(No Model.) 2 Sheets—Sheet 1.

J. GRAVES.

SOLDERING MACHINE.

No. 248,161. Patented Oct. 11, 1881.

Fig 1.

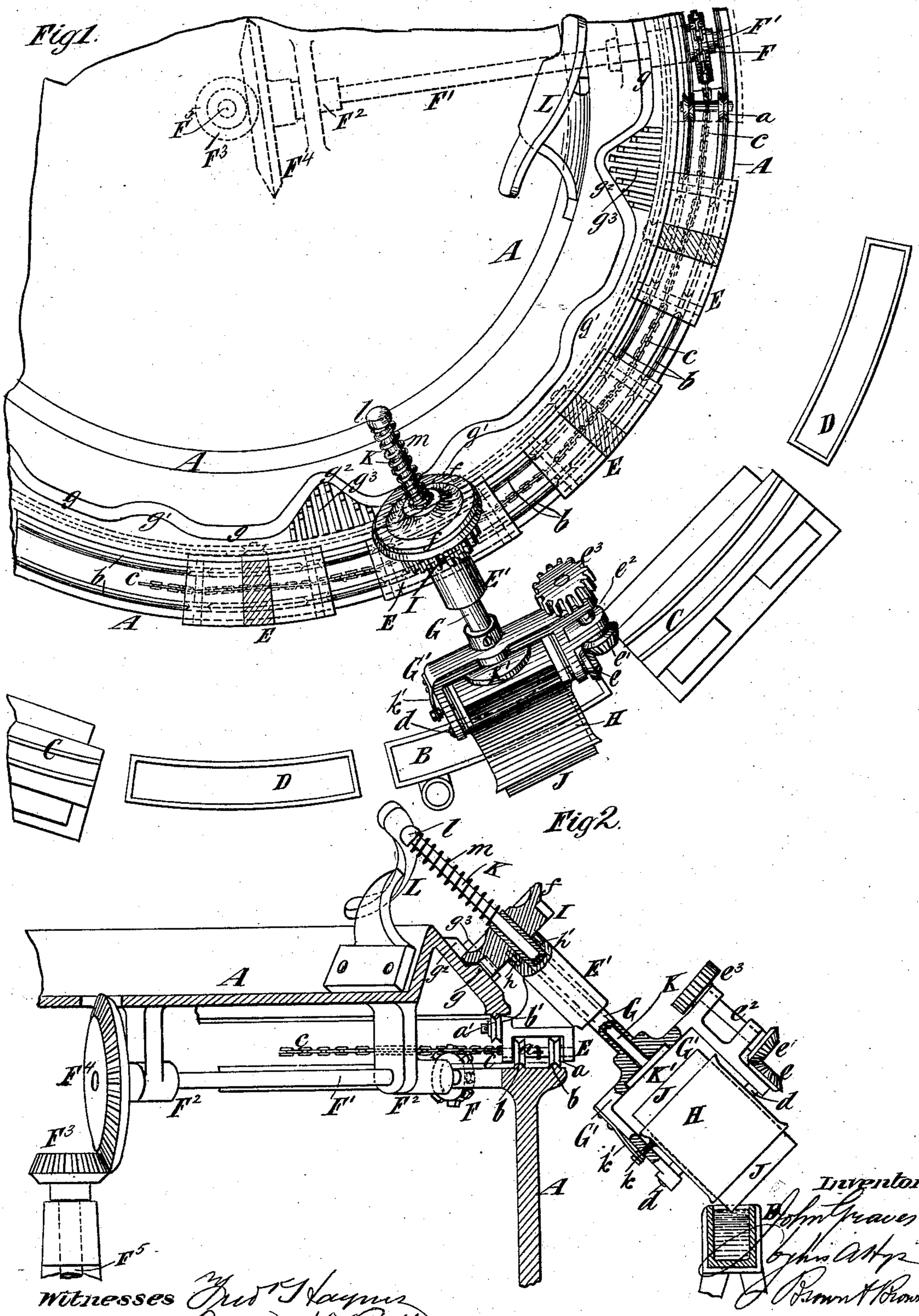

Fig 2.

Witnesses
Jno T Haynes
Geo H Bolte

Inventor
John Graves
by his Attys
Brown & Brown

(No Model.) 2 Sheets—Sheet 2.

J. GRAVES.

SOLDERING MACHINE.

No. 248,161. Patented Oct. 11, 1881.

Fig 3.

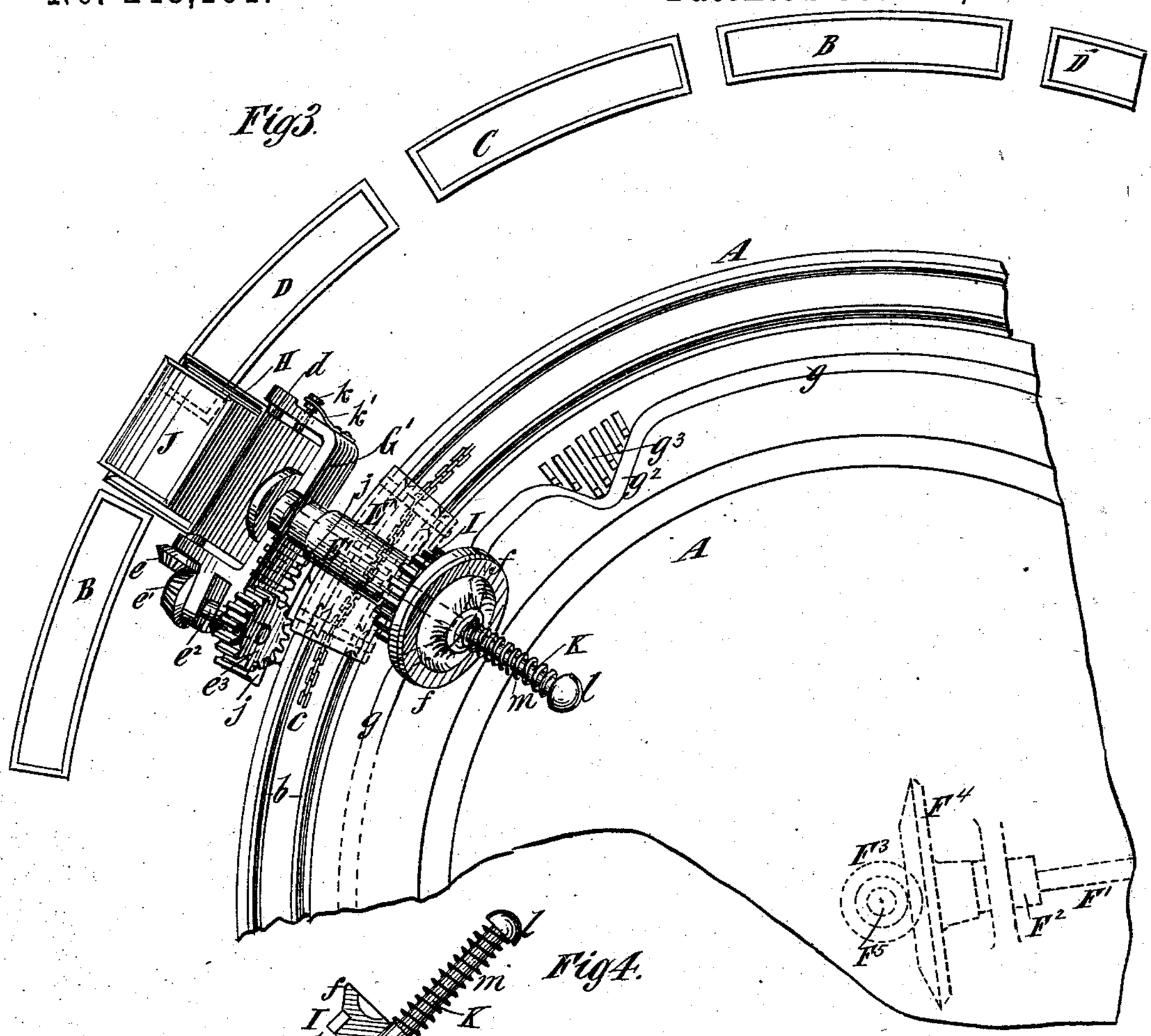

Fig 4.

Witnesses
Fred C. Haynes
George H Botts

Inventor
John Graves
by his Attorneys
Brown & Brown

UNITED STATES PATENT OFFICE.

JOHN GRAVES, OF BROOKLYN, ASSIGNOR TO HERMAN MILLER, OF NEW YORK, N. Y.

SOLDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 248,161, dated October 11, 1881.

Application filed August 29, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN GRAVES, of the city of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Soldering-Machines, of which the following is a specification.

My invention relates to soldering-machines in which the cans are inserted in can-holders and carried by traveling carriers past acid or other flux baths and solder baths into which the edges to be soldered are immersed, and subsequently, if necessary, past and through water baths, whereby the soldered seams or edges are cooled, the cans being turned meanwhile to properly present successively the seams to be soldered.

An important object of this invention is to provide in a simple and effective manner for turning the can-holders in which the cans are held, after the four seams at one end of the cans are soldered, so as to reverse the can end for end to bring the opposite end of the can in position to have its four seams soldered.

The invention consists in the combination, in a soldering-machine, of a stationary track, a carriage running thereon, a can-carrier having a spindle or shaft journaled in said carriage, so that it is free to rotate therein, and a can-holder supported upon trunnions in said carrier, and adapted to be tilted or turned in a plane parallel with the axis of rotation of said carrier, to bring the two ends of the can into position to be passed through the acid and solder.

The invention also consists in a novel combination of mechanism for turning the can-holder to reverse the can end for end, and in means for holding the can-holder in the carrier, so that it cannot tilt after it is so reversed in position.

The invention also consists in a novel combination of mechanism for turning the can-carrier spindle or shaft and carrier in the carriage while the can is passing from one vessel or bath to another, and for locking the can-carrier to the carriage, so that it cannot turn while the can is passing over each vessel or bath, and unlocking the carrier from the carriage when it is to be turned between the vessels or baths.

The invention also consists in the combination, with the can-carrier, of a pusher-rod fitting loosely within the carrier spindle or shaft, and a stationary cam past which the carrier is moved, and by which the pusher-rod is moved longitudinally to automatically eject the can from the holder.

In the accompanying drawings, Figure 1 represents a plan of a portion of a machine embodying my invention. Fig. 2 represents a vertical section thereof, the can in both figures being represented as passing through an acid vessel or bath; and Figs. 3 and 4 represent a similar plan and section, showing the position of the parts while reversing the can end for end.

Similar letters of reference designate corresponding parts in all the figures.

A designates the frame-work or bed-plate of the machine, here represented as of circular form, and B, C, and D designate, respectively, acid, solder, and water vessels or baths, arranged in a circular series around the bed-plate A.

Although the water vessels or baths might be dispensed with they are preferably employed.

At each end of the cans are four seams, and hence for soldering the two ends while in the machine eight vessels or baths of each kind are necessary, and they are arranged in the order above named. As here represented the several vessels or baths are shown upon an enlarged scale for the sake of clearness, and twenty-four could not be arranged in the circle; but in practice they would be smaller and placed nearer together if twenty-four are used.

E designates carriages, of which there may be as many as there are vessels or baths, so that twenty-four cans may be in the machine at one time. The carriages are provided with wheels *a*, which run upon lower stationary tracks, *b*, on the bed-plate A, and they are likewise provided with wheels *a'*, which run upon an upper stationary track, *b'*, whereby the carriages are held against tilting outward. The several carriages are all connected by means of a chain, *c*, to which they are attached at proper distances apart, and motion is imparted to them by means of a sprocket-wheel, F, which is secured upon a shaft, F', arranged radially to the bed-plate A in bearings F^2, and having

rotary motion imparted to it by a bevel-pinion, F^3, and wheel F^4, from a vertical shaft, F^5, as clearly seen in Fig. 2, and in dotted outline in Fig. 1. Each carriage, E, is constructed with a long bearing, E′, arranged at an incline, and in said bearing is mounted a shaft or spindle, G, at the lower end of which is secured or formed a carrier, G′, comprising arms, between which is arranged a can-holder, H. The spindle or shaft G and carrier G′ are formed in one piece or rigidly connected, so that they rotate together, and the spindle or shaft is hollow or tubular, for a purpose hereinafter explained.

The can-holder H consists of a tubular rectangular band or socket, into which the cans may be inserted, and which is of a size to fit the cans sufficiently close to retain them against movement therein. Said holder is mounted upon trunnions *d*, which are journaled in the arms of the can-carrier G′, and the holder may be turned upon its trunnions in a plane parallel with the carrier spindle or shaft G, to reverse the can end for end, by means of a bevel-wheel, *e*, which is fixed upon one of the trunnions, and with which engages a similar bevel-wheel, *e*′, fixed upon a small shaft, e^2, arranged at the side of the carrier G′, and having fixed upon it a spur-pinion, e^3, which is turned as hereinafter described.

I designates a spur-gear wheel, secured upon the spindle or shaft G of the carrier G′, so as to impart rotary motion thereto and move the same longitudinally. Upon the wheel I is an inclined or taper flange, *f*, and upon the bed-plate A is a track or way, *g*, upon which the said flange rides as the carriage is moved along, and upon each wheel is a pin or projection, *h*, which, when the wheel is in the position shown in Fig. 2, enters one or the other of four holes, *h*, in the bearing E′, and thus holds the can-carrier G′ and the can J against turning.

In order to enable the can to pass over the the edges of the vessels or baths in passing from one to another it is necessary to slightly raise the spindle or shaft G and carrier G′, and at the same time it is necessary to prevent the spindle or shaft and carrier from turning. To effect this result I form in the track or way *g* between each acid and solder vessel or bath and between each solder and water vessel or bath a slight upward projection or cam, *g*′, along which the flange *f* of the wheel I rides, and by which the spindle or shaft G, the carrier G′, and the cam J are raised sufficiently to enable the lower edge of the can to clear the edges of the baths, but not sufficiently to remove the pin *h* from its hole *h*′ and permit the can to turn. As soon as the wheel I passes the projecting cam *g*′ the carrier G′ and can move downward by gravity and the edge of the can is lowered into the contents of the bath.

Between each water vessel or bath D and its adjacent acid bath, while one end of the can is being soldered, it is necessary to turn the carrier G′, with its spindle or shaft G, a quarter of a turn, so as to present a new edge of the can to be soldered. To effect this I form in the track *g* between each water vessel or bath and its adjacent acid vessel or bath a cam, g^2, of greater projection than the cams *g*′, and I also form in each cam g^2 spur-gear teeth g^3 or stationary racks, with which the teeth of the pinion or wheel I may engage. When the flange *f* of the wheel I rides up on the cam g^2 it raises the wheel I sufficiently to remove the pin *h* from its hole *h*′, and the continued operation causes the gear-wheel I to engage with the gear-teeth or stationary rack g^3, and thus turn the spindle or shaft G and the carrier G′ and can to present a new edge to be soldered. After the wheel I passes the cam g^2 the spindle or shaft and carrier descend and the pin *h* enters another hole *h*′ in the bearing E, and thus locks the carrier against rotation.

Once during the circuit of the can in the machine it is necessary to turn the can-holder H upon its trunnions *d* to reverse the can end for end, and this is done while the can is passing from one water vessel or bath to its adjacent acid vessel or bath.

Opposite one of the cams *g*′ of lesser projection is a stationary rack, *j*, (seen in Figs. 3 and 4,) and as the can-carrier G′ is moved along, the spur-wheel e^3 upon the shaft e^2 comes into engagement with said stationary rack, and by its rotation turns the can-holder and can end for end.

In order to hold the can-holder immovably in the carrier after reversal I may employ a pin or dent, *k*, fixed upon a spring, *k*′, whereby it is made to engage with a depression in the can-holder sufficiently to offer a slight obstacle to the turning of the holder, though not to prevent its being turned by force.

As before stated, the shaft or spindle G of the can-carrier G′ is tubular, and therein is arranged a pusher-rod, K, which is provided at its lower end with a plate, K′, and at its upper end with a head, *l*. When not otherwise actuated, said pusher-rod is maintained in an elevated position by a spring, *m*, arranged between its head *l* and the end of the shaft or spindle G. When the can has had all its seams soldered, the carrier is brought opposite a stationary cam, L, (shown in Figs. 1 and 2,) and the end of the pusher-rod K bears against this cam, and is by it forced in sufficiently to act upon the can J and force it from the holder H, thus ejecting the cans automatically at the proper time. As the can-holders are emptied, one by one, they are filled with cans to be soldered, and the operation of the machine is continuous. As here represented, the carriages E, and also the cams *g*′ g^2 in the track or way *g*, are too large, and so far apart as to prevent the proper number of each from being placed in the circle. This is, however, simply to enable the machine to be more clearly illustrated, and I would here remark that where the eight seams at the two ends of a can are to be soldered at one operation twenty-four vessels or

baths are necessary, and the track or way g should have six of the cams g^2 of great projection provided with teeth, and eighteen of the lesser cams, g'.

By my invention I provide a simple machine in which the cans after being placed in the machine are soldered at both ends and discharged automatically.

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

1. In a soldering-machine, the combination of a stationary track, a carriage running thereon, a can-carrier provided with a spindle or shaft journaled in said carriage, and a can-holder supported upon trunnions in said carrier and adapted to be tilted or turned in a plane parallel with the axis of rotation of said carrier to reverse a can end for end, substantially as specified.

2. In a soldering-machine, the combination of a stationary track, a carriage running thereon, the can-carrier journaled in said carriage, the can-holder supported upon trunnions in said carrier, gearing applied to one trunnion for turning the holder, and a stationary rack by which said gearing is set in operation, substantially as specified.

3. In a soldering-machine, the combination of a stationary track, a traveling carriage, a can-carrier journaled in said carriage, vessels containing solder or acid and solder, a flanged wheel upon the shaft or spindle of said carrier, and a track or way over which said flanged wheel moves and which comprises projections or cams by which the wheel and can-carrier are raised, substantially as specified.

4. In a soldering-machine, the combination of the carriage, the can-carrier journaled therein, and the wheel secured upon the shaft or spindle of the carrier and provided with a pin adapted to enter one of several holes in the bearing on the carriage for holding the carrier against turning, substantially as specified.

5. In a soldering-machine, the combination of a stationary track, a traveling carriage, a can-carrier journaled in said carriage, vessels containing solder or acid and solder, a flanged spur-wheel upon the spindle or shaft of said carrier, and a track or way over which the said flanged wheel moves and which comprises projections or cams provided with gear-teeth with which said wheel engages, whereby the can-carrier is raised and also turned, substantially as specified.

6. In a soldering-machine, the combination, with the can-carrier having a tubular shaft or spindle and the can-holder, of the pusher-rod arranged within said shaft or spindle, and a stationary cam for moving said pusher-rod longitudinally to eject the can from said holder, substantially as specified.

JOHN GRAVES.

Witnesses:
CHANDLER HALL,
ED. GLATZMAYER.