W. M. HOLLOWAY.

SOLDERING MACHINE.

APPLICATION FILED JUNE 15, 1908.

941,147.

Patented Nov. 23, 1909.

4 SHEETS—SHEET 1.

Fig. 1

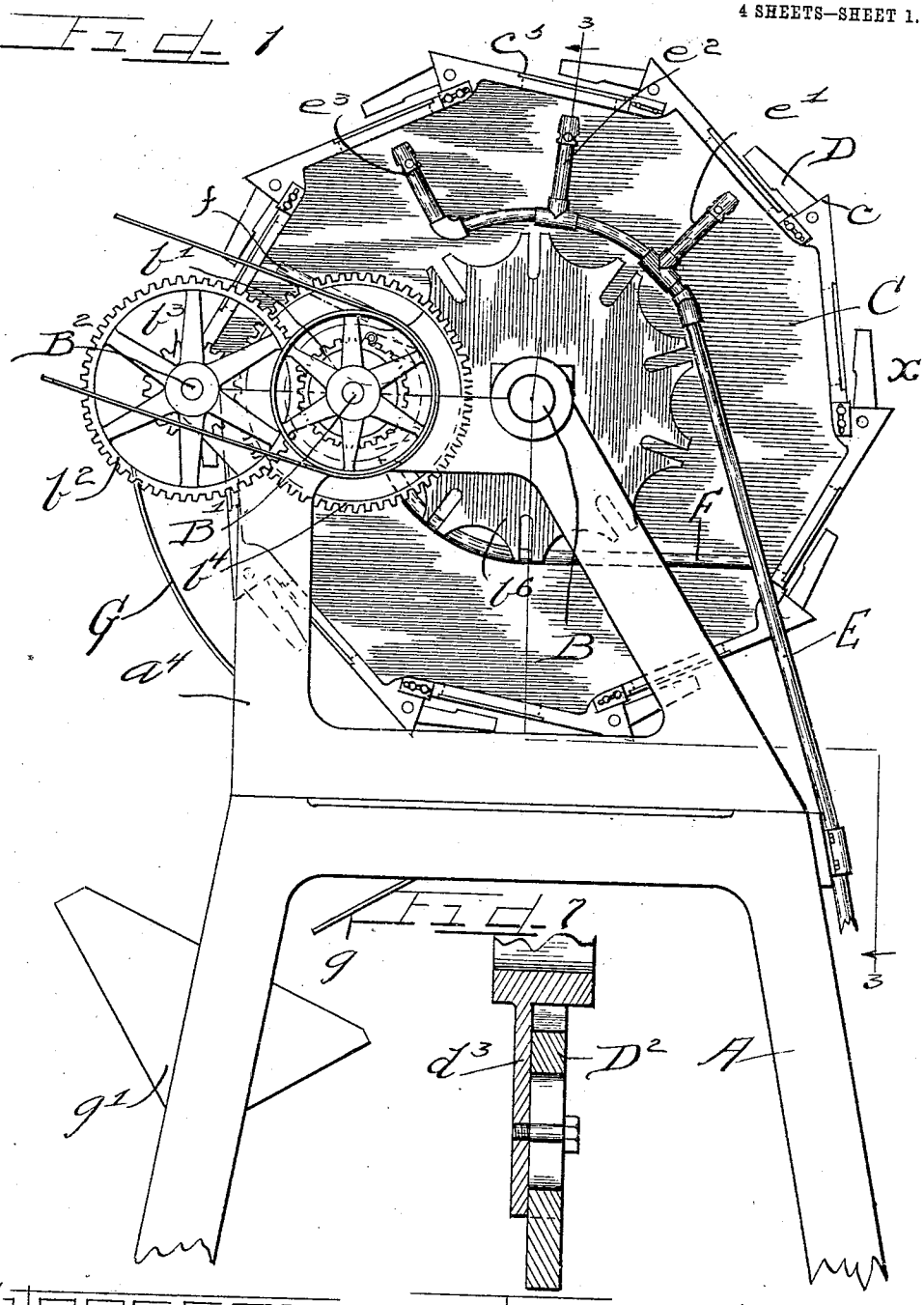

Fig. 2

Witnesses

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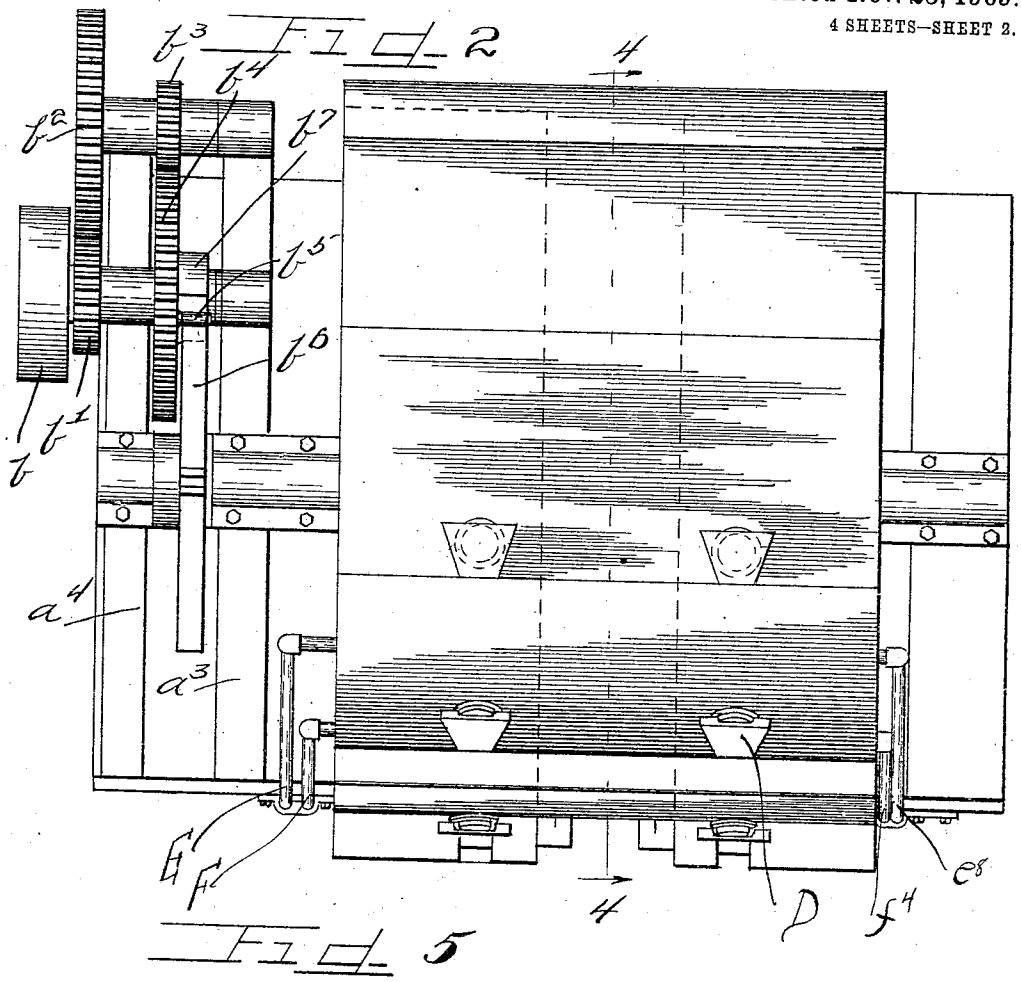
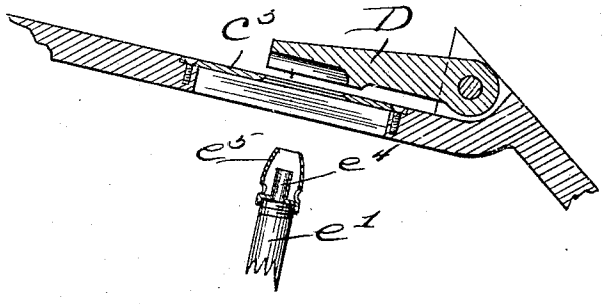


FIG. 5



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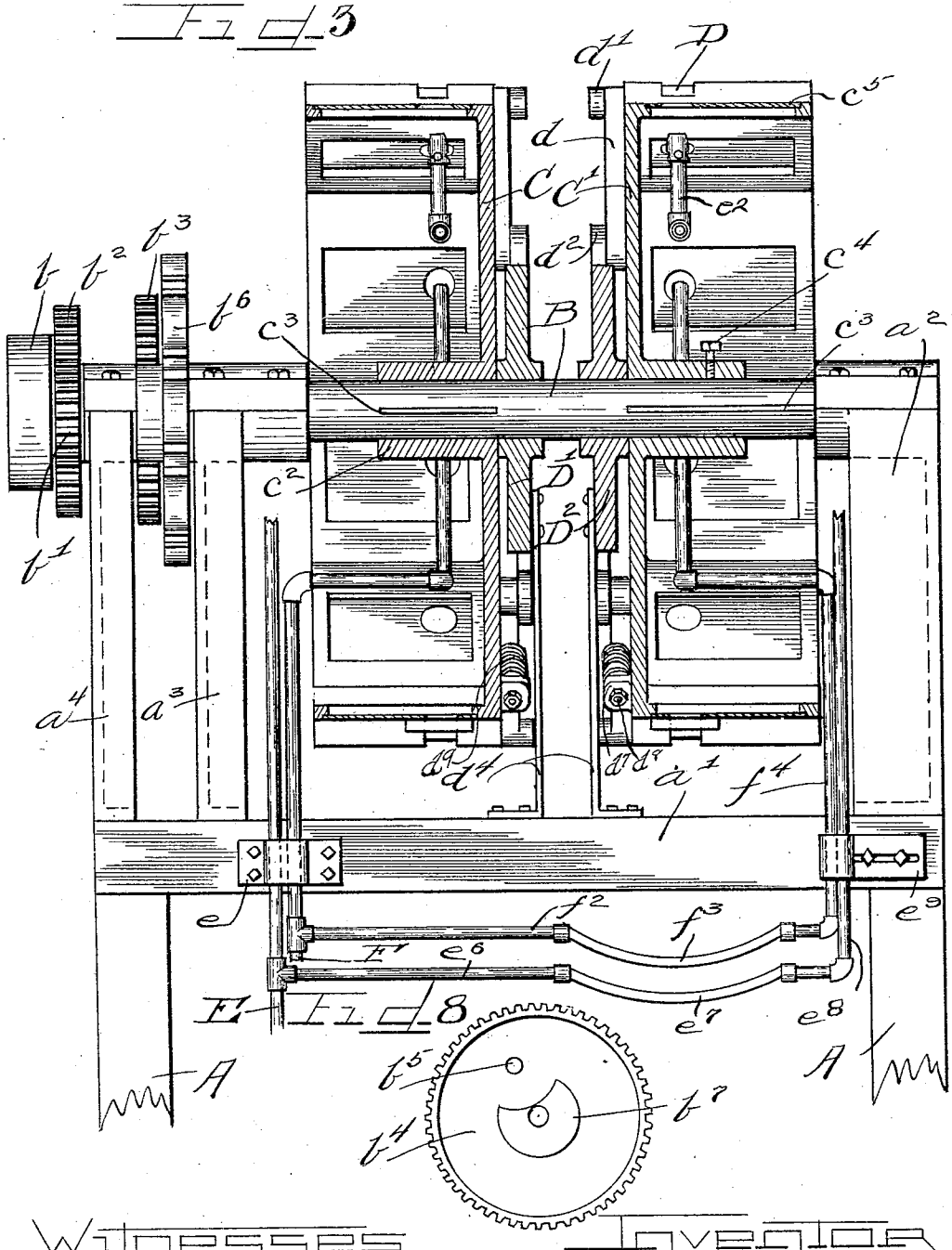
4 SHEETS—SHEET 3.

Fig. 3



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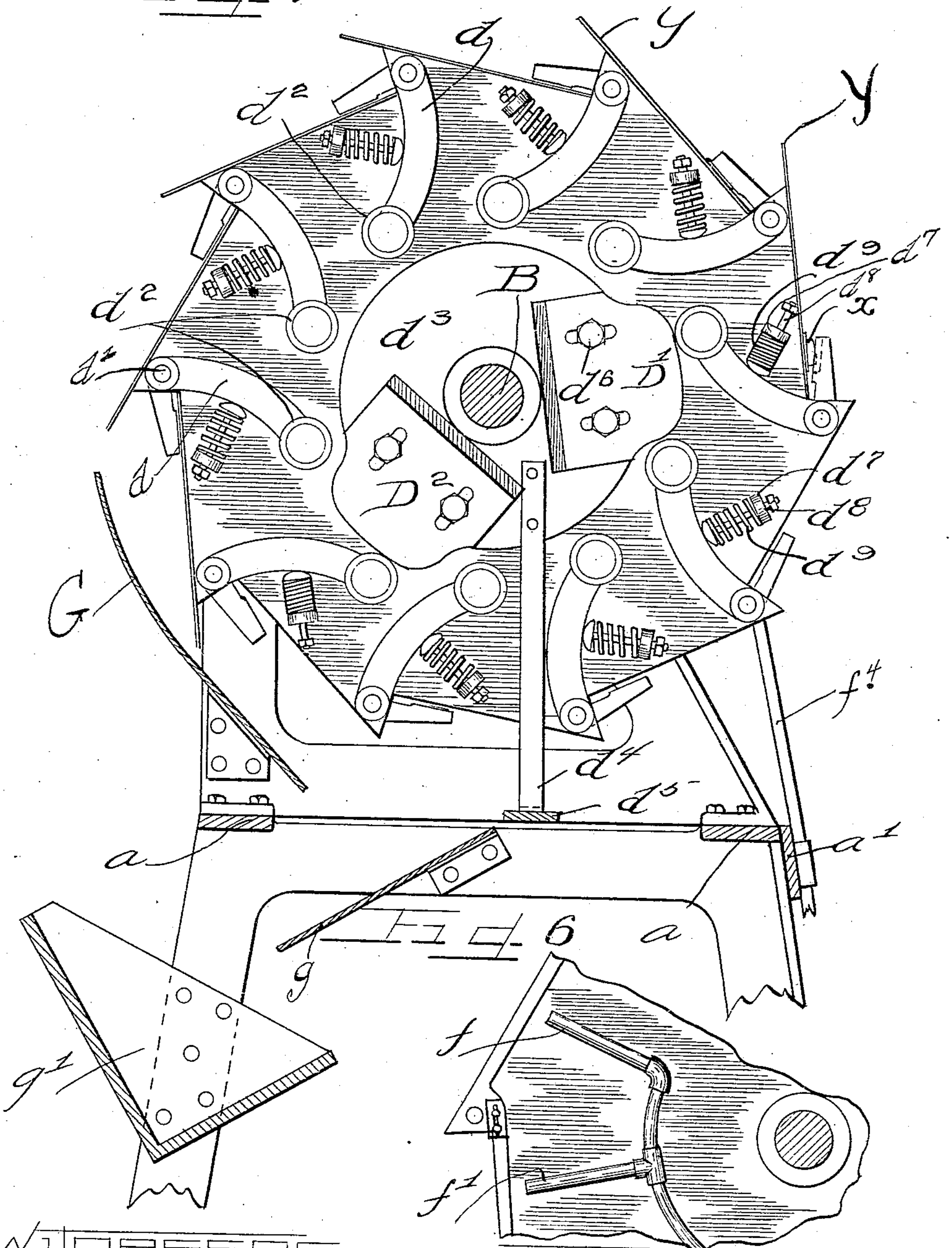
4 SHEETS—SHEET 4.

Fig. 4



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UNITED STATES PATENT OFFICE.

WILLIAM M. HOLLOWAY, OF CHICAGO, ILLINOIS.

SOLDERING-MACHINE.

941,147. Specification of Letters Patent. **Patented Nov. 23, 1909.**

Application filed June 15, 1908. Serial No. 438,461.

To all whom it may concern:

Be it known that I, WILLIAM M. HOLLOWAY, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Soldering-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in soldering machines and is shown more particularly as adapted for soldering bail ears or lugs on pail blanks.

In the construction of sheet metal or tin pails such as are used extensively for lard pails and for many other purposes, a bail ear or lug is soldered on opposite sides of the pail near the top to receive the bent wire bail of the pail. Heretofore the securing of said lugs upon the pail or upon the blank has been a comparatively slow operation and necessarily more expensive than is desirable.

The object of this invention is to afford an exceedingly cheap, simple and positively operating machine whereby the pail blanks of suitable size are fed flat into the machine, and the bail lugs secured in place by the use of heat applied from below or the opposite side of the blank, the blank at the point opposite the lug or ear being subjected to a cold blast after the lug is attached and before delivery from the machine.

It is also an object of the invention to afford means for adjusting the machine for blanks for different sizes of pails and also for different heights or sizes of bail lugs and to so construct the machine that the parts thereof in any manner subjected to heat, are open to the atmosphere to permit of rapid radiation.

The invention embraces many novel features and consists in the matters hereinafter described and more fully pointed out and defined in the appended claims.

In the drawings: Figure 1 is an end elevation partly broken of a machine embodying my invention. Fig. 2 is a top plan view thereof. Fig. 3 is a central vertical section of the machine taken longitudinally of the shaft and showing the shaft in elevation. Fig. 4 is a section on line 4—4 of Fig. 2. Fig. 5 is an enlarged fragmentary detail taken in section, and illustrating the construction of the heating plates and burner. Fig. 6 is a similar fragmentary view taken in elevation and showing the cold blast pipes. Fig. 7 is an enlarged fragmentary section of the cam and ring. Fig. 8 is a detailed face view of the driving gear for the Geneva gear.

As shown in the drawings: Said machine comprises a frame consisting of end members A, which may be of cast metal or constructed of any suitable material, and are rigidly connected on opposite sides longitudinally thereof by side bars a—a', which serve to stiffen the frame and afford a table upon which at each end are bolted uprights a^2—a^3—a^4, upon which the main shaft B, is journaled. As shown, said frame members may also be constructed of cast metal of suitable shape to afford a support for the driving gears as well as said shaft, as shown in Fig. 1, each of said end frame members a^3—a^4, on the driving end of the machine being extended rearwardly and approximately horizontally from the shaft B, for that purpose.

As shown, a shaft B′, is journaled at the top of the frame members a^3—a^4, parallel with the shaft B, and secured in the outer end of the shaft is a driving pulley b, adapted to be engaged by a belt driven from any source of power. Also secured on said shaft, is a pinion b', which meshes with a gear b^2, on a shaft B^2, parallel with and at the rear of the shaft B′. Also secured on said shaft B^2, is a pinion b^3, which meshes with a gear b^4, rotative on the shaft B′, and provided, as shown in Figs. 2 and 5, on its inner face with a pin b^5, adapted to engage in the radial slots of a Geneva gear b^6, secured on the main shaft B. Said Geneva gear, as shown, is provided with a number of radial slots corresponding with the number of intermittent movements of the shaft B, in each revolution thereof and integrally secured on said gear b^4 is a segment b^7, adapted to engage in the concave seats in the periphery of the Geneva gear between the slots to hold the shaft B, rigidly between the intervals of movement thereof.

Feathered on the shaft B, are carrying wheels C—C′, of equal size, and, as shown, provided on the periphery with a number

of flat faces corresponding with the number of slots in the Geneva gear. In the present machine, ten of such flat faces are provided, which, as shown, are directed obliquely with the radius of the wheel passing through the center thereof, thus providing at the rear side of each of said flat faces, a radial, outwardly directed, ratchet-like shoulder c. The rim or face of each wheel, as shown, is comparatively broad, and at the inner edge said rim is integrally connected with the web on which is secured an integral hub c^2, adapted to be held from rotation on the shaft by means of a feather c^3, and held from longitudinal movement in adjusted position on the shaft by means of a set screw c^4, or any other suitable equivalent therefor.

Each of the flat rim faces of the wheel is cut, as shown in Figs. 1, 3 and 5, to afford a comparatively large opening therethrough adapted to be covered by a relatively thin plate of sheet steel or other suitable metal c^5, adapted to quickly radiate heat, and provided with a circular aperture therethrough.

Pivotally secured on each of the shoulders c, is a clamping arm D, which extends centrally over said plate c^5, and is provided on its under side with a seat adapted to receive the ear or lug therein, as shown in dotted lines in Fig. 2, and as shown, a lever arm d, rigidly secured on said clamping arm at the end thereof depends from the pivot pin d', and is provided at its lower end with a roller d^2, adapted to engage the actuating cams whereby said clamping jaws are actuated. As shown, said cams indicated by D′—D² are adjustably secured upon a ring d^3, concentric with the shaft B. Said ring is held from rotation on the shaft by means of a bar d^4, bolted to the ring d^3, and also adjustably secured at its lower end on a longitudinal bar d^5, bolted to the frame. The cams, as shown, are provided with parallel, longitudinal slots adapted to receive therein bolts d^6, which rigidly engage the cam to the ring but which permit the same to be adjusted outwardly or inwardly by releasing the bolts. As shown, the cam D′, projects forwardly from the shaft B, into position to be engaged by the rolls d^2, on the end of the clamping levers d, to throw the clamping jaw outwardly from clamping position and to hold the same outwardly while inserting the blank and the ear lugs in place. The cam D², extends obliquely downwardly and rearwardly from the shaft in position for engagement by the rolls d^2, on the clamping levers to throw the clamping jaw outwardly from clamping position to release the blank after the operation is completed. As shown also, the web of each of said carrying wheels is provided in advance of each of the clamping levers with a lug d^7, through which extends a push pin d^8, which bears on the forward side of the clamping lever and a spring d^9, is provided on said push pin, which acts normally to hold said clamping jaw in clamping relation, as shown in Fig. 4. As shown, the two carrying wheels are identical in construction in all respects and arranged with the webs on the inner sides thereof and are entirely open on the outer sides or ends of the machine.

Extending upwardly at the front of the machine is the fuel supply pipe E, which extends through a suitable adjustable clamp e, on the frame bar a', and extends into the open end of the carrying wheel C′, and curving upwardly over the shaft is provided, as shown, with three branch pipes e'—e^2—e^3, each provided with a suitable burner nozzle e^4, inclosed in a somewhat conical tube e^5, adapted to direct the frame through the aperture in the plate c^5, when the carrying wheels are at rest, said branches being so arranged that the burners act upon three of the adjacent apertures in the carrying wheel at the same time whenever said wheel is at rest. As shown, the pipe E, is also provided with a laterally directed branch e^6, which is connected by means of a hose pipe e^7, with a pipe e^8, which extends upwardly into the carrying wheel C′, and is provided likewise with branch pipes e'—e^2—e^3, such as before described, the arrangement and construction of which, and the burners therefor are each as before described with reference to the carrying wheel C. Also extending upwardly at the end of the frame is a pipe F, connected with a suitable blower or source of air pressure, said pipe also extending through the adjustable clamp e, and thence upwardly and inwardly of the carrying wheel and beneath the shaft B, and provided, as shown in Fig. 6, with branches f—f', two in number, and positioned to direct a cold blast through two adjacent apertures in the plates c^5, and next adjacent to those acted upon by the burners. In a similar manner a branch f^2, extends from said pipe F, and is connected by means of a hose pipe f^3, with a corresponding pipe f^4, which extends into the carrying wheel C′, and is likewise provided with branches as before described, and for the same purpose. As shown also, the pipes f^4 and e^8 are secured on the frame bar a', by means of an adjustable clamp e^9.

Secured at the rear side of the frame is a chute G, which inclines inwardly and downwardly to direct released blanks upon the lower inclined chute g, which is directed rearwardly and downwardly toward any suitable conveyer for conveying away the blanks with the ear lugs attached thereto, or, as shown in Fig. 1, to a receiving box g', into which the blanks fall from the chute and from which they may be manually removed.

The operation is as follows: The carrying wheels are adjusted on the shaft B, by loosening the set screws and sliding the same to a position corresponding with the length of the blank it is desired to operate upon, this, of course, depending upon the size of the pail to be made, said adjustment being such that the blanks when laid upon the flat faces of the carrying wheels shall be so positioned that the point at which it is desired to attach the lugs lies centrally over the apertures in the plate c^5. Having so adjusted the carrying wheels, the same are rigidly engaged upon the shaft by means of the set screws c^4, and if necessary, the cam rings d^3, may be also adjusted by loosening the nuts in the lower end of the bar d^4, and sliding the same to whatever extent may be necessary to insure said bars at all times clearing the clamping levers. Of course, the fuel and air pipes are likewise adjusted to insure that the delivery thereof is at the center of the ear lug attached to the blank. For this purpose, the clamps e—e^9 may be adjusted longitudinally of the frame bar a', to exactly position said pipes as desired. The flexible hose sections e^7—f^3 permit of any desired adjustment thereof. Having adjusted the machine, the blanks are fed into place beneath the clamping jaw at the station indicated by X, on Fig. 1 and Fig. 4, at which point the clamping lever is elevated on the cam D′, affording space to insert the blank and to drop the ear lug indicated by x, in place, one near each end of the blank, as shown in Fig. 2. This is accomplished during the interval of rest of the carrying wheels. The continuous rotation of the gears, however, almost immediately brings the pin b^5, into one of the notches in the Geneva gear, with the effect of rotating the carrying wheels another station and closing the clamping jaws upon the ear lug and blank partly under action of gravity owing to the weight of the clamping levers, but mainly, because of the action of the spring d^9, which forces said lever downwardly bringing the clamping jaw firmly into clamping relation. The carrying wheels coming to rest at the next station position the blank and the ear lug directly in alinement with the first burner e', heating the blank beneath the ear lug, and (inasmuch as the ear lug before insertion into the machine had been coated on the under side its flange with solder) fusing the solder, and also the thin coating of tin on the blank. Inasmuch as the interval of rest is exceedingly brief, several of such burners are desirable, though the number, of course, will depend upon the rapidity of motion of the carrying wheels and the length of the period or interval of rest. In practice, it has been found that three of such burners permit of rapid movement of the wheel and very brief intervals of rest, in fact, the briefest possible interval consistent with the insertion of the blanks and the ear lugs into place manually. Having passed the last burner e^3, at which the solder was completely fused, at the next interval of rest the hot spot on the blank is positioned directly opposite one of the cold blast branches f, rapidly cooling the same and also cooling the thin plate c^5, upon which the blank rests. Such cooling operation may also be continued for one or more intervals, any desired number of such branches being connected in the cooling pipe. The cooling, however, having sufficiently progressed to solidify the solder, the depending end of the cam lever next engages the inclined face of the cam D^2, throwing the clamping jaw outwardly, as shown in Fig. 4, and permitting the blank to fall upon the inclined chutes G—g and into the receptacle g'.

Owing to the peculiar construction of the flat faces of the carrying wheels, the width of the blank is quite immaterial, inasmuch as the edges of each blank indicated by Y, may project over the clamping jaw for the next preceding blank, in this manner enabling the machine to receive and to operate successfully upon blanks of any desired width.

Of course, I am aware that instead of ten clamping jaws on each carrying wheel the number of flat faces and corresponding clamping jaws may vary depending upon the size of the wheel, its rate of movement and whether the blanks and ear lugs be fed manually into position or automatically, which may, of course, be very easily accomplished. I am also aware that for any blank or article which may be more or less curved or present a non-flat surface, the face of the wheel should desirably be shaped to fit thereto, and of course, the clamping jaws desirably shaped on the under face to conform somewhat to the article to be engaged upon the blank. Furthermore, the intermittent motion is not indispensable, inasmuch as a slower rate of continuous rotation permits of the feeding of the blanks or the lugs or articles to be attached thereto into position very readily, and when automatically feeding, continuous rotation may be preferable, with, of course, the consequent variation in the number of burners and cooling nozzles.

Obviously, many features of construction and operation may be varied and I therefore do not purpose limiting this application for patent otherwise than necessitated by the prior art.

I claim as my invention:

1. A soldering machine embracing a rotative carrying wheel having a peripheral rim thereon affording apertured faces adapted to receive the articles to be soldered, a clamping jaw thereupon adapted to rigidly engage the

articles to be soldered thereon, one or more burners arranged to direct the heat thereof against the articles to be soldered through the apertures in said faces and one or more cooling nozzles adapted to direct a cooling blast against said articles at a further stage in the rotation of the wheel.

2. A soldering machine embracing a rotative carrying wheel, a lateral rim thereon affording apertured faces, a clamping jaw pivoted on the rim adjacent each apertured face and adapted to rigidly engage the articles to be soldered thereon, one or more burners arranged to direct the heat thereof through said aperture and against the articles to be soldered, one or more cooling nozzles adapted to direct a cooling blast against said articles at a further stage in the rotation of the wheel and cams for actuating the clamping jaws.

3. A soldering machine embracing a rotative carrying wheel, a laterally extended rim at the periphery thereof and having flattened faces thereon adapted to receive the articles to be soldered, the metal at the flattened parts being thin, a clamping jaw pivoted at each flat face to rigidly engage the articles to be soldered in position, one or more burners arranged to direct the heat thereof against the articles to be soldered through a suitable aperture central in each face, one or more cooling nozzles adapted to direct a cooling blast against said articles at a further stage in the rotation of the wheel and adjustable cams for actuating the jaws.

4. A soldering machine embracing rotative carrying wheels having a peripheral rim thereon affording thin flat, centrally apertured faces adapted to receive articles to be soldered, a clamping jaw pivoted on the carrying wheels and adapted to rigidly engage thereon the articles to be soldered, one or more burners arranged to direct the heat thereof through said apertures against the articles to be soldered, one or more cooling nozzles adapted to direct a cooling blast through said apertures at a further stage in the rotation of the wheel, means for adjusting the carrying wheels to suit the varying lengths of the blanks and an adjustable cam for actuating the jaws in engaging and releasing.

5. A soldering machine embracing a duplicate pair of rotative carrying wheels each having an outwardly directed, peripheral rim thereon affording flat faces adapted to receive the blank, clamping jaws having recesses to receive the article to be soldered to the blank, and adapted to rigidly engage the articles to be soldered in position, one or more burners arranged to direct the heat thereof against the articles to be soldered through a suitable aperture in the rims, one or more cooling nozzles adapted to direct a cooling blast against said articles at a further stage in the rotation of the wheel, means for adjusting the wheels to or from each other and means for adjusting the burners and nozzle to correspond.

6. A soldering machine for pail ears embracing a pair of simultaneously rotative wheels having a plurality of flat faces on the peripheries thereof, coacting to support blanks thereon, said wheels provided with an aperture in each flat face, oscillating clamps secured to each wheel to engage the blanks thereon, one clamp above each aperture and having a pocket adapted to receive an ear therein, burners acting through the apertures in the wheels on the blanks and ears and cooling nozzles positioned to act after the burners.

7. In a machine of the class described a rotative shaft, a pair of carrying wheels adjustably secured thereon and having flat faces on the periphery, each having an aperture therethrough, a positively actuated clamping jaw pivoted on the wheel and extending over the aperture, a cam for actuating said clamping jaws at the receiving position and at the discharge position, burners adjustably arranged within each wheel to direct the heat thereof through said apertures and against the articles engaged by the clamps and cooling nozzles directed also through said aperture at a further stage of movement, and means for adjusting the cams for actuating the clamping jaws.

8. In a machine of the class described a rotative shaft, duplicate carrying wheels adjustably secured thereon and having outwardly directed rims having flat peripheral faces, each having an aperture therethrough, positively actuated clamping jaws pivoted on the wheel, one for each flat face and extending over the aperture, an adjustable cam for actuating said clamping jaws at receiving position and at discharge position, burners adjustably arranged within each wheel to direct the heat thereof through said apertures and against the articles engaged by the clamps and adjustable cooling nozzles directed also through said apertures at a further stage of movement.

9. In a machine of the class described parallel carrying wheels having on one side thereof an outwardly directed, broad peripheral rim, flat faces on said rim each directed obliquely with the radius passing through the center thereof, thereby affording at the rear side of each flat face an upstanding shoulder, an aperture through each of the flat faces, a positively actuated clamping jaw engaged on each of said shoulders, and lying below the plane of the next succeeding rear face on the wheel, whereby the article engaged by one of said clamping jaws may overlap the next engaged in advance thereof.

10. In a machine of the class described

parallel carrying wheels having on one side thereof an outwardly directed, broad peripheral rim, flat faces on said rim each directed obliquely with a radius passing through the center thereof thereby affording at the rear side of each flat face an upstanding shoulder, an aperture through each of the flat faces, a positively actuated clamping jaw engaged on each of said shoulders and lying below the plane of the next succeeding rear face on the wheel whereby the article engaged by one of said clamping jaws may overlap the next engaged in advance thereof, burners arranged within the wheel to heat the articles through said apertures and cooling means acting beyond the burners.

11. In a device of the class described carrying wheels having alined flat faces coacting to support the article thereon and said flat faces being so arranged that the article carried thereon may overlap the article carried on the flat faces in advance thereof.

12. In a soldering machine a plurality of carrying wheels coacting to support the articles to be soldered, burners in each wheel for directing the heat against the articles and blast pipes in each wheel for directing a cool blast against the articles.

13. In a soldering machine a plurality of wheels having alined flat faces, and each flat face having an aperture therein, burners within each wheel for directing heat through the apertures and pipes in the wheel for directing a cold blast through the apertures.

14. In a soldering machine a plurality of wheels having alined flat faces, and each flat face having an aperture therein, burners within each wheel for directing heat through the apertures, pipes in the wheel for directing a cold blast through the apertures, and a clamp pivotally supported over each aperture in each flat face.

15. In a soldering machine a plurality of wheels having alined flat faces, and each flat face having an aperture therein, burners within each wheel for directing heat through the apertures, pipes in the wheel for directing a cold blast through the apertures, a clamp pivotally supported over each aperture in each flat face, means for firmly but yieldingly forcing the clamps to engage the articles carried on the alined faces of the wheels, and independent means for swinging the clamps on their pivots to release the soldered articles and to adjust the clamps to permit insertion of the articles for soldering.

16. In a soldering machine a carrying wheel having a plurality of flat faces formed on the periphery thereof, each adapted to support an article to permit the articles overlapping, a pivotally supported clamp for each flat face having a pocket, a lever connected with each clamp, spring operated means bearing against each lever to normally hold the clamp in clamping position, burners within the wheel adapted to deliver a hot blast against each flat face, and means within the wheel for delivering a cold blast against each flat face.

17. In a soldering machine a carrying wheel having a plurality of flat faces on the periphery thereof, and each provided with an aperture therein, a thin plate secured to each face of the carrying wheel over the aperture and provided with a central aperture, a pivotally supported clamp for each flat face, extending at its outer end over the thin plate and provided with a pocket above the aperture in the thin plate, a lever secured to each clamp, spring operated means bearing against each lever to normally hold the clamp in clamping position, and independent means, one for actuating each lever to adjust each clamp to receive an article between the same and proper face of the wheel and the other to engage the levers to adjust the clamps to release the articles when soldered.

18. In a soldering machine coöperating means for supporting articles of varying widths flat, means secured to said means for clamping the articles in place, burners operating from beneath outwardly to heat the articles and means for delivering a blast from beneath outwardly against the heated articles.

19. In a soldering machine a carrying wheel, a Geneva gear and mechanism for intermittently advancing said carrying wheel, means for clamping the articles to the carrying wheel, burners adapted to deliver heat against the article, means supporting said burners adapted for adjustment to adjust the burners, blast means for delivering a cold blast against the articles and adjustable means for supporting the means delivering the cold blast adapted for adjustment to vary the position of the cold blast means.

20. In a device of the class described a carrying wheel having a plurality of peripheral flat faces, each provided with a small aperture therethrough, clamps pivoted to the wheel, one extending over each flat face and provided with a pocket therein above the aperture in the respective face, means normally holding the clamp in clamping position and means for releasing each clamp a plurality of times during each rotation thereof.

21. In a soldering machine a carrying wheel having flat faces each provided with an opening, a thin plate fitted over each opening and having an aperture therethrough and clamping means for each face extending over the aperture and recessed to receive an article therein.

22. In a soldering machine a carrying wheel having flat faces each provided with an opening, a thin plate fitted over each opening and having an aperture there-

through, clamping means for each face extending over the aperture and recessed to receive an article therein, burners positioned to direct a hot blast through the apertures from within the wheel and means positioned in advance of the burners to deliver a cold blast through the apertures.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

WILLIAM M. HOLLOWAY.

Witnesses:

K. E. HANNAH,

LAWRENCE REIBSTEIN.