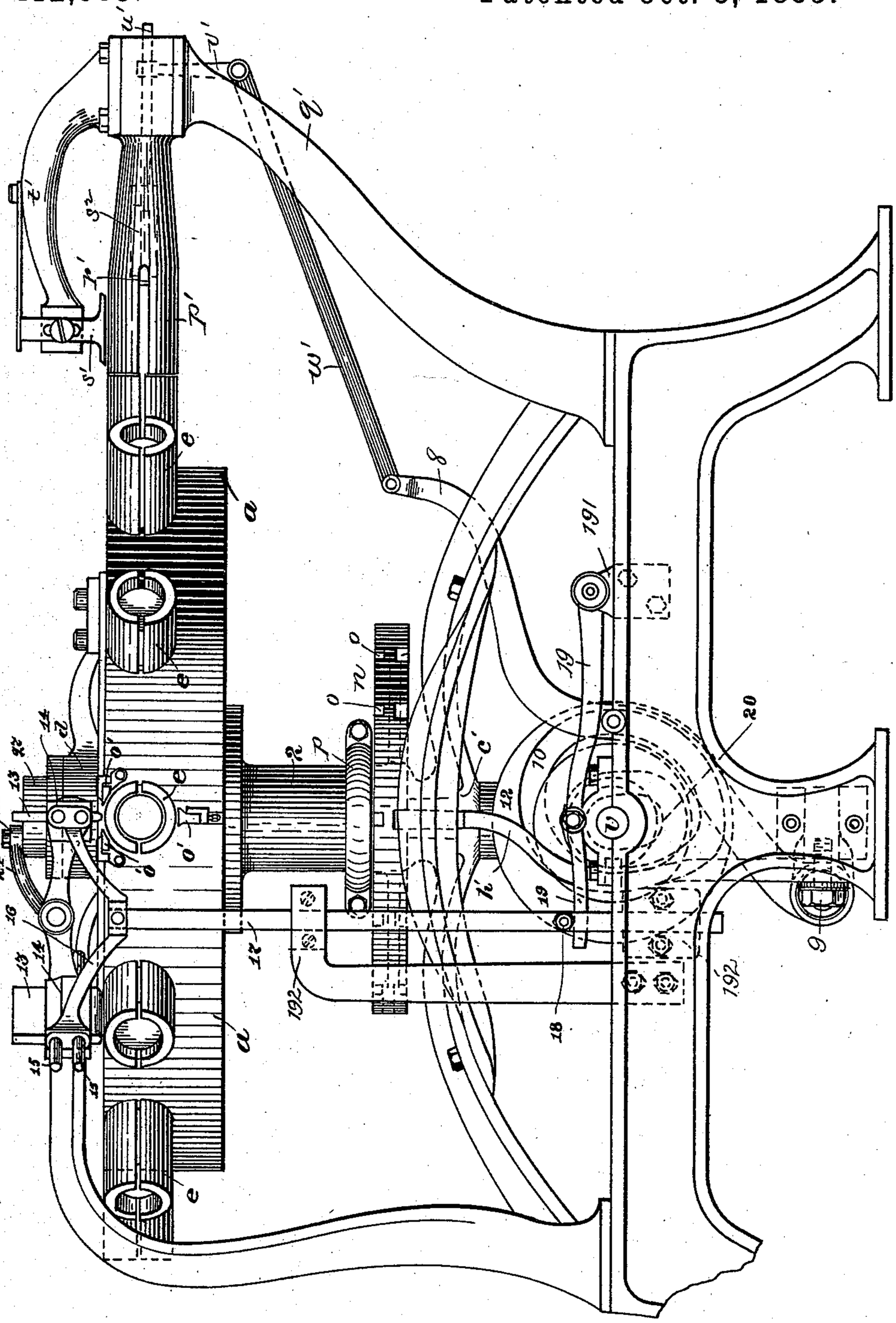
(No Model.) 3 Sheets—Sheet 1.

E. E. ANGELL.

SOLDERING APPARATUS FOR CAN SOLDERING MACHINES.

No. 412,583. Patented Oct. 8, 1889.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

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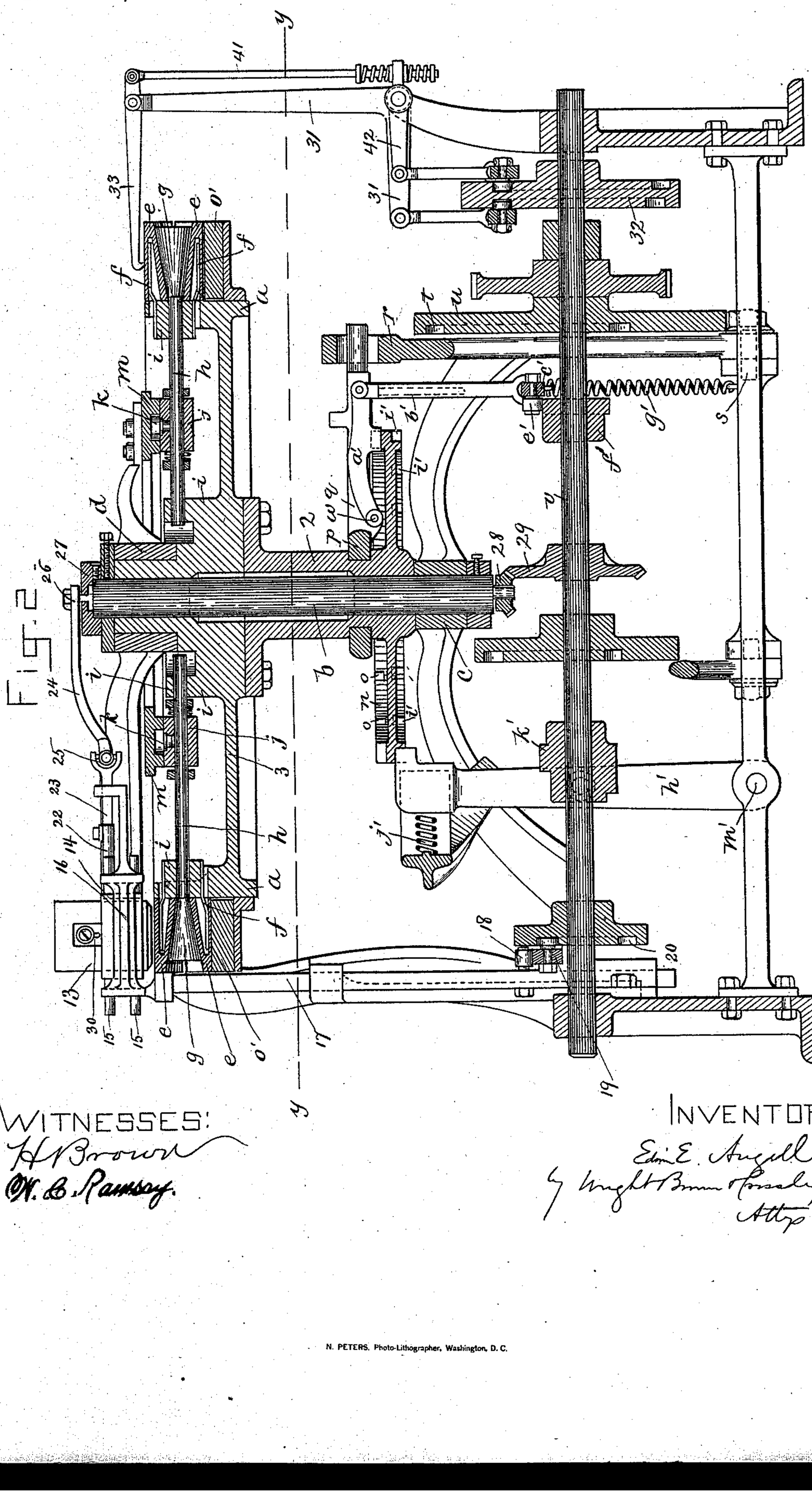

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

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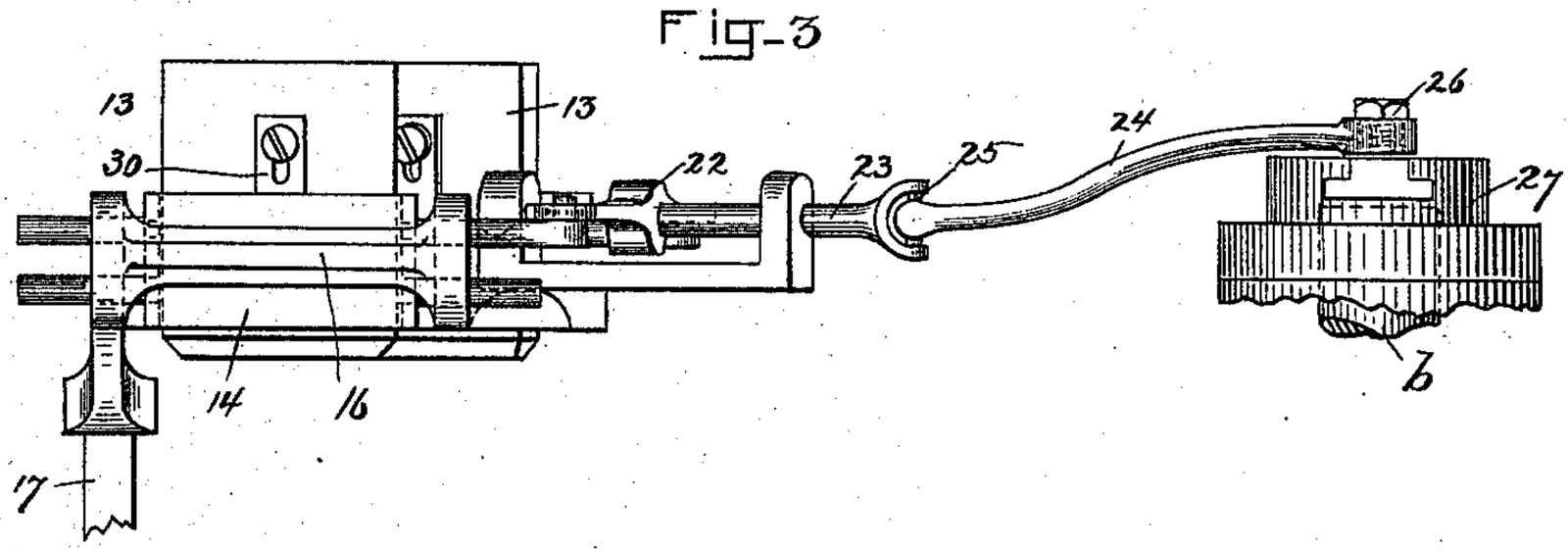
Fig-3



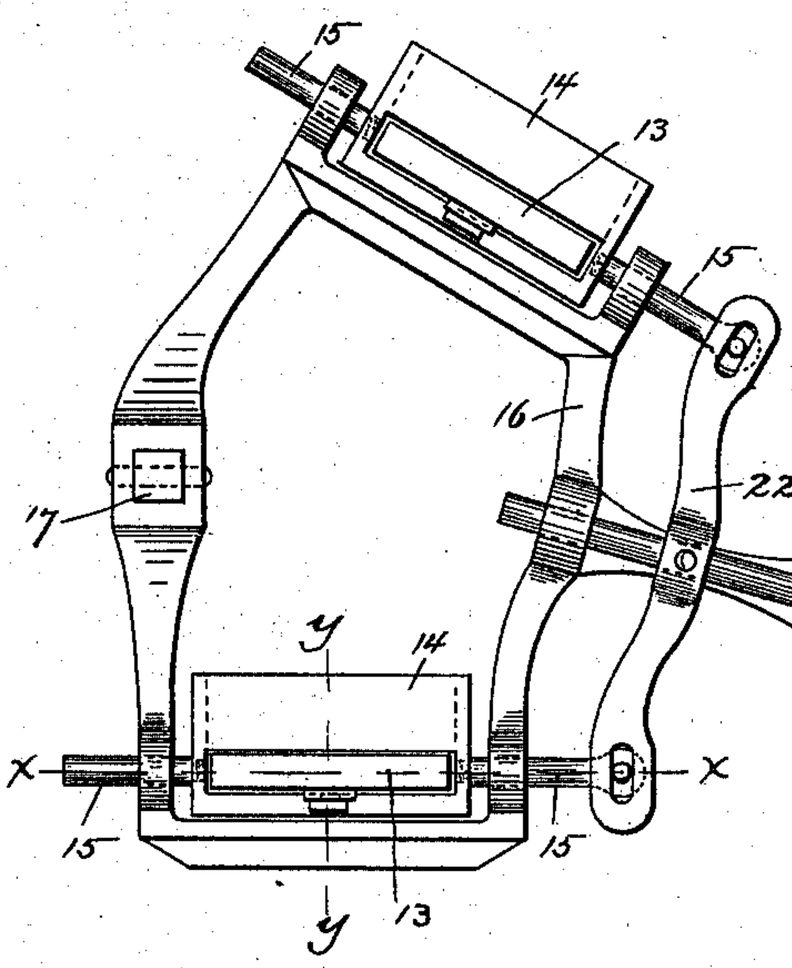


Fig-4.

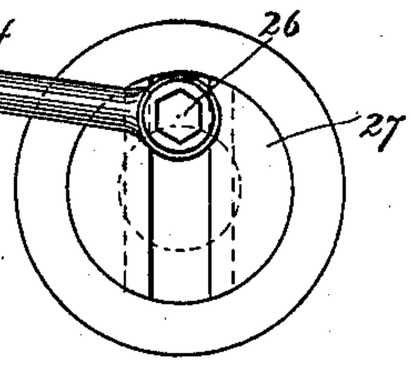


Fig-5.

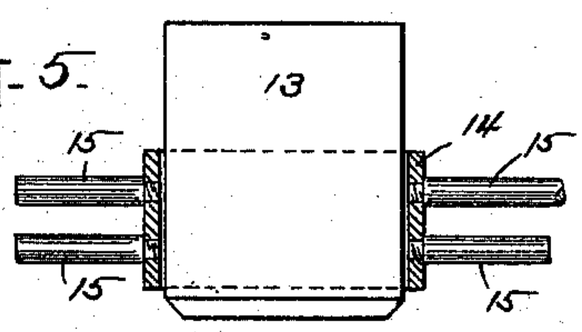
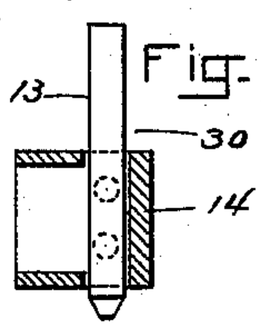


Fig-6.



WITNESSES:
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UNITED STATES PATENT OFFICE.

EDWIN E. ANGELL, OF BOSTON, ASSIGNOR OF ONE-HALF TO E. B. WELCH, OF CAMBRIDGE, MASSACHUSETTS.

SOLDERING APPARATUS FOR CAN-SOLDERING MACHINES.

SPECIFICATION forming part of Letters Patent No. 412,583, dated October 8, 1889.

Application filed January 29, 1889. Serial No. 298,009. (No model.)

To all whom it may concern:

Be it known that I, EDWIN E. ANGELL, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Soldering Apparatus for Can-Soldering Machines, of which the following is a specification.

This invention has for its object to provide improved means for soldering the seams of sheet-metal can-bodies; and it consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a portion of an organized can-machine provided with my improvements. Fig. 2 represents a vertical section of the same. Figs. 3 and 4 represent, respectively, a side and a top view of the soldering devices separated from the blank holding and carrying devices. Fig. 5 represents a section on line *x x*, Fig. 4. Fig. 6 represents a section on line *y y*, Fig. 4.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents a rotary carrier or turret having a hub 2 connected with the turret by spokes or arms 3. The hub of the turret is fitted to rotate on a vertical shaft *b*, and is supported by a fixed bearing *c*, in which said shaft is journaled, the lower end of the hub resting on said bearing, as shown in Fig. 2. The turret and shaft are capable of rotating independently of each other, the shaft serving both as a center on which the turret may rotate and as a means for reciprocating the soldering-irons, as hereinafter described. The upper end of the hub is formed as a journal and fitted in a fixed bearing *d*. The bearings *c d* are parts of the supporting-frame of the machine. The turret is provided with a series of radiating mandrels *e*, each of which is composed of sections connected by flexible arms or springs *f f*, Fig. 2, with the turret, said flexible arms permitting the mandrel-sections to move from and toward each other for the purpose of expanding and contracting the mandrel. Within the mandrels are a series of conical wedges *g*, which are formed on radiating rods *h*, fitted to slide in guides *i i* on the turret. Said rods are provided within the turret with sleeves or collars *j*, which are provided with trundle-rolls *k*, projecting into a groove in a fixed cam *m*.

The turret is rotated step by step by the devices which I will now describe.

n represents a flanged wheel affixed to the hub 2, and having in the upper edge of its flange a series of notches *o*, corresponding in number and position to the mandrels. On the hub is fitted the collar *p*, on which is formed a lever *q*, said lever and its collar being adapted to oscillate horizontally. The outer end of the lever projects into a slot in the upper end of a lever *r*, the lower end of which is pivoted at *s* to an ear or bracket on the supporting-frame. Said lever *r* has a trundle-roll, which enters a cam-groove *t* in a disk *u* on the driving-shaft *v*. The rotation of said disk oscillates the lever *r*, which in turn oscillates the horizontal lever *q*. To the lever *q* is pivoted, at *w*, a dog *a'*, which is formed to engage the notches *o* in the wheel *n*. The outer end of said dog is pivoted to a vertical rod *b'*, the lower end of which is pivoted to one end of a lever *c'*, which is pivoted to the supporting-frame and has a trundle-roll *e'* bearing on the periphery of a cam *f'* on the driving-shaft. A spring *g'* holds said roll on the cam and pulls downwardly on the dog. The rotation of the cam *f'* and the force of the spring *g'* oscillate the dog vertically, as will be readily seen. The horizontal movements thus given to the lever *q* and the vertical movements given to the dog *a'* are so timed that when the dog is depressed and engaged with a notch in the wheel *n* the lever *q* is moved horizontally in the direction required to rotate the turret one step. The dog is then raised by the cam *f'* and held raised while the lever *q* moves in the opposite direction, after which the dog is depressed and engaged with the next notch *o*, and so on, each partial motion of the turret being sufficient to present a new mandrel to the horn hereinafter described. The turret is locked after each movement by the lever *h'*, having a tooth formed to enter slots *i'* formed in the lower edge of the flange of the wheel *n*. Said

lever is thrown into engagement with one of the said slots i' when the turret stops by a spring j', and is withdrawn just before the next rotation of the turret by a cam k' on the driving-shaft bearing against a roll on said lever, the latter being pivoted at m' to the supporting-frame. The cam m is so formed that when the rotation of the turret brings a rod h to the one portion of the cam said rod and the wedge thereon are moved inwardly and the mandrel on said wedge is expanded, thus clamping the can-body blank thereon against jaws o' o' o', attached to the turret. The jaws of one of the mandrels are shown in Fig. 1; but the jaws of the other mandrels are omitted from said figure to avoid unnecessary repetition of detail, said jaws being fully shown in another application filed by me simultaneously herewith, Serial No. 298,008. The can holds the wedges in their mandrel-expanding position during a part of the rotation of the turret and while the soldering-irons are operating on the can-blank, as hereinafter described. When the rods h reach another portion of the cam, they are thrown out thereby. The wedges are thus caused to release the mandrel-sections, so that they no longer clamp the can-bodies thereon, the wedges being held in said position while the soldered can-bodies are being removed from the mandrels and while unsoldered blanks are being placed thereon.

The machine is provided with a horn p', which is affixed at one end to a fixed arm or bracket q' on the frame of the machine, and is arranged so that each mandrel is brought successively into line with it. The can-blanks, which have been previously bent into scrolls with their edges overlapping, are placed on the horn by the operator and are forced from the horn onto the mandrel coinciding therewith by jaws r' r', which are pivoted to a reciprocating carrier s^2 within the horn, and are forced outwardly by springs, their outer ends projecting through longitudinal slots in the horn. The carrier s^2 is reciprocated by the lever 8, pivoted at 9, and having a stud entering the groove 10 of the disk 12, said lever being connected by the rod w' with the arm v', attached to the rod u' of the carrier, and each movement of the carrier toward a mandrel causes the jaws to force the can-blank from the horn to the mandrel. A guide s', supported by an overhanging arm t', stands over the horn and constitutes an abutment against which the overlapping edge of the can-body blank is caused to bear by the operator. The can-blank is guided during its removal from the horn by said abutment or guide, so that when the blank is placed upon the mandrel its overlapping edge is in proper position with relation to the soldering devices to be described. The movements of the jaw-carrier are so timed with relation to those of the turret that the blank is forced from the horn while the turret is stationary.

The shaft b is continuously rotated from the driving-shaft v through the bevel-gears 28 and 29 on said shafts b and v, respectively.

13 13 represent two soldering irons or slugs, which are arranged to act simultaneously on can-blanks supported by two adjacent mandrels. Said irons are held in sliding carriers or boxes 14, which have rods 15 on their ends fitted to slide in ears or guides on a yoke or frame 16. To the outer end of said yoke is attached a vertical rod 17, which is fitted to slide in fixed guides 192 on the supporting-frame, and has a roll or stud 18, which bears on the free end of a lever 19, the other end of which is pivoted to an ear 191 on the supporting-frame. Said lever 19 is provided between its ends with a trundle-roll, which enters a cam-groove 20 in a disk 21, affixed to the driving-shaft. The rotation of said disk causes its cam-groove to oscillate the lever 19, which in turn reciprocates the rod 17, and thus alternately raises and lowers the yoke 16 and the soldering-irons supported thereby, the said irons being alternately applied to and raised from the can-blanks on the mandrels under the irons. These movements are so timed that the irons are raised while the turret is being rotated, and are lowered and held upon the blanks after the turret stops and until it is again rotated. The iron-holders 16 are continuously reciprocated horizontally to give the irons a lengthwise rubbing motion. The means whereby the irons are reciprocated are a cross-head 22, connected with the upper rods 15 on the inner ends of the iron-holders, a rod 23, affixed to the cross-head and fitted to slide in bearings on the yoke or frame 16, a pitman 24, connected by a gimbal-joint 25 with the outer end of said rod, and a wrist-pin 26, connecting said pitman with a disk 27, affixed to the upper end of the shaft b, said wrist-pin being eccentrically connected with the disk 27, so as to impart through the pitman a reciprocating movement to the rod 23, cross-head 22, and holders 14. The shaft b is continuously rotated by a connection with the driving-shaft, said connection being a bevel-pinion 28 on the shaft b and a bevel-gear 29 meshing therewith on the driving-shaft v.

The irons are placed loosely in vertical slots in the holders 16, and are provided with shoulders or projections 30 above said holders, which projections bear on the upper edges of the holders when the latter are raised, and thereby enable the holders to raise the irons. When the holders are depressed, the projections are prevented from bearing on the holders by the contact of the irons with the can-blanks. There is therefore no positive connection between the holders and the irons, the latter being entirely independent of the holders, so far as their pressure on the can-blanks is concerned, so that they can conform to variations in the thickness of the metal of different blanks, and bear upon the blanks with a pressure due only to their own weight.

The shoulders or projections 30 are prefer-

ably made adjustable, as shown in Fig. 3, to enable the height of the irons to be properly regulated.

The soldered blank or body is removed from each mandrel after the latter has been released or allowed to contract by the outward movement of its wedge by an ejector or dog 33, operated by levers 31 and 42 and rod 41, said levers and rod being actuated from the cam-grooves of the disk 32, as fully described in my application, Serial No. 298,008, above referred to. Reference may also be had to my applications Serial Nos. 298,006 and 298,007, filed simultaneously herewith, the former relating particularly to the horn and the jaw-carrier reciprocating therein, and the latter to the expansible mandrels, their co-operating clamps, and expanding mechanism, the patentable features herein shown and not claimed being claimed in my said applications.

I do not limit myself to the use of the soldering mechanism herein described in connection with the blank supporting and carrying mechanism here shown, but may use the same in connection with any suitably arranged and operated mandrels.

A single soldering-iron and its holding and operating devices and a single mandrel co-operating therewith will constitute a combination which will be no departure from the spirit of my invention.

It is obvious that many of the details of construction herein shown may be varied without departing from the spirit of the invention.

I claim—

1. The combination of a holder having an iron-receiving slot or aperture, a slug or iron placed loosely in said slot, a frame having guides in which said holder is adapted to reciprocate, means for reciprocating said holder in the frame, and a can-blank-supporting mandrel to which the iron is presented by its holder, as set forth.

2. The combination of the frame or support 16, a plurality of holders 14, adapted to slide in guides in said frame, the slugs or irons 13, loosely inserted in said holders, the cross-head 22, connected to said holders and provided with the rod 23, and means for reciprocating said rod and thereby simultaneously reciprocating the holders 14, and a plurality of can-blank-holding mandrels to which the irons are presented by said holders, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 22d day of January, A. D. 1889.

EDWIN E. ANGELL.

Witnesses:
C. F. BROWN,
A. D. HARRISON.