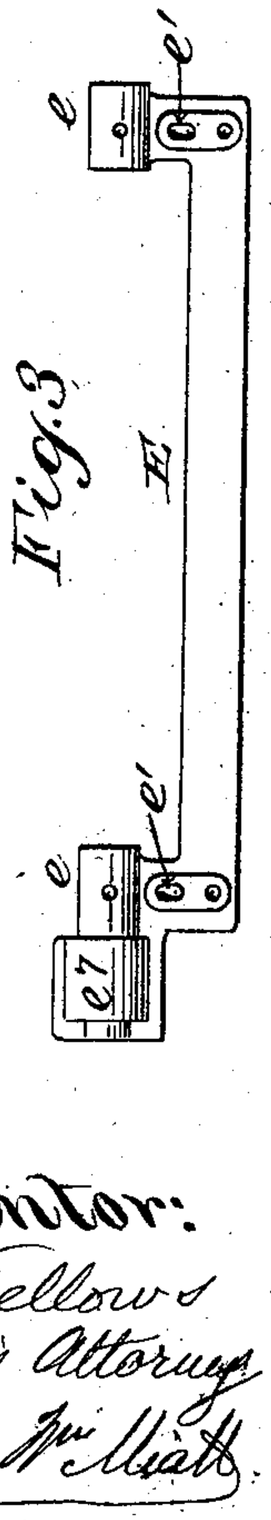


Fig. 2.

Fig. 3.



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NO MODEL. 7 SHEETS—SHEET 3.

Fig. 5.

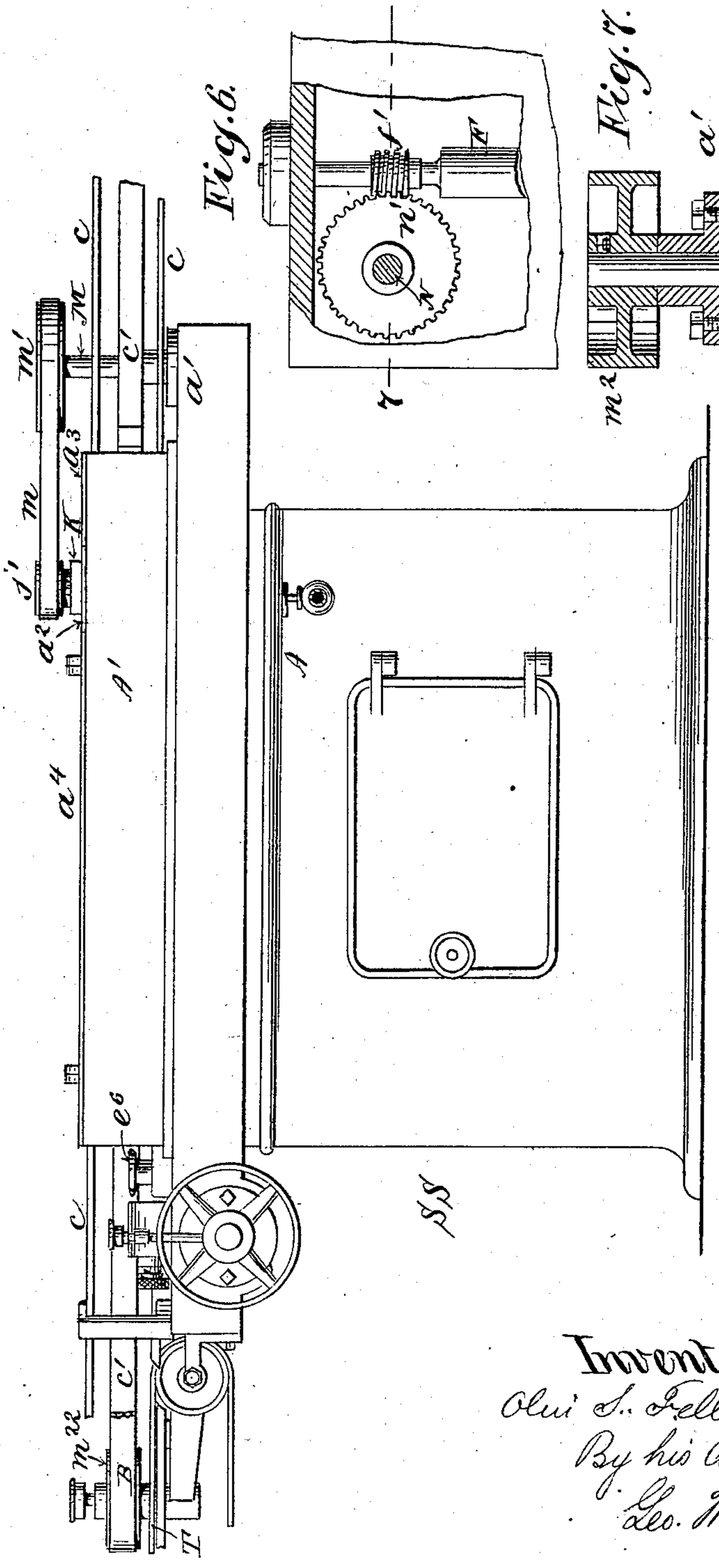
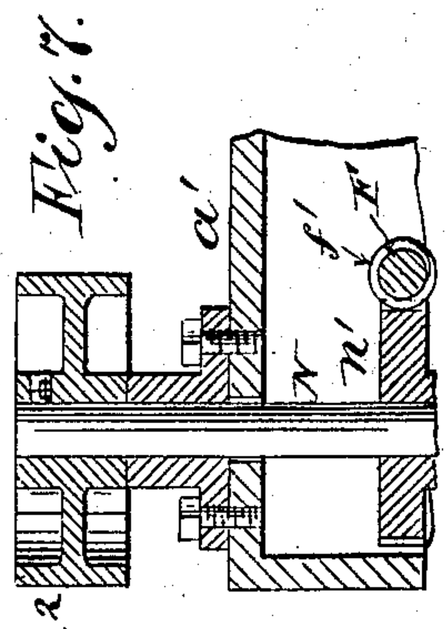


Fig. 6.

Fig. 7.



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NO MODEL. 7 SHEETS—SHEET 4.

Fig. 8.

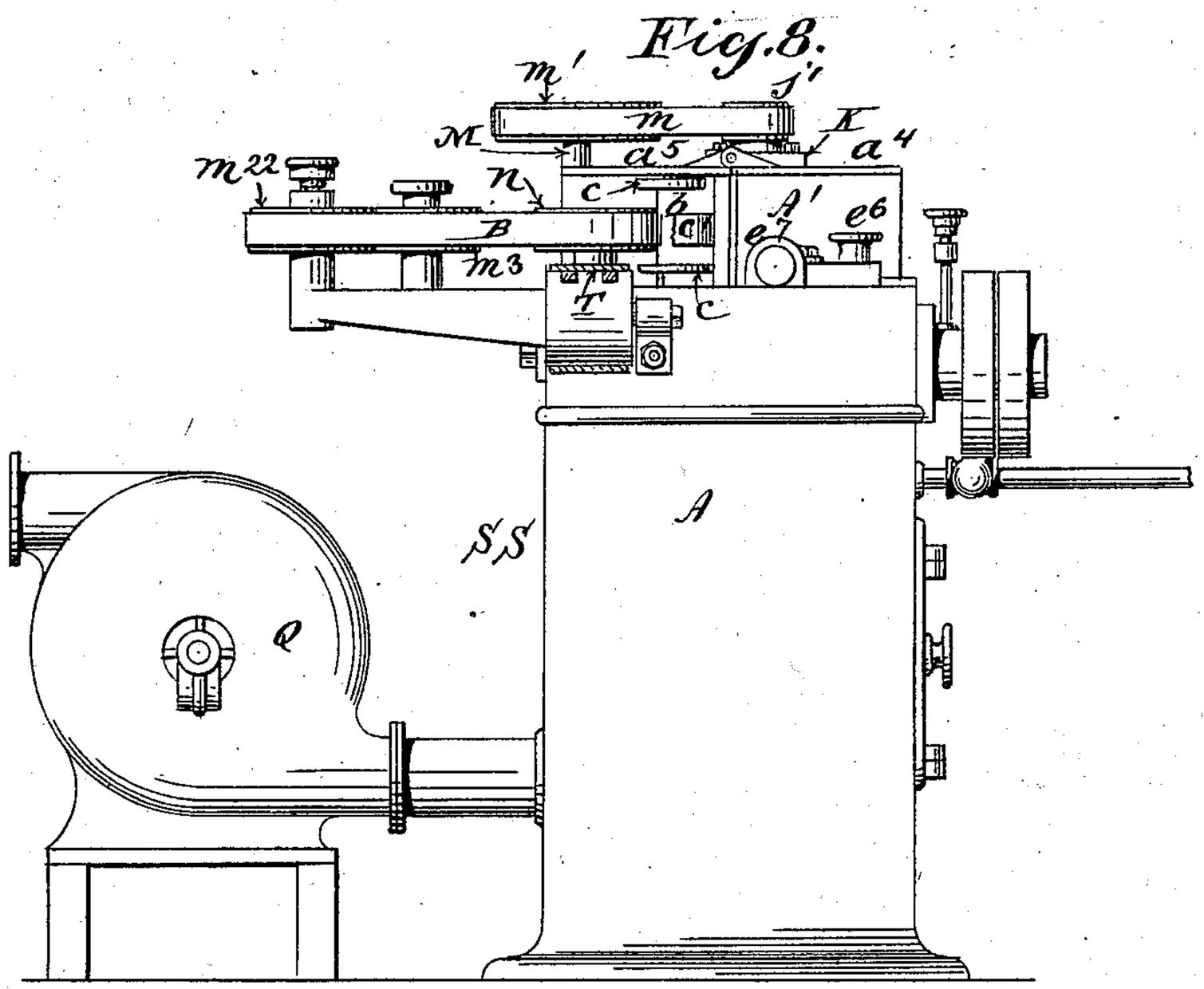
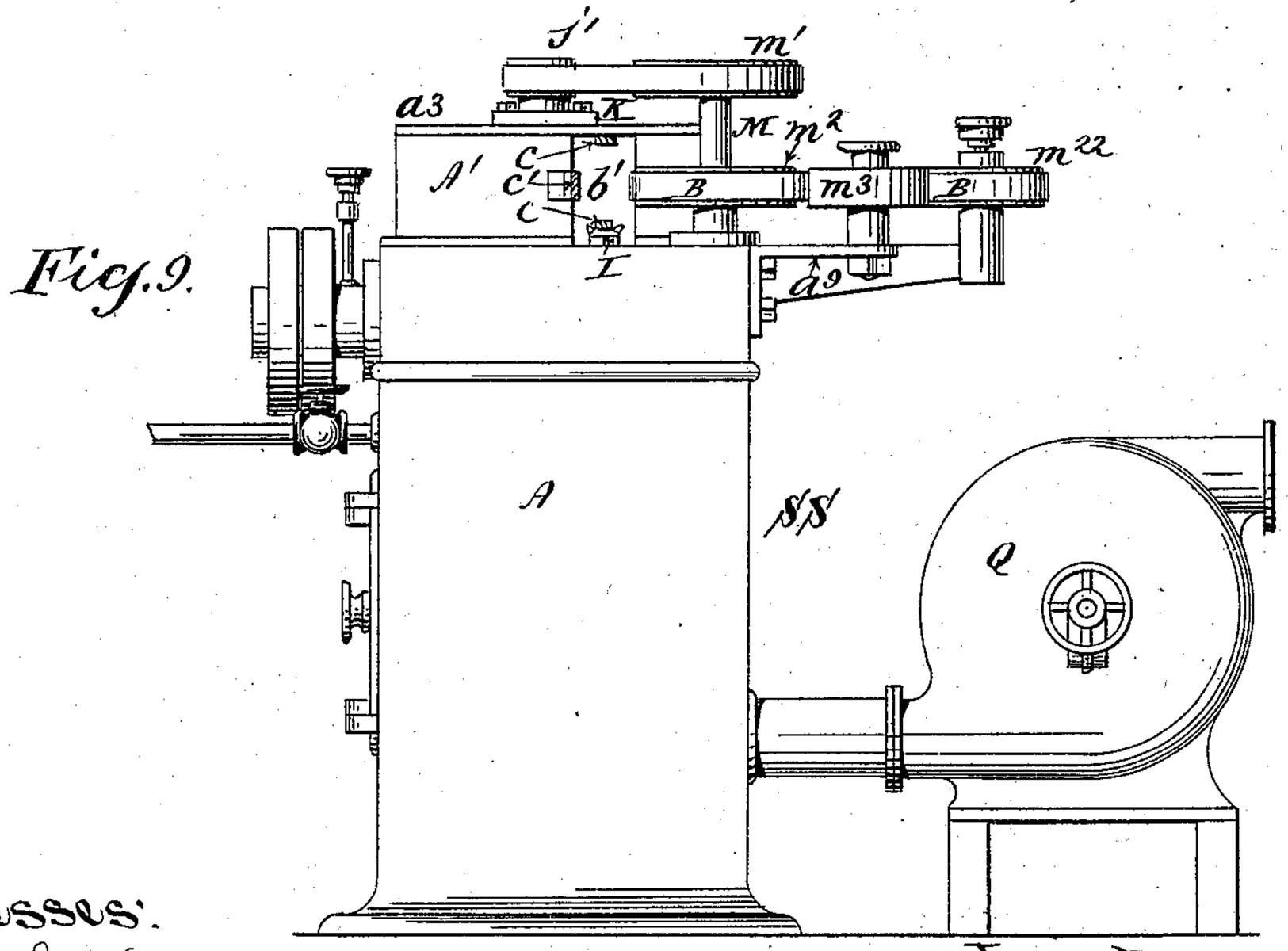


Fig. 9.



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NO MODEL. 7 SHEETS—SHEET 5.

Fig. 10.

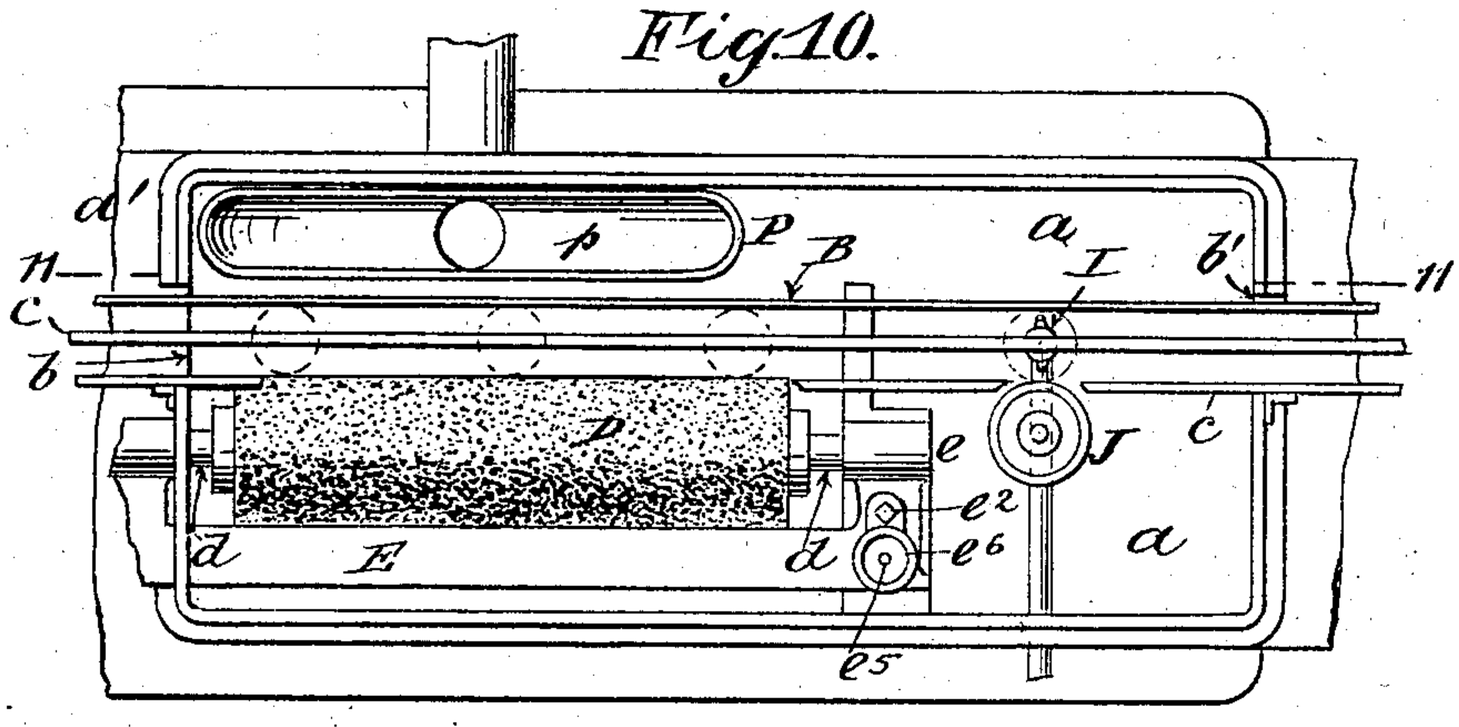


Fig. 11

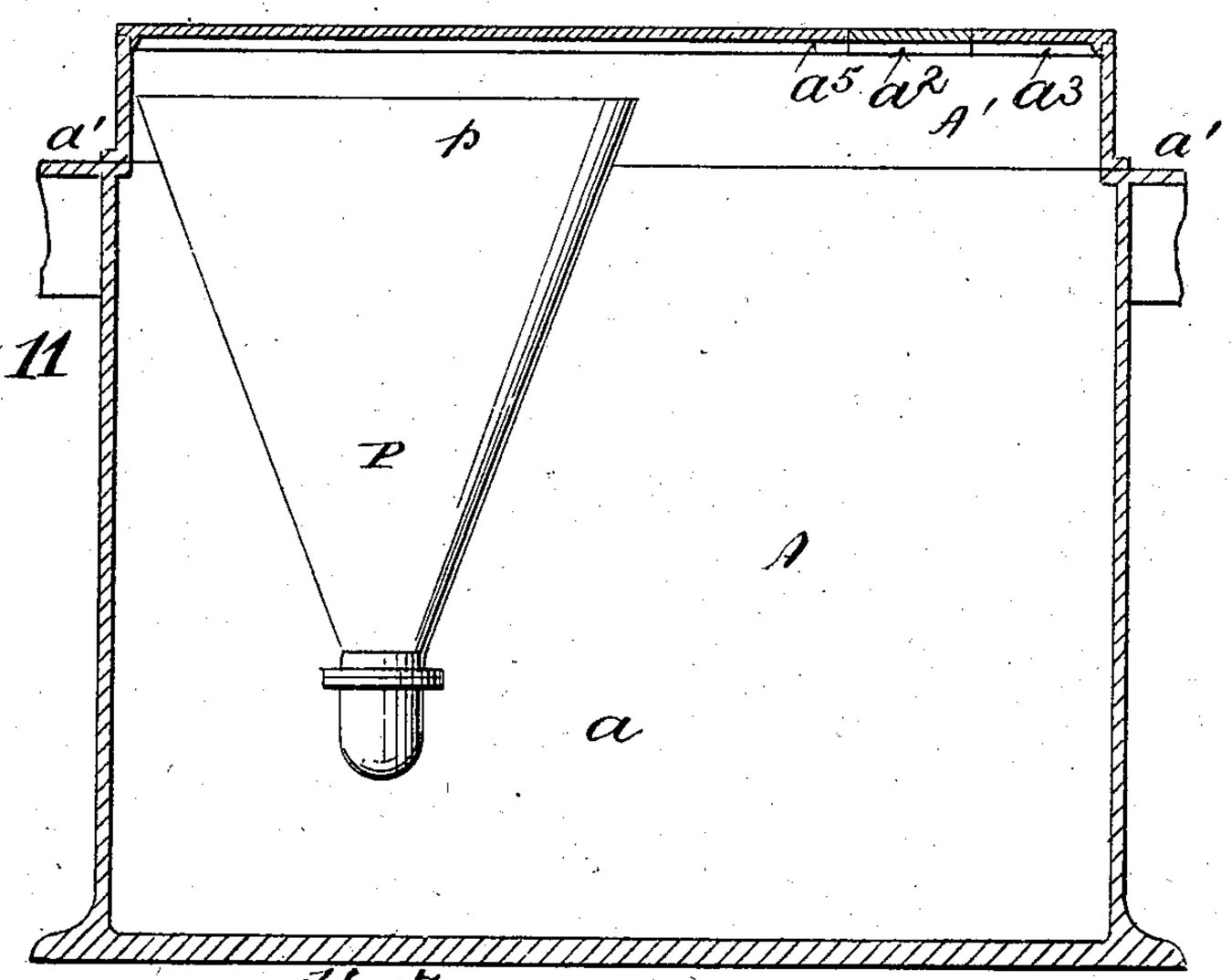


Fig. 12.

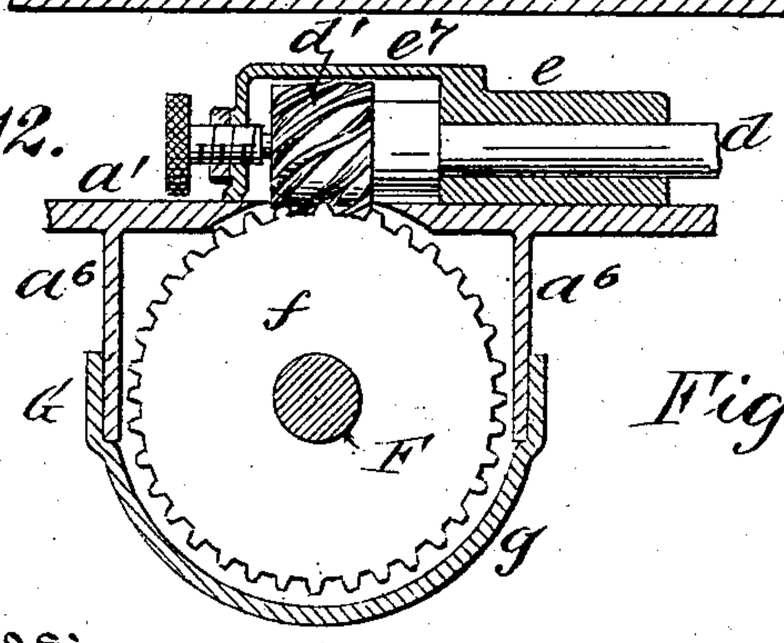
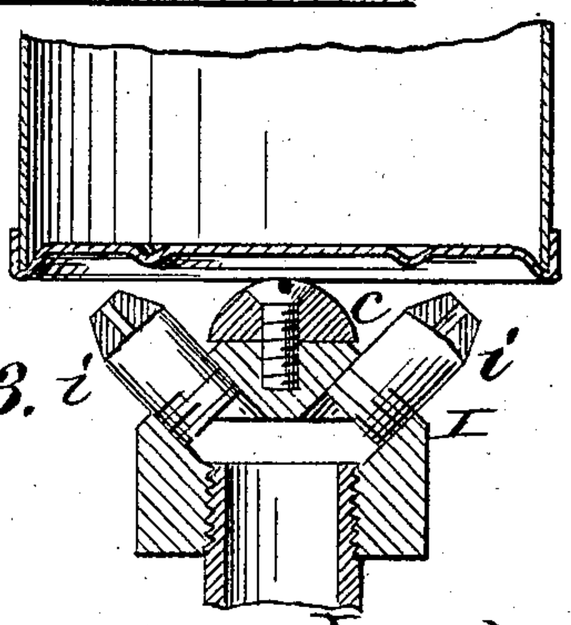


Fig. 13.



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NO MODEL. 7 SHEETS--SHEET 6.

Fig. 14.

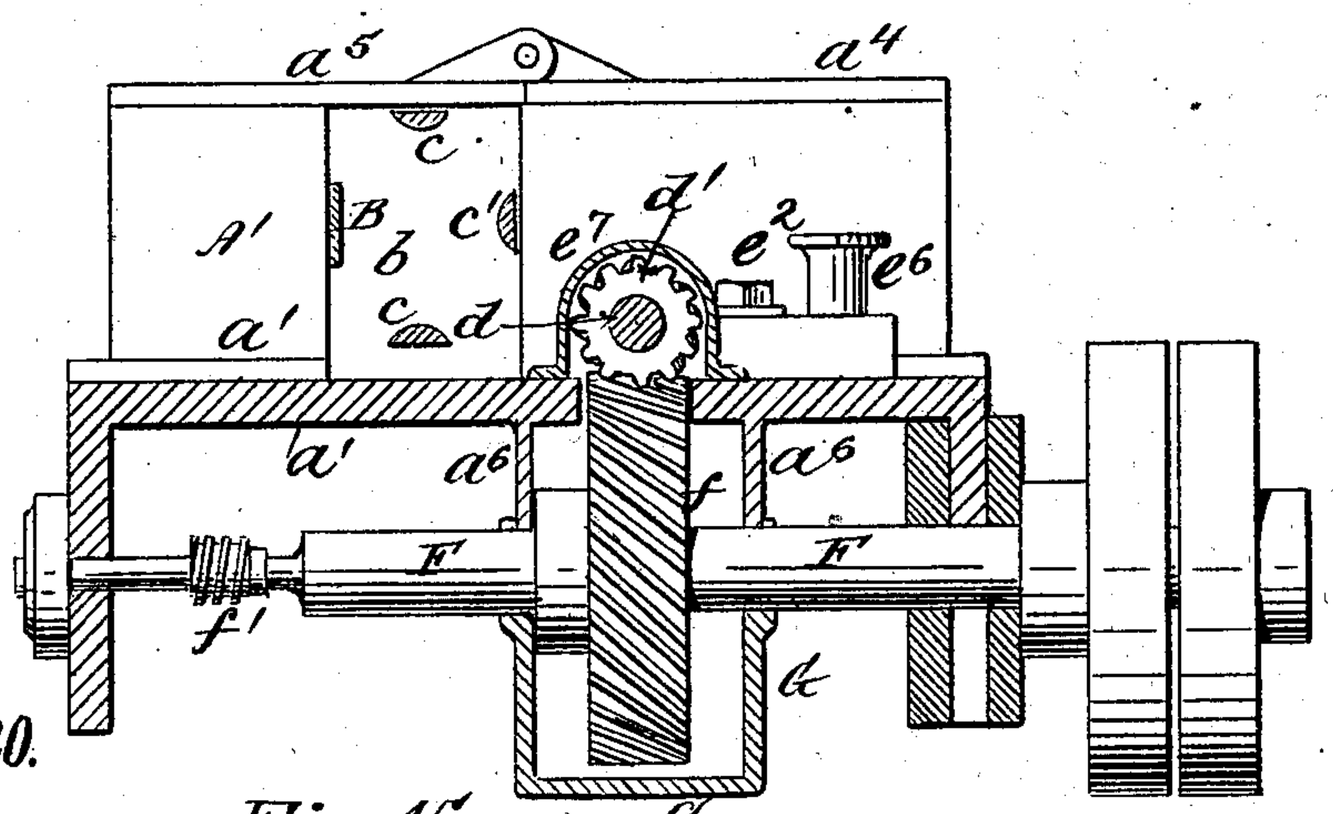


Fig. 20.

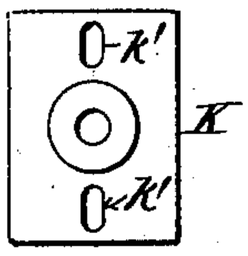


Fig. 15.

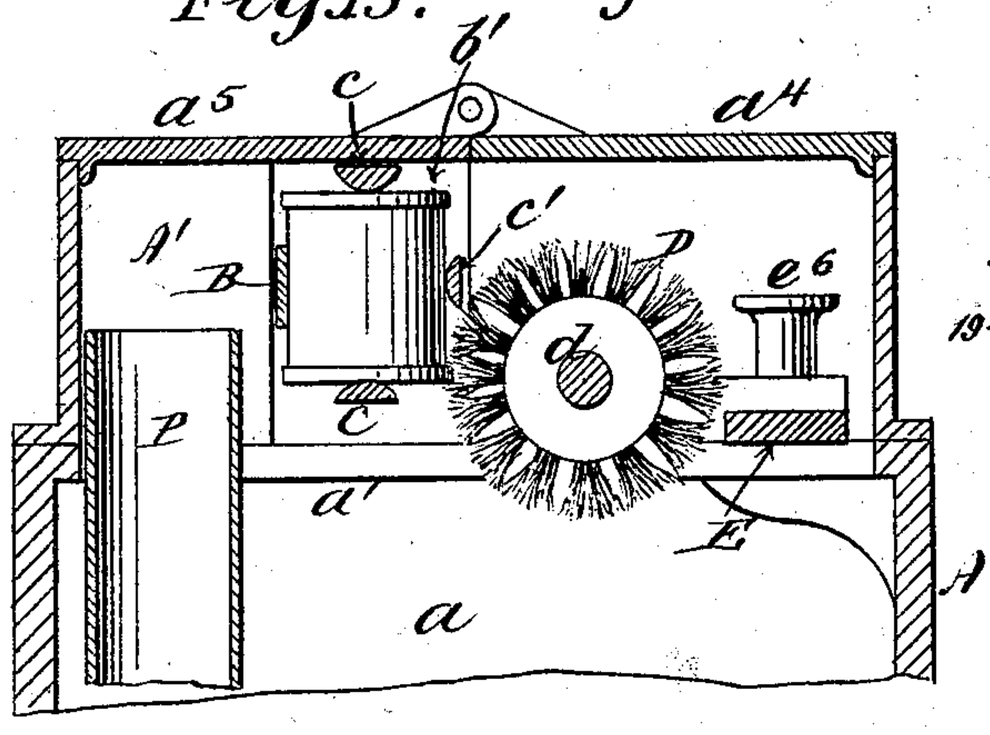


Fig. 17.

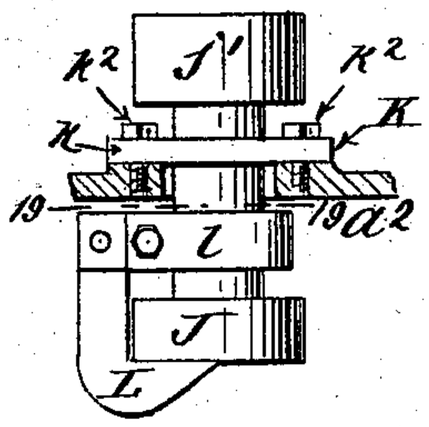


Fig. 19.

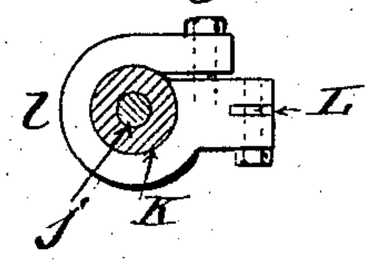


Fig. 18.

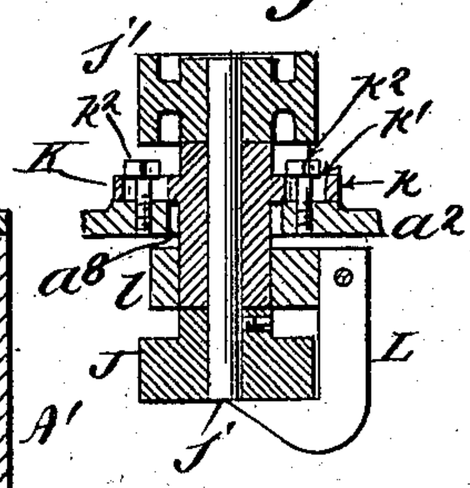
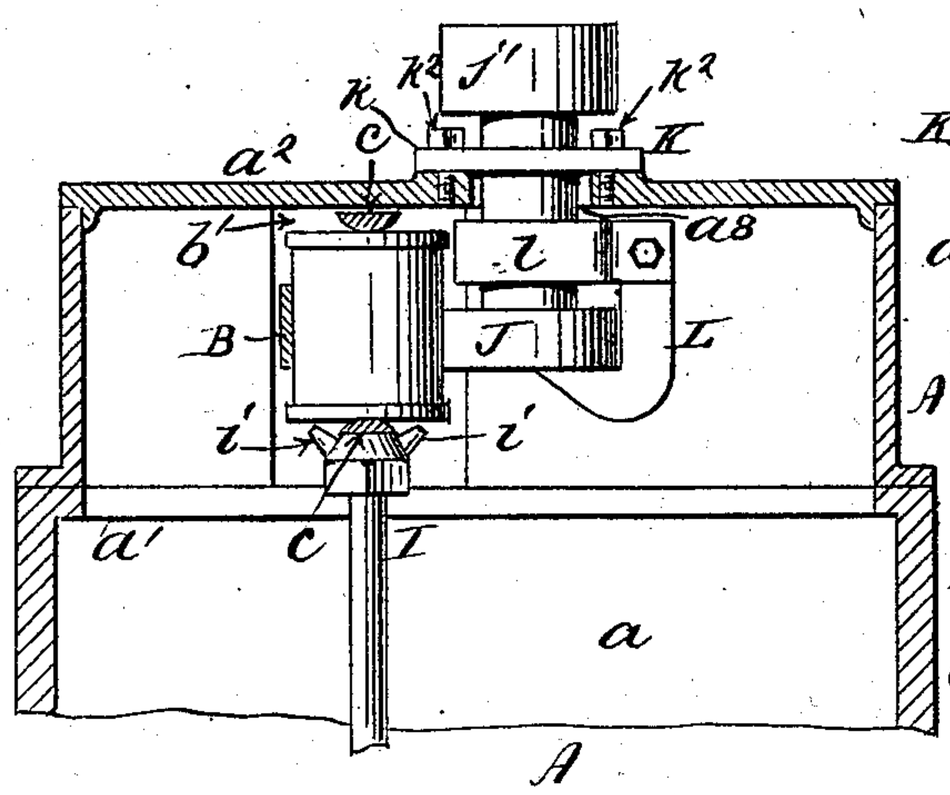


Fig. 16.



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APPLICATION FILED OCT. 17, 1902.

NO MODEL. 7 SHEETS—SHEET 7.

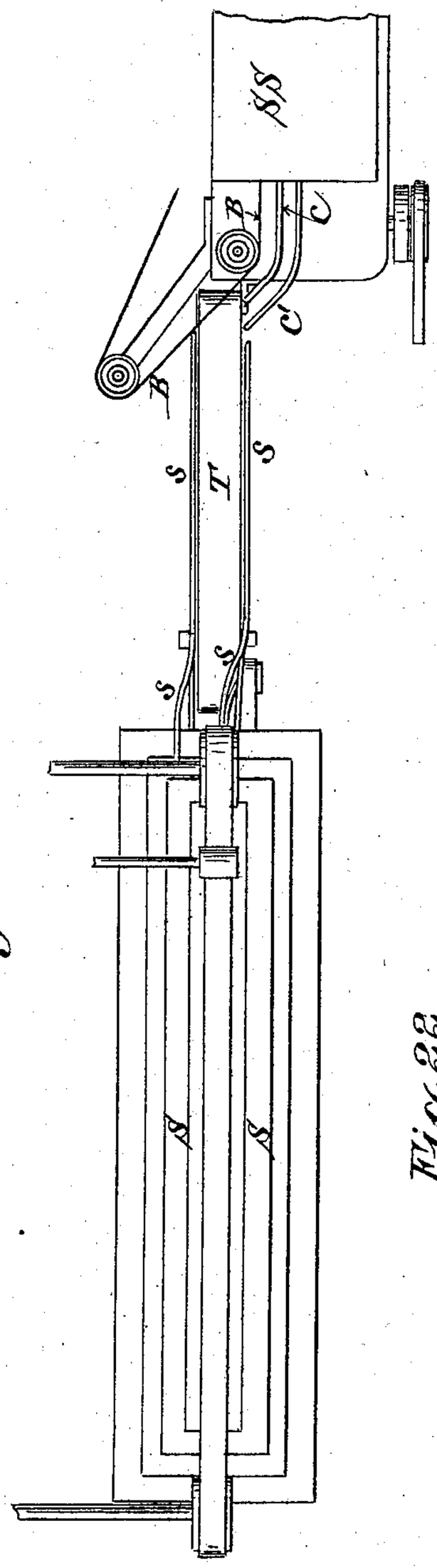

Fig. 21.

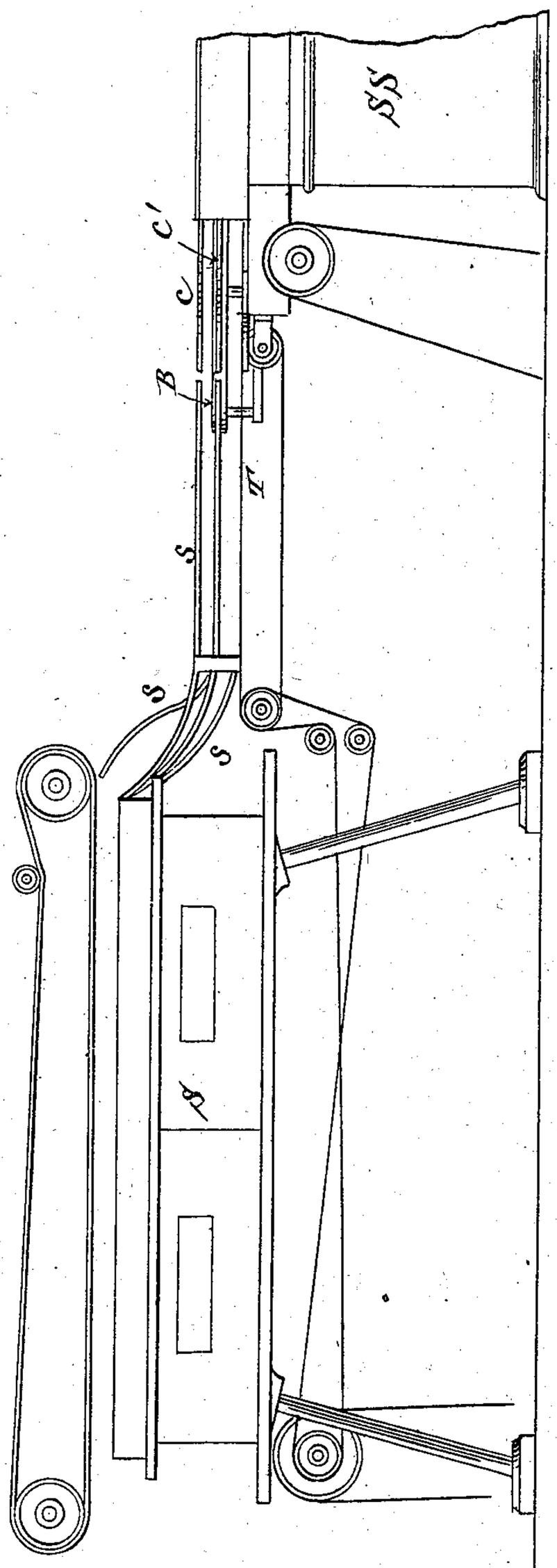

Fig. 22.

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Inventor:
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By his Attorney
Geo. W. Mead

UNITED STATES PATENT OFFICE.

OLIN S. FELLOWS, OF MIDDLETOWN, NEW YORK.

MEANS FOR REMOVING SUPERFLUOUS SOLDER FROM SHEET-METAL CANS.

SPECIFICATION forming part of Letters Patent No. 725,429, dated April 14, 1903.

Application filed October 17, 1902. Serial No. 127,643. (No model.)

To all whom it may concern:

Be it known that I, OLIN S. FELLOWS, a citizen of the United States, residing at Middletown, Orange county, and State of New York, have invented certain new and useful Improvements in Means for Removing Superfluous Solder from Sheet-Metal Cans, of which the following is a specification sufficient to enable others skilled in the art to which the invention appertains to make and use the same.

My invention relates to the class of solder-saving apparatus set forth in my Letters Patent Nos. 586,966 and 586,967, dated July 27, 1897, and Nos. 595,704 and 595,705, dated December 21, 1897; and it consists, essentially, in the special construction and arrangement of parts herein set forth and claimed specifically.

In the accompanying drawings, Figure 1 is a plan of my improved apparatus with covers in place. Fig. 2 is a similar view with covers removed; Fig. 3, a detail view of the adjustable yoke-bearing, in which the brush is mounted. Fig. 4 is a sectional detail taken upon a larger scale upon plane of line 4 4, Fig. 2. Fig. 5 is an elevation of the apparatus. Fig. 6 is a detail view showing the gearing for transmitting motion to the forwarding-belt; Fig. 7, a detail section on plane of line 7 7, Fig. 6. Figs. 8 and 9 are respectively elevations of opposite ends of the apparatus. Fig. 10 is a top view of a portion of the apparatus, illustrating the operation of removing superfluous solder from the cans. Fig. 11 is a longitudinal vertical section upon plane of line 11 11, Fig. 10. Fig. 12 is a detail, upon a larger scale, of the spiral gearing by which the brush is actuated. Fig. 13 is a sectional view illustrating the construction and operation of the fluid-pressure nozzle. Fig. 14 is a sectional elevation upon plane of line 14 14, Fig. 1; Fig. 15, a sectional elevation upon plane of line 15 15, Fig. 1; Fig. 16, a sectional elevation upon plane of line 16 16, Fig. 1. Fig. 17 is an elevation of the retarding-wheel and its solder-stripper; Fig. 18, a sectional elevation of the same; Fig. 19, a transverse section upon plane of line 19 19, Fig. 17; Fig. 20, a top view of the adjustable bearing for the retarding-roller shaft. Fig. 21 is a top view, and Fig. 22 a side view, of adjoining portions of the soldering apparatus and the solder-saving apparatus, between which is interposed my special arrangement of transferring device.

A is the main supporting-frame of the solder-saving apparatus, made in the form of an elongated base or box, the bottom and sides of which are continuous, so as to constitute a chamber a, which is partly inclosed at top by the table a', upon which is secured the extension-chamber A', fitting over the opening in the table a' and closed by a cross-plate a^2 and covers a^3 a^4 a^5. The end walls of the extension A' are formed with opposed openings or inlet and outlet ports b b', between and through which the parallel can-supporting rails c c' extend, the cans being delivered to said rails from the soldering-machine by an endless belt B or other suitable feed mechanism.

Mounted upon the table a' within the extension-chamber A and parallel to the rails c c' is a cylindrical brush D. The accurate alinement of this brush with relation to the rails c c' is of special importance, since an even uniform pressure of the brush upon all the cans passing it on the rails is essential in order to attain the best results. For this reason I mount the journals of the brush-shaft d in bearings e e, formed in a yoke E, which is secured adjustably upon the table a'. It is obvious that the adjustment of this yoke E with relation to the rails c c' may be effected by the employment of various mechanical expedients. In the drawings the bearing-heads are formed with slots e' e', through which protrude bolts e'' e'', engaging with screw-caps e^2 e^2, by which the bearing-heads and yoke E as a whole may be clamped to the table. In order to facilitate the delicate adjustment of the yoke E and brush D with accuracy, I prefer to employ a pinion e^3 and rack e^4, the latter being formed or let into the sides of slots a^7 in the table a', and the engaging pinions e^3 being attached to arbors e^5 e^5, passing through the bearing-heads of the yoke, and having handles e^6, by which the pinions may be turned upon the racks to slide the yoke and brush back or forth more or less as may be required in actual use. In order to admit of this adjustment of the brush and yoke with relation to the rails c c' and at the same time to insure a steady even speed

and pressure, I operate the brush-shaft d by means of spiral pinion d', secured to said shaft, and a spiral driving-wheel f upon the power-shaft F, as will be seen clearly by reference to Fig. 14. This form of gearing imparts a positive even speed to the brush, while allowing the pinion d' to adapt itself to any reasonable adjustment of the yoke and brush D. It also admits of the inner or receiving end of the brush to be independently forwarded slightly from time to time to compensate for the comparatively high degree of wear to which said receiving end is subjected in use as compared with the opposite or discharging end of the brush.

The spiral gear f is inclosed in a casing G, consisting of the box-shaped flange a^6, projecting downward from the table a', and the cup-shaped segment g, fitting upon said flange a^6, the chamber G thus formed constituting a receptacle for the lubricating-oil which is used to insure smoothness in the running of the brush at a high rate of speed, preferably as high as eighteen hundred revolutions per minute. The spiral pinion d' is also inclosed by a cap e^7, preferably forming a part of the yoke E, so that the oil thrown off by the pinion is intercepted and returned to the chamber G.

I have devised the means for mounting and running the brush as herein set forth for the express purpose of attaining and maintaining a uniform speed and brush-pressure, so that the cans will be spaced and treated uniformly as they pass under the action of the brush. In this connection it is to be noted that the cans while acted upon by the brush are in contact with the supporting-rails c c', particularly the central rail c', opposed to the forwarding-belt B. I have heretofore opposed a movable retarding-surface to the forwarding-surface, the said retarding-surface traveling in a direction opposite to that of the forwarding-surface. In the present case I use a stationary retarding-surface, over which the cans roll while in contact with the brush. As a result the sides of the cans in immediate contact with the brush move slower than the sides in actual contact with the forwarding-surface B. In other words, the cans practically roll along the brush, in contradistinction to my old method of attaining a relatively high speed of axial rotation by passing the cans between surfaces traveling in opposite directions. As a consequence the efficiency of the brush is increased, and one of less length may be used with like result.

Situated a short distance beyond the brush is the "vapor-blast" I, by means of which steam or other fluid or gas is caused to impinge against the inner edge of the end-plate flange of each can as it passes. I am aware that I have heretofore used steam for blowing off excess of solder from the bottoms or end plates of a can, as set forth in my Patents Nos. 595,704 and 595,705, hereinbefore referred to.

The novelty in the present case consists in treating the cans with the vapor-blast immediately after they leave the brush and in using a plurality of diverging nipples or jets, which simultaneously eject steam or other fluid against the inner edge of a can. In the first place the brush is relied upon to remove the excess of solder from the cylindrical sides of the can, including the peripheral flange of the end plate, and this it does thoroughly, excepting that it leaves a slight edge of solder upon the apex or extreme edge of the end plate, where it is bent over to receive the edge of the cylindrical body of the can. This sweeping is removed by the vapor-blast, which thus supplements the action of the brush and completes the cleaning operation as a whole, the blast not only driving off the excess of solder taken up by the under side of the end plate in the solder-bath, but also removing the ridge or fringe of solder forced to and left upon the extreme edge of the can by the action of the brush, and thus performing the function of a finishing-wiper. The other feature of novelty relating to the vapor-blast—namely, the employment of a plurality of nipples or jets—is designed not only to have one jet or nipple counterbalance the action of the other, but also to expedite the removal of excess of solder from the bottom of the end plate. Where one or more jets are arranged to cause the steam to impinge upon one side or point of the can only, the pressure of the blast tends constantly to impair the perfect alinement of the can on the rail. Furthermore, the can has to make a complete revolution upon its axis before it can be forwarded from the blast, thus limiting the speed and capacity of the apparatus as a whole. I obviate these objections by my improved plurality blast I, arranged centrally with relation to the axis of the can to be treated and formed with two or more diverging nipples i i, which are set to eject the steam or other fluid against opposite sides of the exterior of the end plate, as will be understood by reference to Figs. 13 and 16. In this manner the action of one nipple i counterbalances the action of the other, and there is no tendency to force the can out of position on the supporting-rails. If two nipples i i are employed, as shown, it is obvious that the whole circumference of the end plate will be treated during one-half a revolution of the can upon its axis, thus admitting of the forwarding of the can in one-half the time heretofore required, and thereby doubling the capacity of the apparatus, provided that the latter is speeded accordingly.

The cans are held successively over the nozzle I by a retarding-wheel J, opposed to the forwarding-surface, as in my last patent hereinbefore referred to. This retarding-wheel has a peripheral speed less than the speed of the forwarding-surface, the speed being regulated to discharge the can at a prescribed time after its contact with the retarding-

wheel, for it is obvious that three or even more nipples *i i* may be arranged at equidistant points and angles, so as to treat the entire circumference of the end plate in one third, fourth, or other desired portion of a revolution of the can upon its axis, the speed and capacity of the apparatus being thereby correspondingly augmented.

The retarding mechanism is of special construction, consisting of the contact-wheel J, suspended upon the lower end of a spindle *j*, to the upper end of which is secured the pulley *j'*, the spindle *j* rotating in a sleeve or bearing K, which is adjustable upon the cross-plate a^2 with relation to the rail *c'* and to the blast-nozzle I. Thus in the drawings the bearing K projects through an elongated opening a^8 in the cross-plate a^2, on which it is supported by its flange *k*, the latter being formed with slots *k' k'* for the passage of bolts k^2 k^2, screwing into the cross-plate a^2, so that the bearing K may be secured in a prescribed position and the retarder J adjusted with accuracy with relation to the path of the cans which it is to intercept and detain temporarily.

In order to keep the retarder J free of solder dislodged by the blast from the nozzle *i*, I provide it with a stripper L, which may be attached to any stationary part of the apparatus. I prefer, however, to attach it directly to the bearing K, so that its relation to the retarder J may be maintained when the latter is adjusted as above stated. This I accomplish by securing the stripper-blade L to a collar *l*, provided with means for clamping it to the bearing K, as will be seen by reference to Fig. 19. The pulley *j'* is rotated by a belt *m*, passing over the driving-wheel *m'*, secured to the vertical shaft or spindle M, which also carries a pulley m^2, around which passes the forwarding-belt B. The forwarding-belt B also engages the idlers m^{22} m^3, the latter of which is adjustable upon the bracket a^9, Figs. 1, 2, and 9, to regulate the tension of said belt B, which receives its power from the pulley *n* on the vertical shaft N. The latter is driven by a worm *f'* upon the power-shaft F, said worm *f'* engaging with a spur-gear *n'*, secured to the shaft N.

It will be seen that when the covers a^3 a^4 a^5 are in place all the operative parts excepting the belts are inclosed either in the base A or the extension thereof, A', the inlet and exit ports *b* and *b'* being the only openings through which air is admitted freely. By reference to Fig. 11 it will also be seen that the lower portion of the chamber in the base A constitutes a dead-air space of relatively large area, since the inlet and outlet ports *b b'* are in the end walls of the extension A' and above the table *a'*, and the elongated mouth *p* of the exhaust-funnel P also opens into the extension-chamber A' above the table *a'*.

The exhaust-funnel P is connected with an exhaust-fan Q or any other well-known mechanical expedient for withdrawing the air from the extension-chamber A'. As a result air admitted through the ports *b b'* is drawn across and around the brush D and vapor-blast I and into the funnel P, carrying with it the finer impalpable dust or solder detached from the cans and at the same time creating a partial vacuum or area of low tension in the chamber *a*, into which the heavier particles of solder are precipitated from the induced air-current.

The can-bodies, with the end plates forced thereon, are run through the soldering-machine with their longitudinal axes slightly inclined with relation to the horizontal plane of the solder-bath in such manner that the parts of the joint between end plate and can-body to be soldered are successively submerged below the surface of the solder as the can is rolled over the solder-bath. In its passage through the solder-bath the said joint of the can takes up considerable solder externally; but owing to the nearly-horizontal position of the can when passing over the bath the solder does not always penetrate in sufficient degree between the opposed surfaces of the end-plate flange and the can-body. The joint and adjoining parts of the can are, however, thoroughly heated by the solder-bath, so that the solder taken up by the can remains in a fluid condition for some time after the can is discharged from the soldering-machine; otherwise the means employed by me for removing the superfluous solder from the exterior of the can would be ineffective. Hence in order to facilitate and insure the penetration of a sufficient quantity of the fluid solder into the joint before subjecting the can to the action of my solder-saving mechanism I turn each can into a vertical or substantially vertical position and maintain it in such position while it is being transferred from the soldering-machine to the solder-saving apparatus, so as to utilize the force of gravity in drawing in the solder around the edge of the joint into and between the opposed internal surfaces of the joint. Obviously this transfer of the can in a vertical position from soldering-bath to solder-saving mechanism in a substantially vertical position may be accomplished by various mechanical expedients, and I do not confine myself to the identical form and construction of parts herein described, although the arrangement shown by way of exemplification is simple and practical. Thus in Figs. 21 and 22 the soldering-machine S is formed with discharge-rails *s s*, which turn the cans successively from the inclined position, in which they have passed over the solder-bath, to a substantially vertical position, in which position they are deposited upon the upper surface of the endless horizontal belt T, by which they are transferred, still in such upright position, to the ways *c c'* and forwarding-surface B of the solder-saving apparatus S S.

It is evident that by regulating either the length or speed of the transferring-belt T

gravity may thus be utilized in effecting the flow of solder into the can-joint for the length of time requisite to attain the desired result prior to subjecting the can to the action of the devices for removing the superfluous solder from the exterior thereof.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In solder-saving apparatus, the combination of an inclosing compartment, can-supporting rails extending through the upper part of said compartment, and arranged to support a can in a substantially vertical position, a traveling surface arranged to forward the can along said rails in a substantially vertical position, and a rotary brush situated in said compartment adjacent to and substantially parallel with said supporting-rails and arranged to remove superfluous solder from the substantially vertical cylindrical sides of the can and to precipitate the solder so removed into the comparatively still air in the inclosed lower portion of the said compartment, where the solder will be retained by gravity, substantially as set forth.

2. In solder-saving apparatus, the combination of an inclosed compartment, can-supporting rails extending through the upper part of said compartment, a traveling surface for forwarding cans along said rails, a rotary brush situated in said compartment parallel to said rails and arranged to remove superfluous solder from the cans passing over said rails, and air-exhausting mechanism having an exhaust-flue the mouth of which opens into the compartment in proximity to the can-supporting rails, whereby the superfluous solder removed from the cans by the brush is projected through a comparatively strong induced current of air into the rarefied air in the lower part of the compartment, substantially as set forth.

3. In solder-saving apparatus, the combination of an inclosed compartment, can-supporting rails extending through the upper part of said compartment, a traveling surface for forwarding cans along said rails, a rotary brush situated in said compartment parallel to said rails and arranged to remove superfluous solder from cans passing over said rails, and air-exhausting mechanism having an exhaust-flue the mouth of which opens into the compartment in proximity to said can-supporting rails and on the side thereof opposite to that upon which the rotary brush is situated, whereby the superfluous solder removed from the cans is projected through a comparatively strong current of air drawn across said rails and precipitated into the rarefied air in the lower part of the compartment, substantially as set forth.

4. In solder-saving apparatus, the combination of an inclosed compartment, can-supporting rails extending through the upper part of said compartment, a traveling surface for forwarding cans along said rails, a rotary brush situated in said compartment parallel to said rails and arranged to remove superfluous solder from cans passing over said rails, and air-exhausting mechanism having an exhaust-flue the mouth of which is elongated and opens into the compartment in proximity to, and parallel to, said can-supporting rails, on the side thereof opposite to that upon which the rotary brush is situated, whereby the superfluous solder removed from the cans is projected through a comparatively strong current of air drawn across said rails and precipitated into the rarefied air in the lower part of the compartment, substantially as set forth.

5. In solder-saving apparatus, the combination of an inclosed compartment, can-supporting rails extending through the upper part of said compartment, a traveling surface for forwarding cans along said rails, a rotary brush in said compartment parallel to said rails and arranged to remove superfluous solder from the cylindrical edges of cans passing over said rails, means for projecting steam or other fluid under pressure, against the end plates of the cans after they pass beyond said brush, and air-exhausting mechanism having an exhaust-flue the mouth of which opens into the compartment in proximity to the can-supporting rails whereby the superfluous solder removed from the cans is projected through a comparatively strong induced current of air into the rarefied air in the lower part of the compartment, as set forth.

6. In solder-saving apparatus, the combination of an inclosing compartment, can-supporting rails extending through the upper part of said compartment and arranged to support a can in a substantially vertical position, a traveling surface arranged to forward the can along said rails in a substantially vertical position, means for projecting steam or other fluid under pressure against the lower end plate of the can as it passes over said rails, whereby superfluous solder detached from said lower end plate of the can by the fluid-blast is precipitated into the relatively still air in the inclosed lower portion of the compartment, where it will be retained by gravity, substantially as set forth.

7. In solder-saving apparatus, the combination of an inclosing compartment, can-supporting rails extending through the upper part of said compartment and arranged to support a can in a substantially vertical position, a traveling surface arranged to forward the can along said rails in a substantially vertical position, means for projecting steam or other fluid under pressure against the lower end plate of the can as it passes over said rails, whereby superfluous solder detached from said lower end plate of the can by the fluid-blast is precipitated into the relatively still air in the inclosed lower portion of the compartment, where it will be retained by gravity, and a top rail or support arranged to sustain the can against the action

of the fluid-blast upon the lower end plate of the can while the latter is subjected thereto, substantially as set forth.

8. In solder-saving apparatus, the combination of an inclosed compartment, can-supporting rails extending through the upper part of said compartment, a traveling surface for forwarding cans along said rails, means for projecting steam under pressure against the end plates of succeeding cans as they pass over said rails, and air-exhausting mechanism having an exhaust-flue the mouth of which opens into the compartment in proximity to the can-supporting rails, whereby superfluous solder removed from the cans by the fluid-blast is projected through a comparatively strong induced current of air in the upper part of the compartment into the rarefied air in the lower part of the compartment, substantially as set forth.

9. In solder-saving apparatus, the combination of an inclosing compartment, can-supporting rails extending through the upper part of said compartment and arranged to support a can in a substantially vertical position, a traveling surface arranged to forward the can along said rails in a substantially vertical position, a rotary brush adjacent to and substantially parallel with said supporting-rails and arranged to remove superfluous solder from the substantially vertical cylindrical sides of the can and means for projecting steam or other fluid under pressure against the lower end plate of the can as it passes over said rails, the said brush and the said fluid-blast being arranged to precipitate the solder removed from the can into the comparatively still air in the inclosed lower portion of the said compartment where the solder will be retained by gravity, substantially as set forth.

10. In solder-saving apparatus, the combination of an inclosing compartment, can-supporting rails extending through the upper part of said compartment and arranged to support a can in a substantially vertical position, a traveling surface arranged to forward the can along said rails in a substantially vertical position, a rotary brush adjacent to and substantially parallel with said supporting-rails and arranged to remove superfluous solder from the substantially vertical cylindrical sides of the can, means for projecting steam or other fluid under pressure against the lower end plate of the can as it passes over said rails, and means for retarding the passage of the can while subjecting it to the fluid-blast, the said brush and the said fluid-blast being arranged to precipitate the solder removed from the can into a comparatively still air in the inclosed lower portion of the said compartment where the solder will be retained by gravity substantially as set forth.

11. In solder-saving apparatus, the combination of parallel can-supporting rails, a traveling surface for forwarding cans upon said rails, and a nozzle formed with two diverging nipples arranged to simultaneously project jets of steam or other fluid under pressure against diametrically-opposed inner sides of the end plates of the cans as they pass successively over the rails, substantially as set forth.

12. In solder-saving apparatus, the combination of parallel can-supporting rails, a traveling surface for forwarding cans upon said rails, and a nozzle formed with a plurality of divergent nipples arranged to simultaneously project jets of steam or other fluid under pressure against the inner sides of the edges of the end plates of the cans at substantially equidistant points, whereby the entire circumference of the end plates may be treated to the fluid under pressure during less than one revolution of the can upon its axis, for the purpose and substantially in the manner set forth.

13. In solder-saving apparatus, the combination of stationary can-supporting rails, a traveling surface for forwarding cans upon said rails, and a rotary brush parallel to said rails and arranged to remove superfluous solder from the cylindrical edges of said cans, said can-supporting rails being formed and arranged for contact with the cans while the latter are subjected to the action of the brush whereby the part of each can in actual contact with the brush moves slowly, relatively speaking as compared with the part acted upon by the opposed can-forwarding surface, as set forth.

14. In solder-saving apparatus, the combination of parallel can-supporting rails, a traveling surface for forwarding cans upon said rails, means for projecting steam or other fluid under pressure against the end plates of the cans as they pass successively over the rails, a retarding-wheel for detaining the cans successively while being subjected to the fluid-blast, and a scraper or wiper to remove solder from the surface of the retarding-wheel, substantially as set forth.

15. In solder-saving apparatus, the combination with parallel can-supporting rails, traveling surface for forwarding cans upon said rails, of the brush D, the adjustable yoke E, upon which the brush is mounted, the spiral pinion d', on the brush-shaft d, and the spiral gear f, upon the power-shaft F, the whole arranged and operating substantially in the manner and for the purpose described.

16. In solder-saving apparatus, the combination with parallel can-supporting rails, traveling surface for forwarding cans on said rails, of the brush D, the adjustable yoke E, upon which the brush is mounted, said yoke being formed with the cap e^7, the spiral pinion d', on the brush-shaft d, the spiral gear f, upon the power-shaft F, and the oil-compartment G, the whole arranged and operating substantially in the manner and for the purpose described.

17. In solder-saving apparatus, the combi-

nation of parallel can-supporting rails, a traveling surface for forwarding cans upon said rails, a stationary can-retarding surface opposed to said can-forwarding surface the parts being so arranged that the cans will roll upon said stationary retarding-surface while subjected to the action of means for removing superfluous solder from the cans, and said means for removing superfluous solder from the cans situated adjacent to said can-retarding surface and upon the side of the supporting-rails upon which said can-retarding surface is situated and opposed to the traveling can-forwarding surface, for the purpose set forth.

18. In solder-saving apparatus, the combination of parallel can-supporting rails, a traveling surface for forwarding cans upon said rails, a stationary can-retarding surface opposed to said can-forwarding surface, and a rotatable brush for removing superfluous solder from the edges of the cans rolling over said stationary retarding-surface, said rotatable brush being situated adjacent to said can-retarding surface, upon the side of the supporting-rails upon which said can-retarding surface is situated and opposed to the traveling can-forwarding surface, for the purpose set forth.

19. The combination of mechanism for removing superfluous solder from cans, and a can-feeding device for transferring a can on end in substantially a vertical position, from the solder-applying apparatus to said solder-saving mechanism, whereby the force of gravity is utilized to facilitate the entrance of the hot solder into the joint between the can-body and the can-head preparatory to subjecting the can to the action of the solder-saving mechanism substantially as set forth.

20. The combination of mechanism for removing superfluous solder from cans, and a can-feeding device for transferring a can from the solder-applying apparatus to said solder-saving mechanism, said transferring and feeding device consisting essentially of a substantially horizontal endless belt upon which each can rests on end and in substantially a vertical position, whereby the hot solder is drawn into the joint between the can-body and the can-head by gravity prior to subjecting the can to the action of the solder-saving mechanism, substantially as set forth.

21. The combination of an apparatus for applying solder to end joints of a can, said apparatus having guideways formed to turn and discharge the can on end in a substantially vertical position, a device for receiving the can on end from the soldering apparatus and transferring it in a substantially vertical position to mechanism for removing superfluous solder and said solder-removing apparatus.

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