(Model.) 8 Sheets—Sheet 1.

W. WAGNER.

CAN SOLDERING MACHINE.

No. 540,371. Patented June 4, 1895.

Fig. 1.

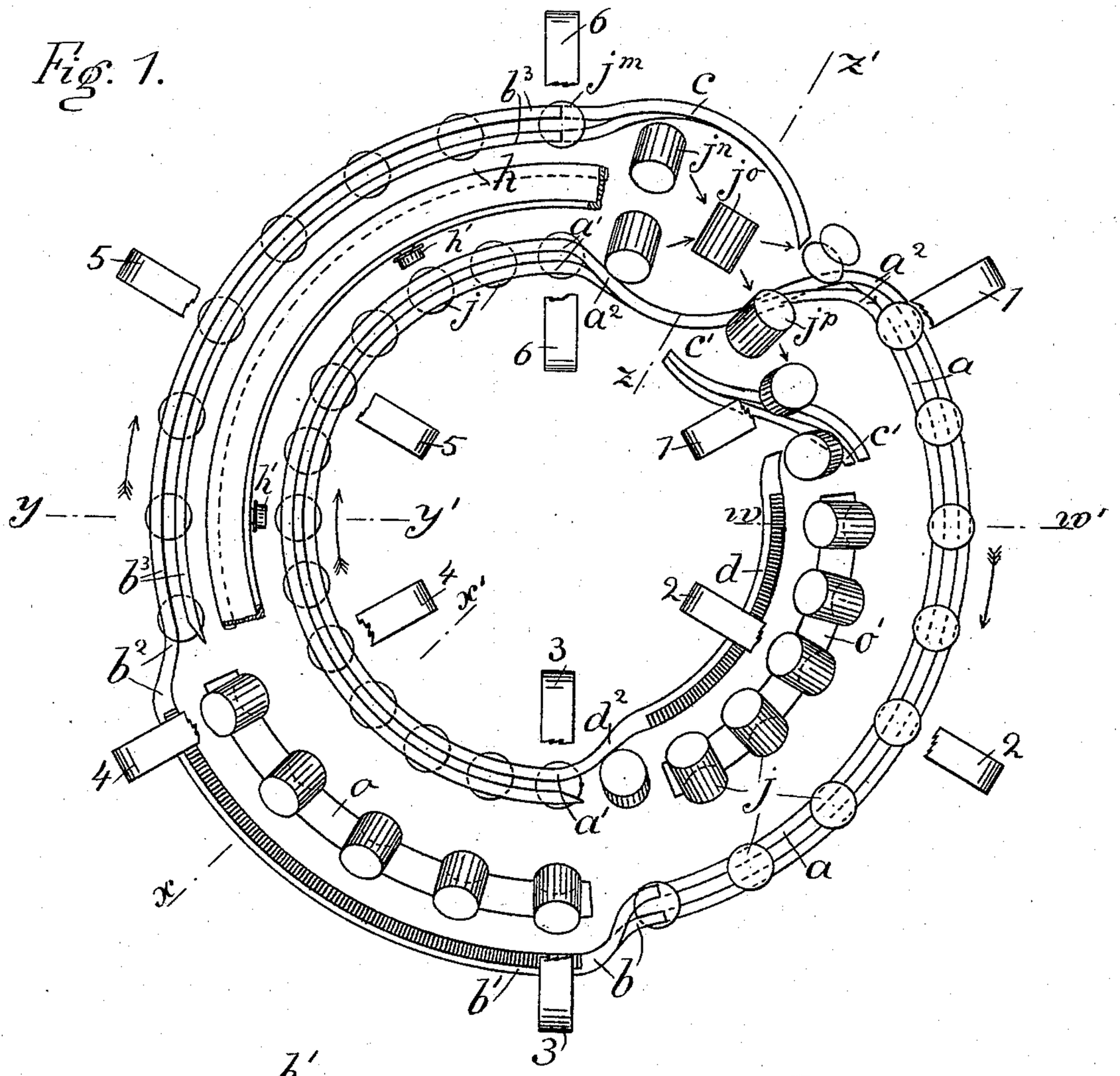


Fig. 2.

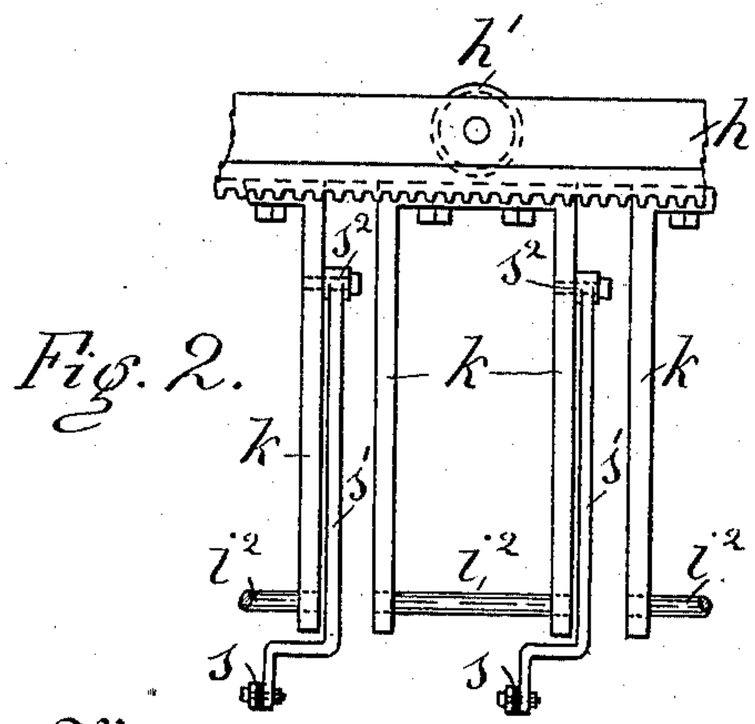
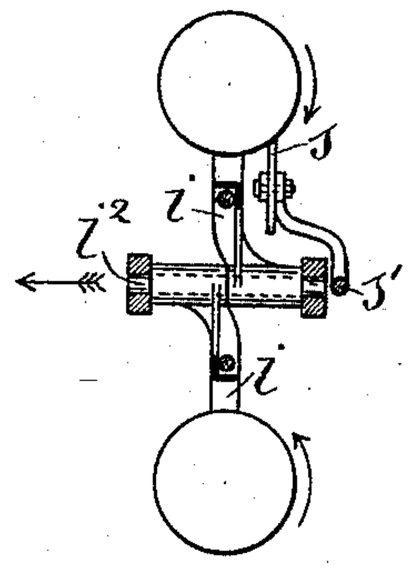


Fig. 3.



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CAN SOLDERING MACHINE.

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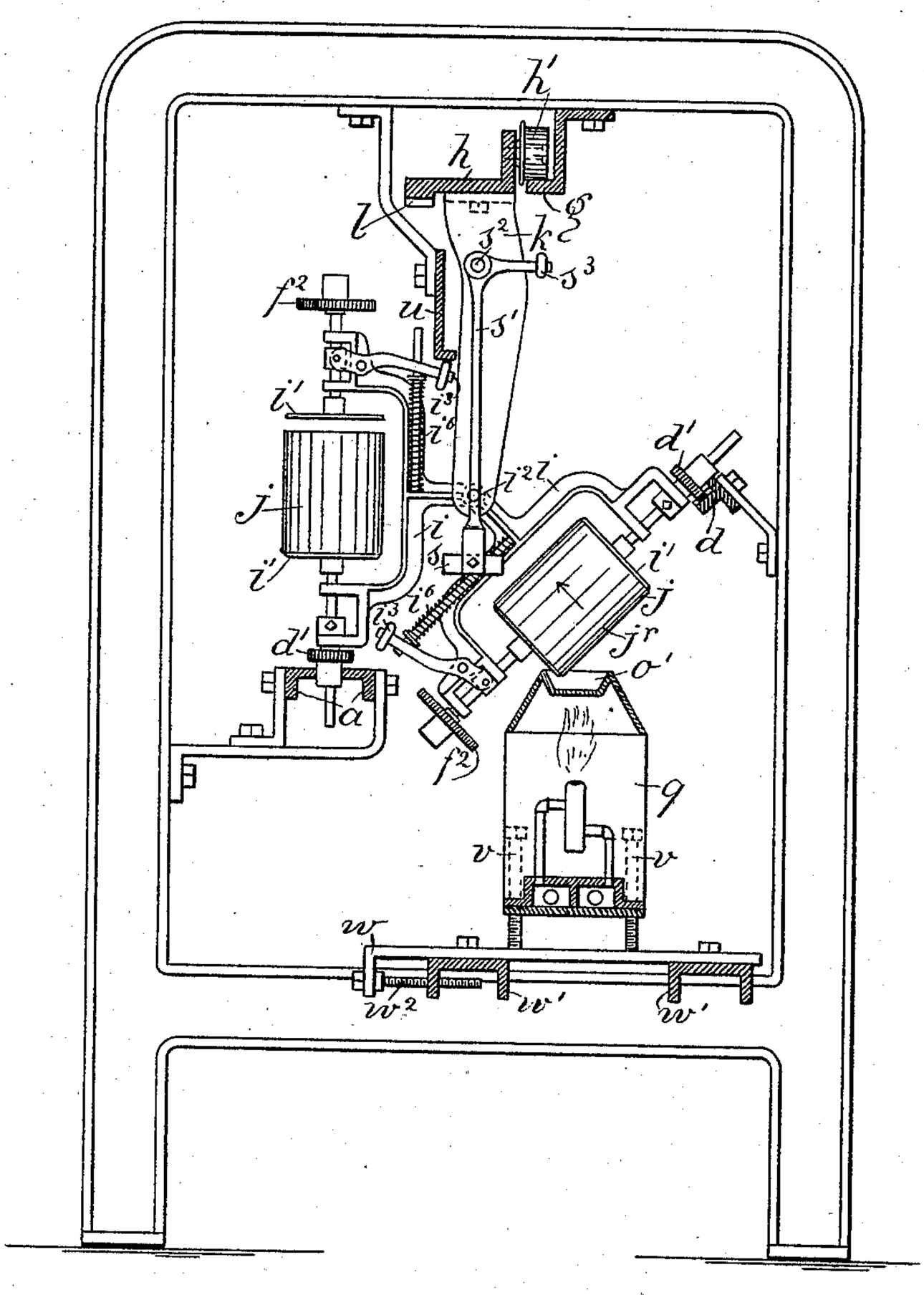
Fig. 4.



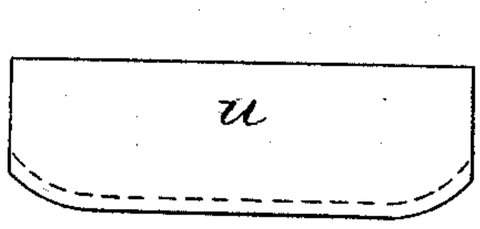


Fig. 4 A

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Fig. 5.

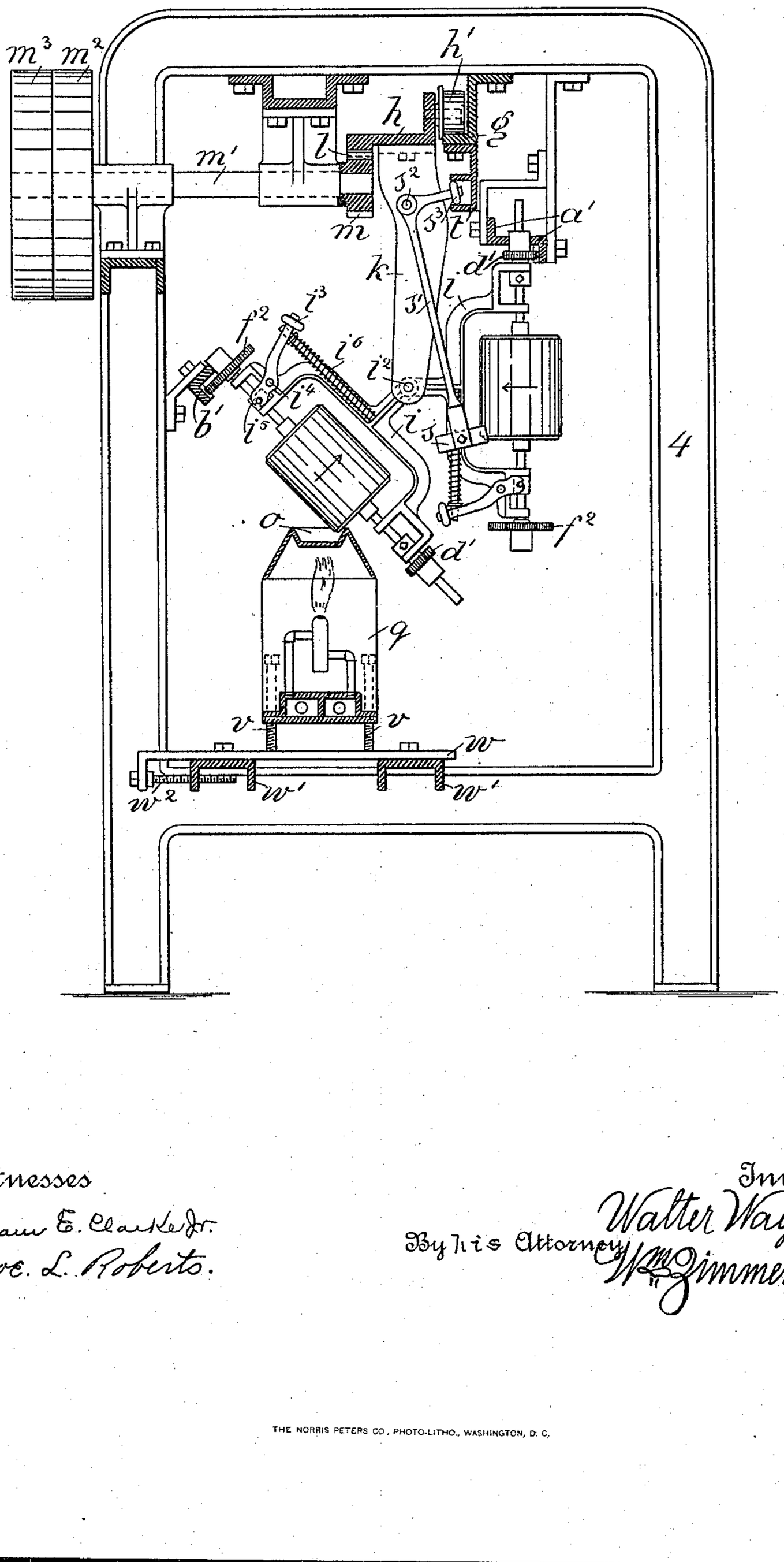

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Fig. 6.

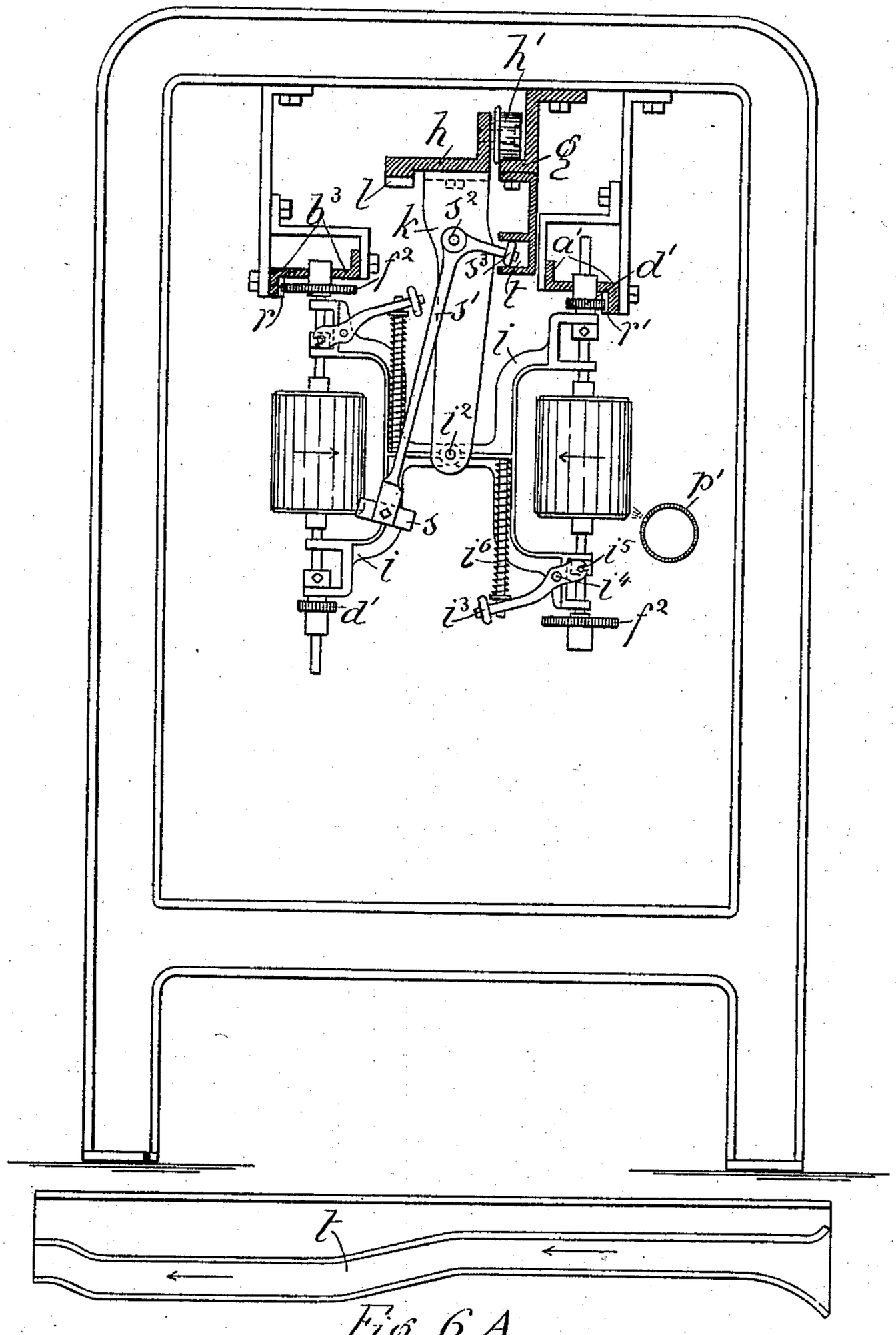

Fig. 6 A

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Fig. 7.

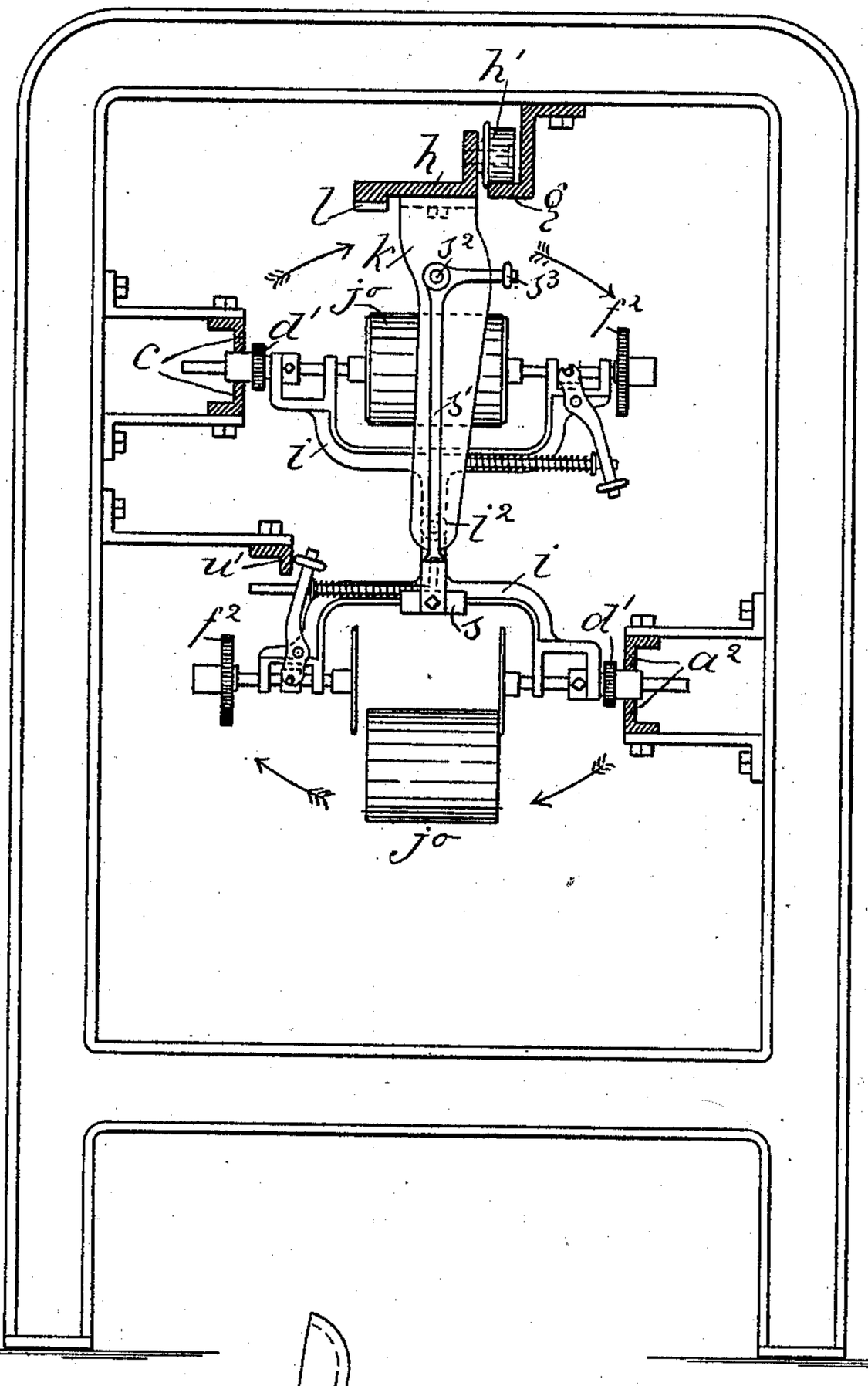

Fig. 7.A.

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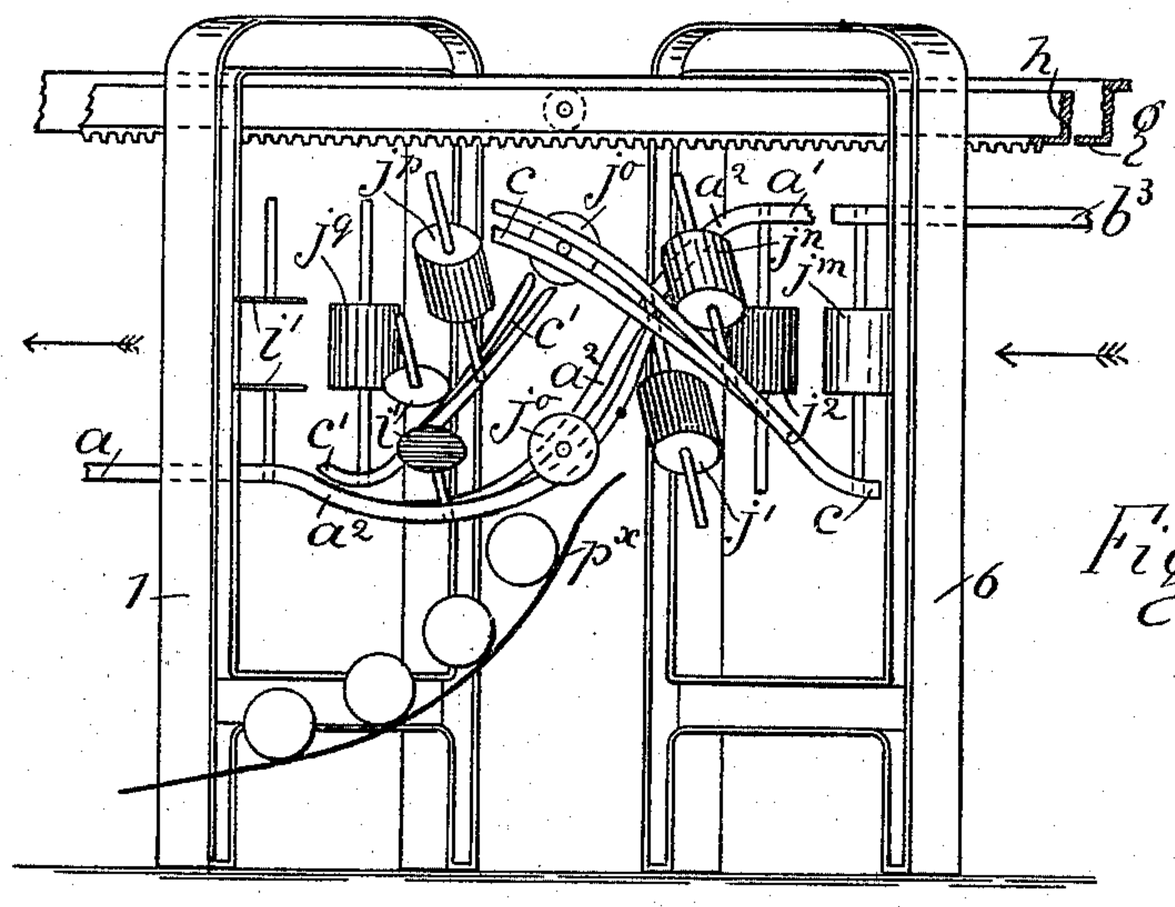

Fig. 8.

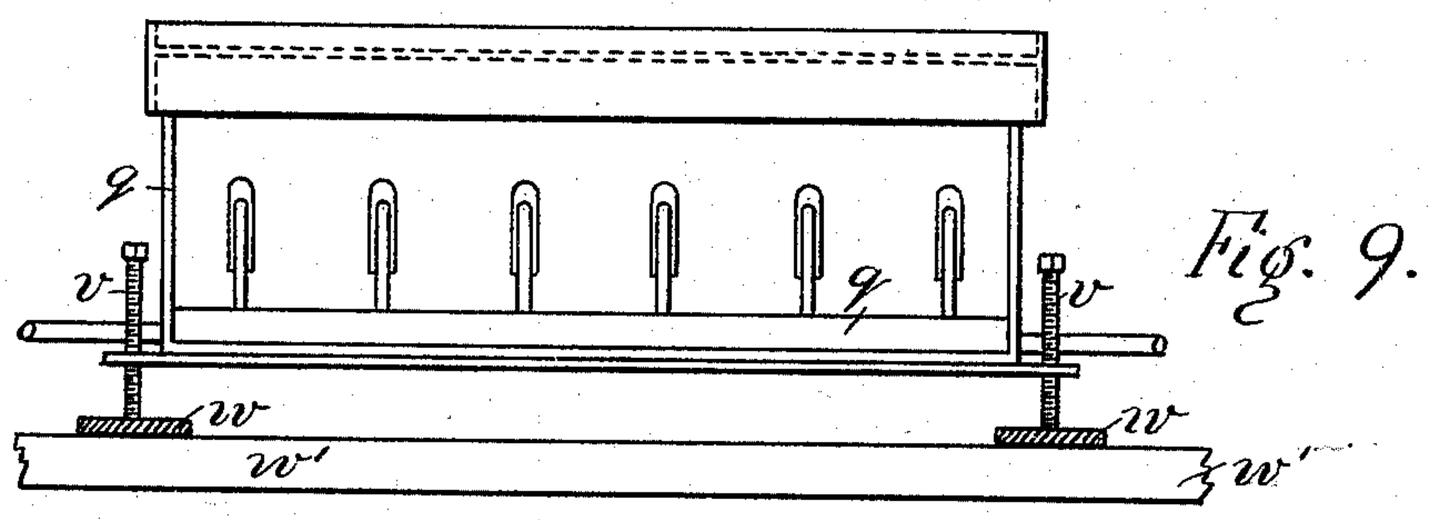

Fig. 9.

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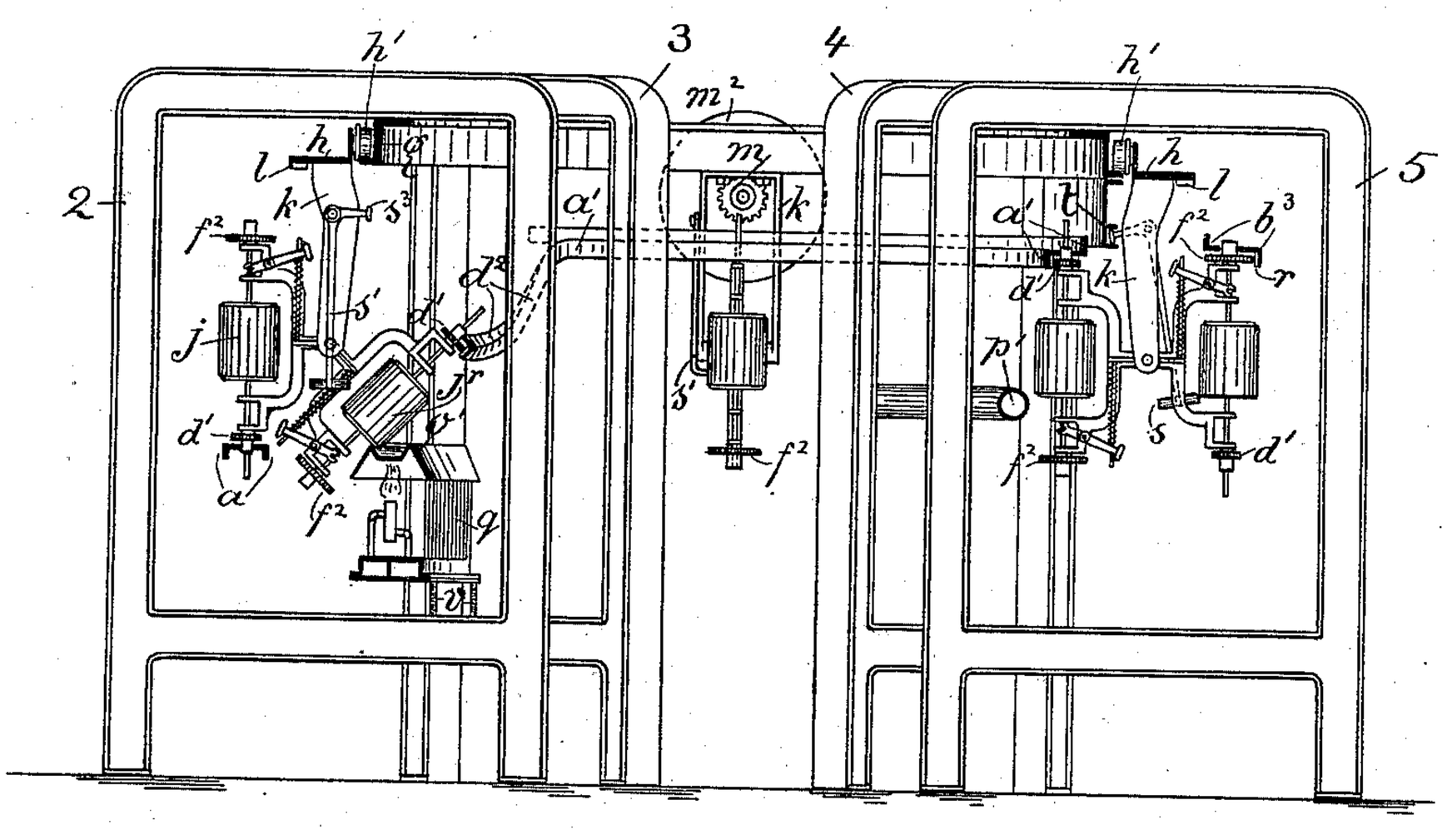

Fig. 10.

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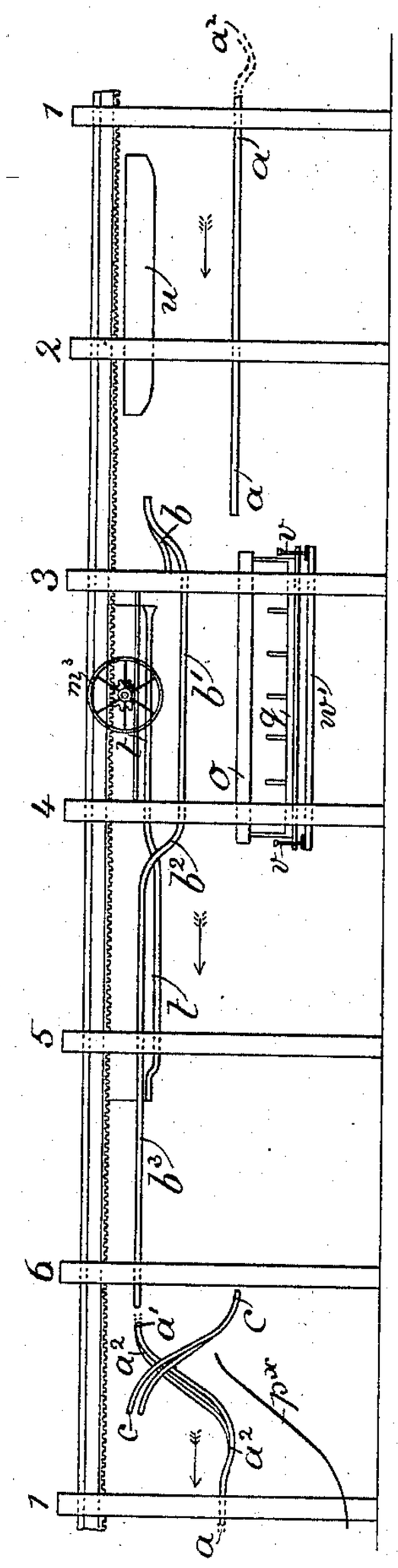

Fig. 11.

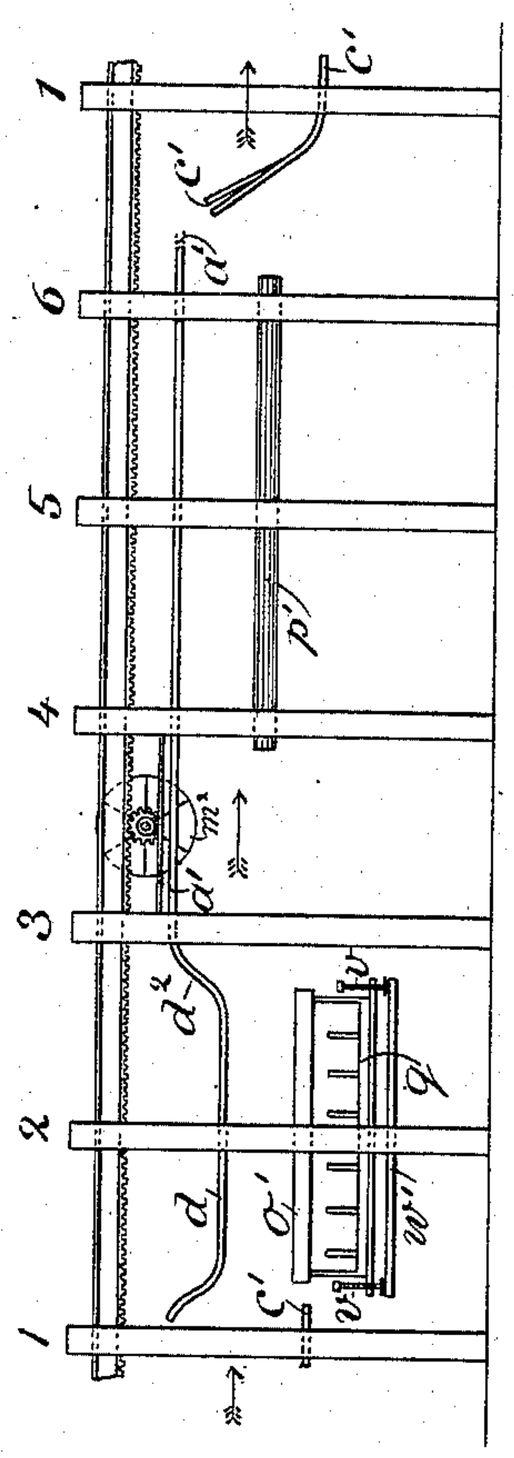

Fig. 12.

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UNITED STATES PATENT OFFICE.

WALTER WAGNER, OF CHICAGO, ILLINOIS.

CAN-SOLDERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 540,371, dated June 4, 1895.

Application filed July 1, 1893. Serial No. 479,329. (Model.)

To all whom it may concern:

Be it known that I, WALTER WAGNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Can-Soldering Machines, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part hereof, in which—

Figure 1 shows my improved can-soldering machine in plan view, the upper parts of the frames being broken away and all other machinery removed except the circular and in part spiral cams which guide the can-carriers and the cans and soldering-troughs. The machine is shown full of cans. Fig. 2 shows a fragment of the revolving ring with arm or hanger *k* and wipers with their levers *s'*. Fig. 3 shows a horizontal section through a hanger or arms *k* and *s'*, the wiper working on the can. Fig. 4 shows a vertical section taken on the plane *w w'* of Fig. 1, which is at or near the point where cans enter into the machine. In this and all similar sections the cans are moving from the observer and the right-hand cans are on the inner and the opposite cans on the outer circle as they move in the machine. An inside can is passing through the soldering-trough. The outer can is yet unsecured between the chucks. Fig. 4^{A} shows in side elevation, as seen from the outside of the machine, the cam which operates the mechanism which actuates the movable chuck of the can-carrier. Fig. 5 shows a vertical section taken on the line *x x'* of Fig. 1. Here the outside can is undergoing the soldering operation while the inside can is being wiped. It also shows the mechanism which drives the revolving ring. Fig. 6 shows a vertical section on the plane *y y'* of Fig. 1. Here the outside can is being wiped while the now finished inside can is being cooled. Fig. 6^{A} shows a longitudinal elevation of a portion of the cam, as seen from the outside, which operates the mechanism to which the can-wiper is attached. Fig. 7 shows a vertical section on the line *z z'*, Fig. 1. Here the outside can of the preceding figure has advanced and ascended and moved into a horizontal position, while the inside can has descended and also moved into the horizontal position, at which point it is about to be discharged from the machine. Fig. 7^{A} shows in plan view the cam which operates the mechanism which discharges the can from the machine. Fig. 8 shows an outside elevation, between frames 1 and 6, of that part of the machine where the can-carriers change their said relative circular positions—that is to say, the outer carriers go to the inner and the inner carriers to the outer circle, and thus bring the opposite ends of those cans thus sent to the inner circle into the soldering-trough, and at the same time the cans finished on the inner circle are sent outward and discharged near the point where they first entered the outer circle. Fig. 9 shows a side elevation of a soldering-trough with its end supports and vertical adjusting-screws. Fig. 10 shows a vertical section of Fig. 1, the cutting plane being in front of the frames 2 and 5, only enough hangers with cans being shown to illustrate the matter sufficiently and avoid confusion. Fig. 11 shows an exterior view of my machine with the outer circle of cams and parts connected with it only developed into a plane, frame 1 and a fragment of cam a^2 being repeated. Fig. 12 shows the inner circle of cams, as seen from the interior or center of the circle, and parts connected with it only developed into a plane, frame 1 and a part of cam *c'* being repeated, the repetition of frame 1 and cams being made to show more fully and clearly the several parts. The arrows in both figures indicate the same motion of the cams.

Like letters and figures refer to like parts.

The object of my invention is to produce a soldering-machine of that class whereof the form is circular and in which the cans move in a series of concentric circles and wherein the cans undergo a complete operation and discharge from the machine, and, to thus save a vast amount of room and cost of production of such a machine.

To attain said desirable ends I make use of a rotating horizontal carrier, or ring *h*, from which depend fixed hangers, or arms, holding can-carriers placed radially and so as to form inner and outer, or concentric circles of cans, and said circles of cans are adapted to change, at fixed places, from one circle to the other and end for end into the soldering trough after which they are wiped, cooled and discharged from the machine.

I construct my said machine in substantially the following manner, namely: Its frame work consists of a series of cast iron frames 1, 2, 3, 4, 5, 6; set radially and equidistant from a point, and are connected by and support a circular track, g, on which, on rollers, h', rotates an annular carrier, h, with gear-teeth l and dependent fixed arms k, which support between them, on pins i^2 radially revolving can-carriers, i, which are actuated by means of fixed cams a, b, b', b^2, b^3, c, c', d, d^2, a', a^2, also supported by said frames. One of said frames (4) carries a shaft m' with pinion, m, which engages the teeth, l, and a fixed pulley, m^2, and loose pulley, m^3, to actuate said carrier.

In Fig. 1 the cans, j, are represented by circles and by shaded cylinders, where they are inclined to the line of sight. The can ends thus shown may also be regarded as the geometrical representation of the chucks, i', which hold the cans, because the position of the one indicates the position of the other and each represents the position of the can-carrier, i, which holds the can. Said chucks or plates, i', are shown with the can-carrier, i, on enlarged scales in Figs. 4, 5, 6, and 7, and are also shown in Fig. 8. All details are omitted from Fig. 1, because the parts there represented are thus more easily understood.

From the preceding statement a sufficiently clear idea has been given to show the operations a can undergoes in passing through the machine, omitting, for the present the details of mechanism required to complete the operation.

Looking at the machine between the frames, 1 and 6, Figs. 1 and 8, we see a pair of chucks, plates, or heads, i', near 1, open to receive a can, vertically, and supplied with a can in Fig. 4, which approach and clamp cans placed between them, when slightly advanced from said position as indicated.

The cam, a, holds the spindle of the lower chuck or head i', and thus the carrier i and its can, j, in an erect position (see left hand can in Fig. 4) until it gets near 3. At that point the said cam ends and the end of the upper spindle enters a curved and slotted cam, b, which moves the can outward around the pin, or center, i^2, upon which the carrier turns to incline it, as shown in Figs. 1 and 5. At the end of said cam, b, begins a rack, b', which engages the pinion f^2, on the upper spindle of each carrier i. In said position the lowest corner of the can dips into and revolves in a trough, o, of melted solder. Said trough, and rack, terminate near 4, where the rack forms an upwardly and inwardly curved cam, b^2, which again erects the can. At the termination of the short part, b^2, begins the part b^3, which, with a corresponding inside part forms the circular and slotted cam b^3, similar to the cam, a, which extends to about the central plane of 6. Directly under the cam b^3 begins a cam c, which engages the spindle of the opposite or lower end. Said cam bends outwardly, and extends upward, at the same time curving inward, spirally as abruptly as possible, and far enough to turn the axis of the can into the horizonal position, shown by the upper can, in Fig. 7, where, or slightly farther on, said cam terminates and at said point the opposite spindie enters the slotted cam, c', which, from said point, descends about as abruptly as the cam, c, ascends, and the ends of the can are thus reversed. At this point the lower cam, c', terminates and the upper cam, d, begins and receives the upper end of the spindle and brings the can-carrier down into the position shown in Fig. 4, where the pinion d' engages with the rack d, which rotates the can. Said rack terminates with an upwardly rising and outwardly turning part d^2 which sets the can vertical, from whence said cam continues in a horizontal position and circular form and with a corresponding outer piece forms the slotted cam a', terminating in about the same radial plane as b^3. At said latter point said cam twists and curves abruptly into a part a^2 which reaches over to and joins the cam, a, near 1, of which it is, in fact, a part, the parts d, d^2, a', a^2, and a, forming one connected piece. Through said cam, a^2, the can-carrier receives a half-revolution and is thus brought into its original position ready to receive another can.

When the cans have been soldered in the troughs o, o', they must revolve axially for the purposes of both wiping and cooling them. This is accomplished by providing rack-teeth, r, under the exterior member of the cam, b^3, and rack teeth, r', for the interior member of the cam, a'; the pinion f^2, engaging with the rack r, and the pinion d' with the rack r', a pipe, p, throwing a cold air-blast against the last soldered joint to cool it sufficiently before the can is dropped out of the machine.

Wipers, s, wipe the cans when soldered and again erect. Each wiper is operated by a bell-crank lever, s', pivoted at s^2, on arm, k, and operated by a slotted and circular cam, t, under the track, g, which receives the roller, s^3, on shorter arm of said lever. By varying the vertical position of said cam, or parts of it, the wiper s, will engage with and wipe on the inner or outer circle of cans. In Figs. 4 and 7 the roller s^3 is free. Hence the wiper hangs midway between the two circles of cans. In Fig. 5 the cam, t, is above the pin s^2. Hence the wipers work upon the inner circle of cans. In Fig. 6 it is below the said pivot. Therefore the wipers work upon the outer circle of cans.

The chucks i' are adjusted in any well known manner for the particular height of cans. One chuck in each carrier is operated by a lever i^3 fulcrumed at i^4 and holding a collar i^5, at its outer end, on the chuck spindle. The free end of said lever is moved outward by a spring i^6 and said lever is moved oppositely by a cam, u, when the chucks are to open to receive a can; and, closed and held by the spring, i^6, when released from said

cam, u, and again opened by the short cam u' when the cans are to be dropped from the machine.

The soldering troughs, o, o', are supported on a frame-work, q, which also carries the gas-burners. They are permanently adjusted to each other. Said frame-work is supported at its four corners by vertical adjusting screws, v, which stand on radially adjustable bars w, supported on beams w', w', on the frames 4, 5, 6. Said bars w, and beams w' are connected by screws w^2 whereby the troughs o, o', can be moved toward or from the center of the machine.

The cans, shown in Fig. 7, above each other, are shown in Fig. 8 at j^o, j^o, and in Fig. 1 by the single can j^o. The upper can is shown in Figs. 7 and 8. Said upper can came from the cam b^3 which passed it into the inclined cam, c, as j^m, j^n, j^o, and from which it passed into the cam, c', as, j^p, j^q, which, if followed into the position shown in Fig. 4, would be shown at j^r.

The finished cans, after they have passed through the inner circle of cams, &c., come from the cam, a', into cam, a^2, as can j^2, j', j^o, which brings them into the position shown in Fig. 7 where they are dropped from the machine onto the incline p^x. From thence the now empty chucks pass on into an inclined and then erect position and into the cam, a, as shown in Figs. 4 and 8 where, in the latter place the can is already in position to be secured between the chucks and to pass on into the soldering-trough, o, thence to the inner soldering-trough o' and thence out of the machine, as before pointed out.

The now known can-soldering machines have but one circle of can carriers and they do not revolve in a complete, but only in a partial circle which also requires manual assistance to complete such motion.

The form of my carrier is substantially that of a machinist's parallel clamp resembling the half of a lengthwise divided frame the axes of the chucks being coincident with that of the screw, in the open side of the frame. The axes on which the carrier rotates is, transverse to its plane, in a lug back of, or opposed, to the open edge of said frame.

What I claim is—

1. The combination with can-carriers each revolving on an axis at one side of and transverse to the axis of revolution of the can, of circular cams having spiral portions for revolving the carriers, mechanism for moving the carriers about a center concentric with that of the cams and soldering mechanism, substantially as specified.

2. The combination with can carriers in the form of an open frame pivoted on an axis at the side of the carrier opposite the opening of the frame, of circular cams having spiral portions for revolving the carriers, mechanism for moving these about a center coincident with the center of the cams and soldering mechanism, substantially as specified.

3. The combination with concentric circles of can-carriers simultaneously moving on axes transversed, one fixed and the other moving, of concentric circles of soldering mechanism and means to revolve the cans and the carriers, substantially as specified.

4. The combination with concentric circles of can-carriers, transferable from circle to circle on an axis moving around a common center, of soldering mechanism, substantially as specified.

5. The combination with a circular track and rotary carrier-ring thereon with can-carriers revolving on their own axes, of soldering and wiping mechanism, and means to actuate said parts, substantially as specified.

6. The combination with a circular track with rotary carriers thereon holding concentric circles of radially revolving can-carriers, of concentric circles of soldering mechanism, substantially as specified.

7. The combination with concentric circles of can-carriers each on both a moving and a common fixed axis and mechanism to incline a can-body once in its circle and to revolve it twice on its fixed axis, of soldering mechanism to operate therewith, substantially as specified.

8. The combination with concentric circles of can-carriers revolving, each in a plane on a moving and on a fixed center, of concentric circles of soldering and wiping mechanism, substantially as specified.

9. The combination with concentric circles of can carriers on axes transversed, one a fixed and the other a moving center of revolution on which said carriers turn and means to actuate said carriers, of soldering mechanism, substantially as specified.

10. The combination with concentric circles of can-carriers revolving, simultaneously, on a moving and a fixed center, of chucks to said carriers with mechanism to hold and to rotate cans in said chucks and means to rotate said can-carriers on their moving centers and to actuate them, substantially as specified.

11. The combination with concentric circles of can-carriers revolving simultaneously on a fixed and on moving centers, of soldering and wiping mechanism to act alternately on each circle of cans, substantially as specified.

12. The combination with can carriers rotating simultaneously on a fixed and on moving centers, of chucks with mechanism to hold and rotate cans in said carriers and means to solder, and wipe, said cans, substantially as specified.

13. The combination with concentric circles of can-carriers revolving simultaneously on a fixed, and on moving centers, of concentric circles of mechanism to revolve, invert, solder, wipe, and pass the cans from one circle to the other and means to hold and to release the cans from said carriers, substantially as specified.

14. The combination with concentric circles of can-carriers revolving simultaneously on a fixed and on moving centers, of concentric cir-

cles of mechanism to revolve, invert, rotate, solder and wipe the cans and to hold and release them from said carriers, substantially as specified.

15. The combination with a track and carrier thereon holding concentric circles of can-carriers revolving thereon, in radial planes, of concentric circles of mechanism to revolve said can carriers, concentric circles of soldering mechanism, and means whereby said carriers are passed from one to the other of said circles, substantially as specified.

16. The combination with a circular track and carrier thereon, of concentric circles, of can carriers, soldering mechanism, and cams to rotate said can-carriers and pass them from one circle to the other, substantially as specified.

17. The combination with a circular track and carrier thereon, of concentric circles of can-carriers, soldering mechanism and cams to rotate said can-carriers and cans and pass them from one circle to the other and to wipe, clamp, and release the cans, substantially as specified.

18. The combination with concentric circles of can-carriers, revolving simultaneously on a fixed, and, on moving axes, of soldering mechanism and cams to rotate said can carriers, and mechanism to hold, revolve, solder, invert, wipe, and pass the cans from circle to circle and to release them, substantially as specified.

19. The combination with can-carriers revolving simultaneously on a fixed and on moving axes in a plane through said fixed axis and the can-axes and mechanism to actuate said can-carriers, of soldering mechanism, substantially as specified.

20. The combination with concentric circles of can-carriers revolving simultaneously on a fixed, and moving axes, of mechanism to revolve, invert, solder, wipe and pass the cans from the machine, substantially as specified.

21. The combination with concentric circles of can-carriers revolving simultaneously on a fixed, and, on moving axes, of mechanism to hold, revolve, invert, solder wipe, and pass the cans from one circle to the other and to release them, substantially as specified.

22. The combination with a rotary carrier-ring holding can-carriers, each revolving on its own axis and said axes revolving around a common axis, of concentric circles of soldering mechanism, substantially as specified.

23. The combination with horizontally moving can-carriers and soldering mechanism, of horizontally and vertically adjustable burners, substantially as specified.

24. The combination with concentric circles of can-carriers each carrier revolving on an axis and all revolving on a common axis and can-carrier actuating cams transferring, successively, from circle to circle said carriers, of soldering mechanism, substantially as specified.

25. The combination with concentric circles of can-carriers each revolving on a moving and all revolving on a fixed axis and cams to actuate said can-carriers and transfer them from circle to circle and give the cans axial rotation, of soldering mechanism, substantially as specified.

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