(No Model.) 3 Sheets—Sheet 1.

S. J. SENECA.

CAN SOLDERING MACHINE.

No. 452,584. Patented May 19, 1891.

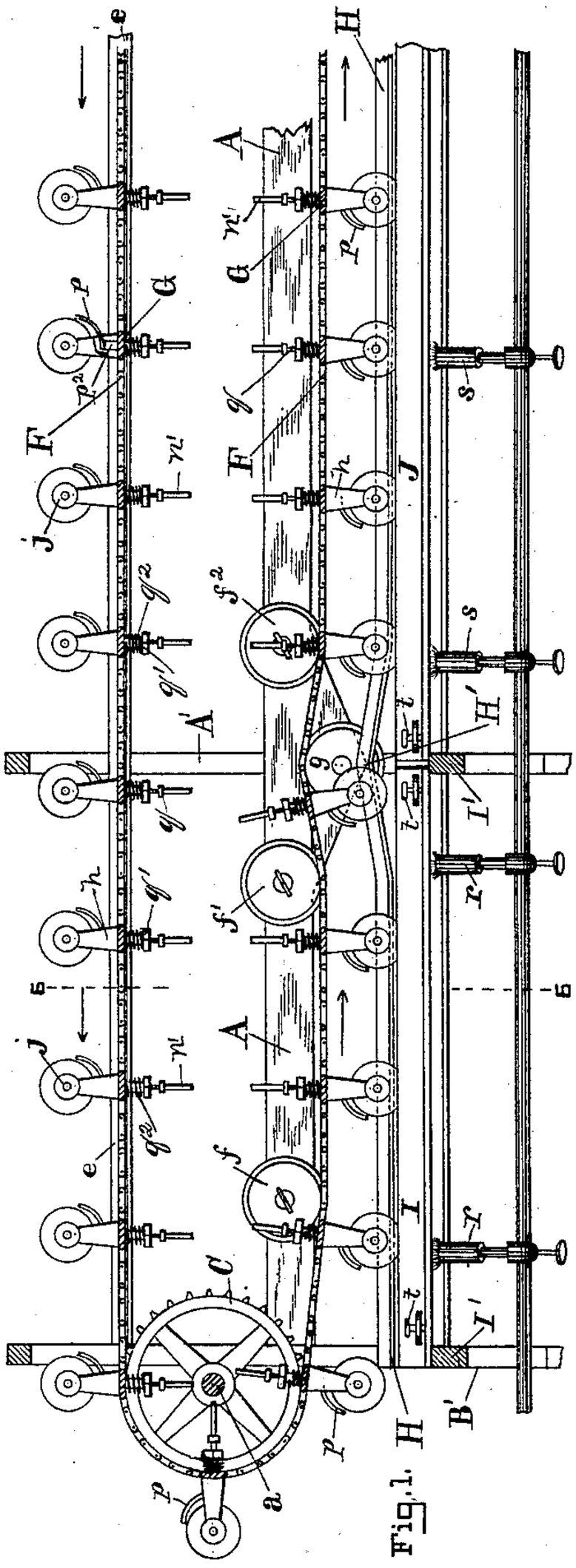

Fig. 1.

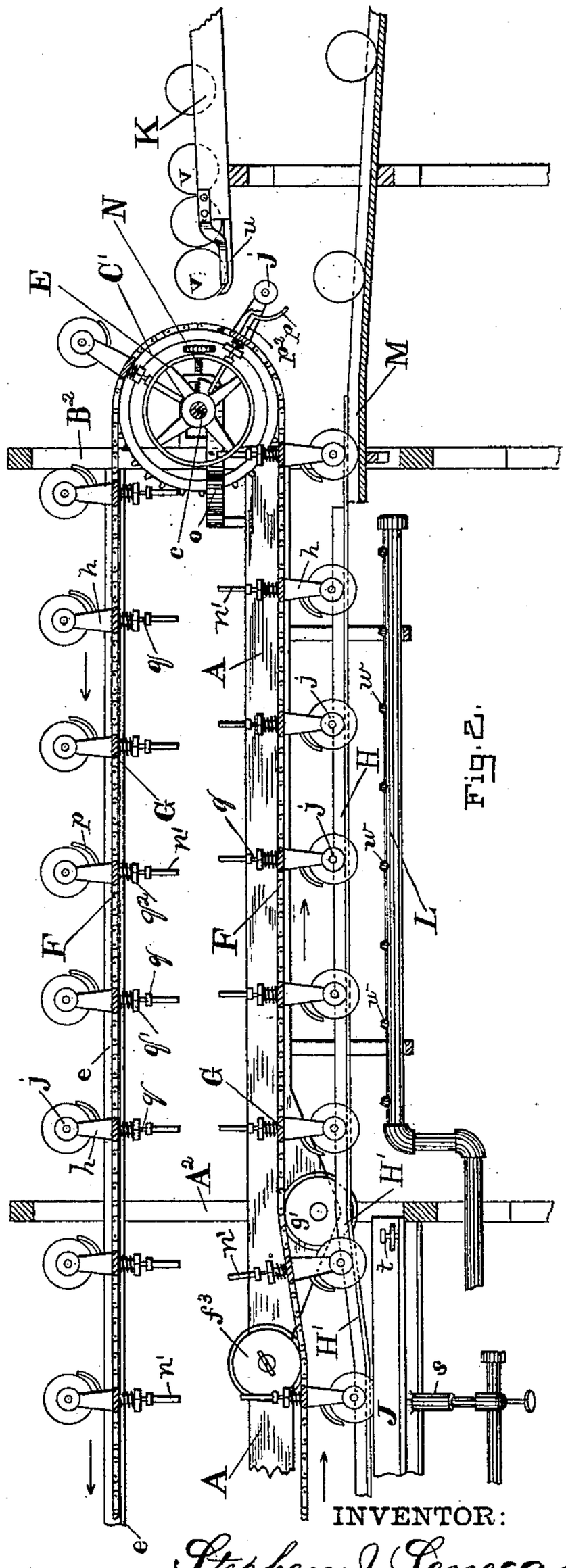

Fig. 2.

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Fig. 3.

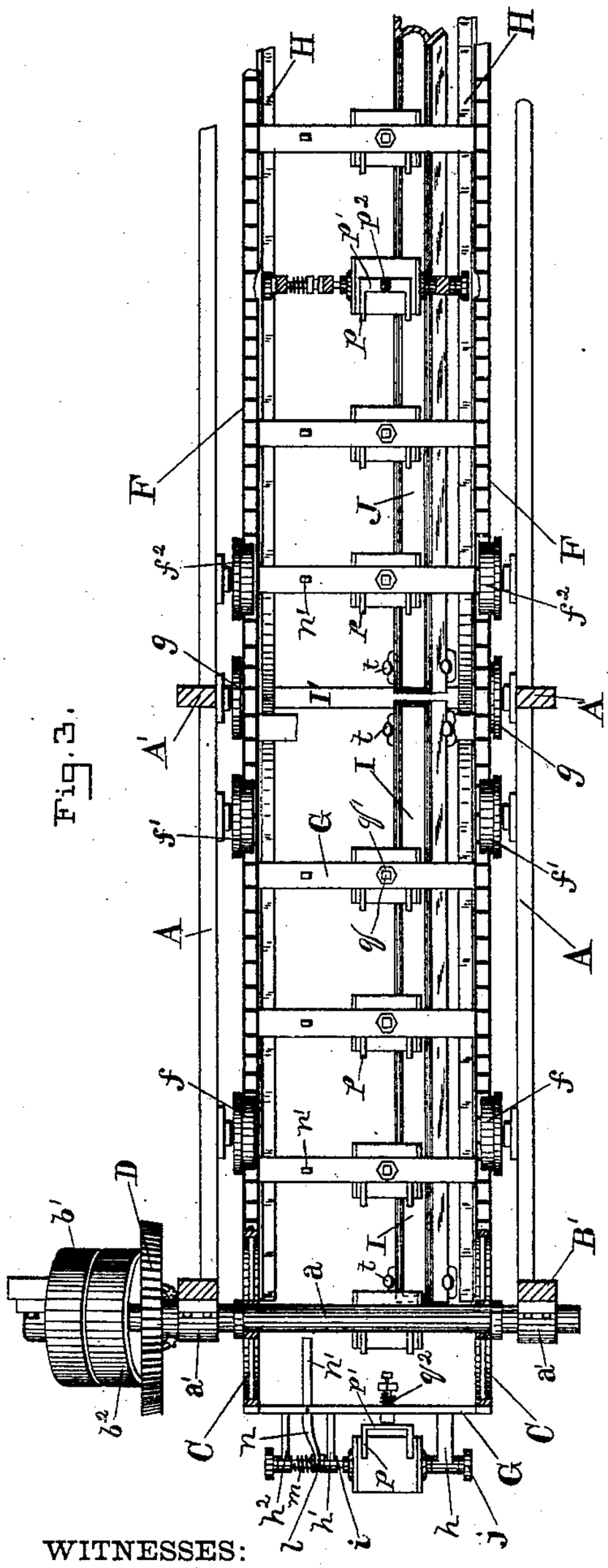

Fig. 4.

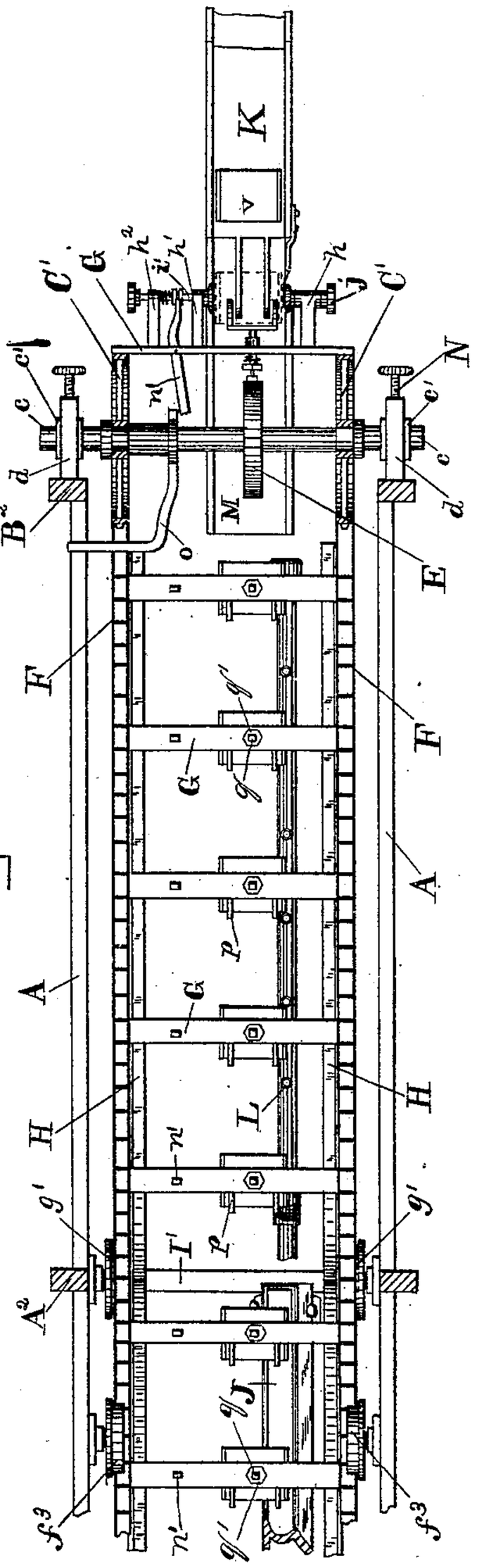

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Fig. 7.

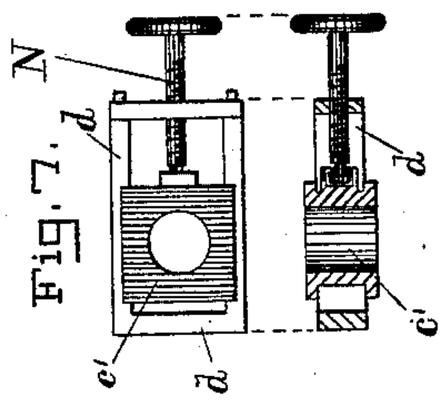


Fig. 12.

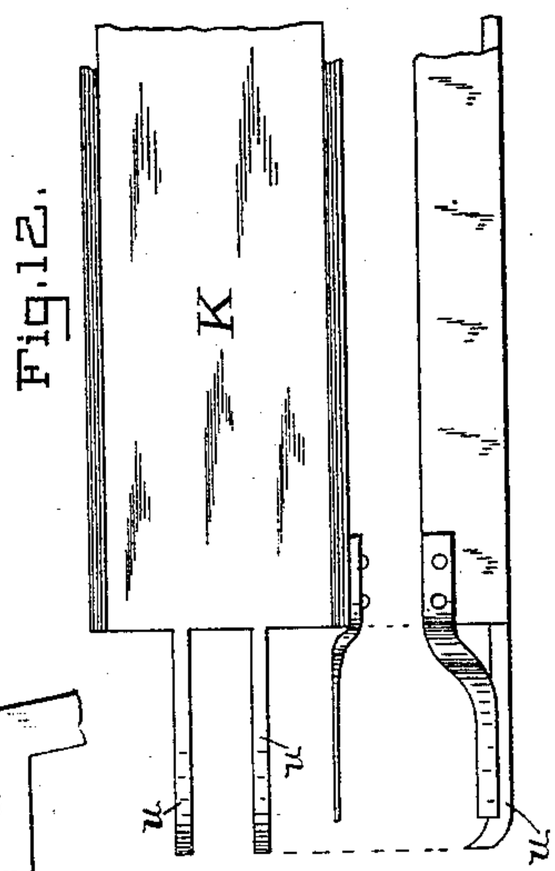


Fig. 11.

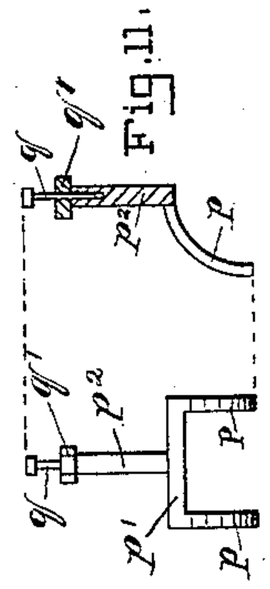


Fig. 6.

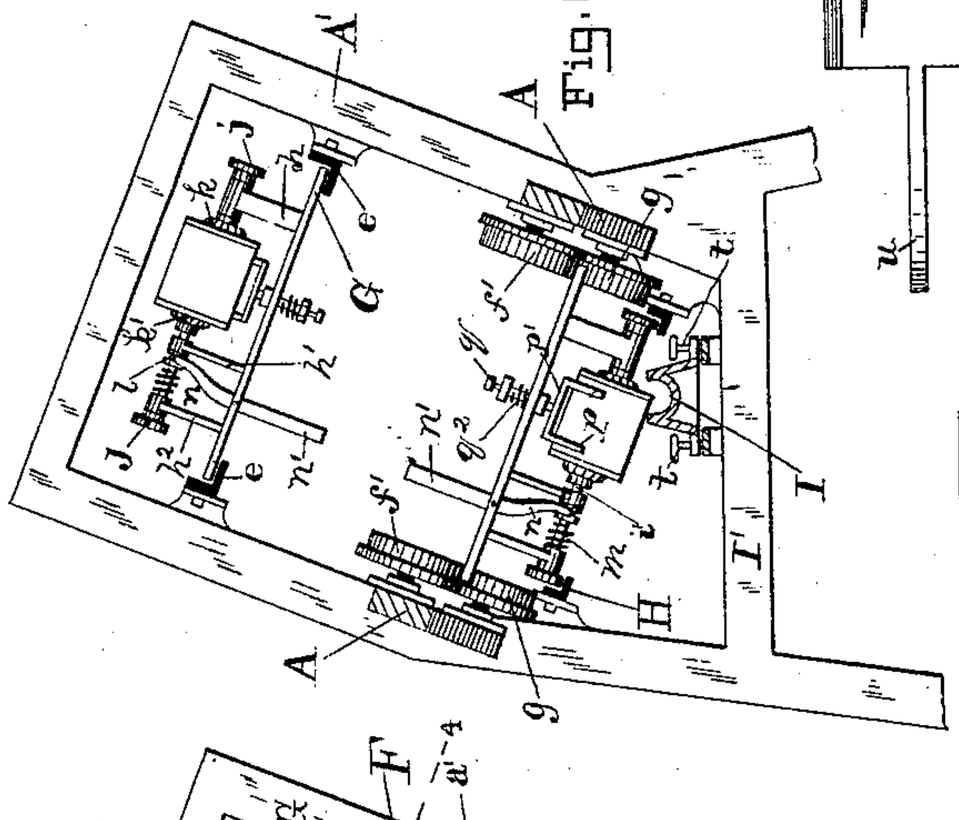


Fig. 10.

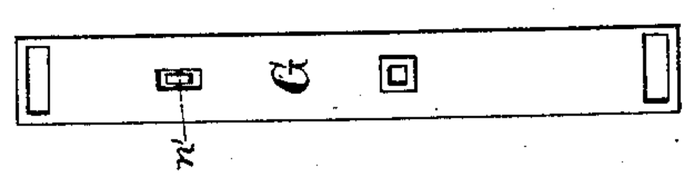


Fig. 5.

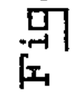


Fig. 5.

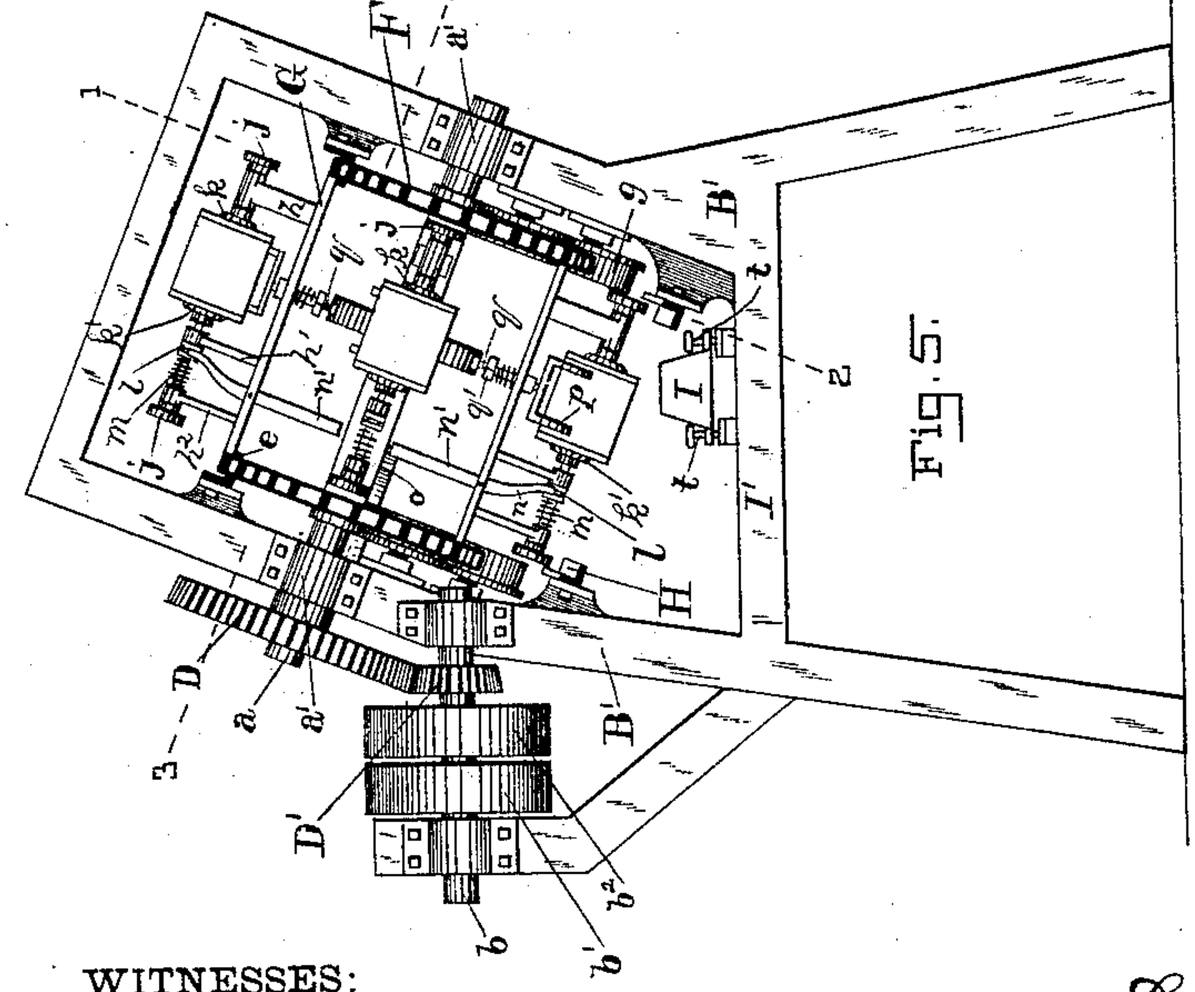
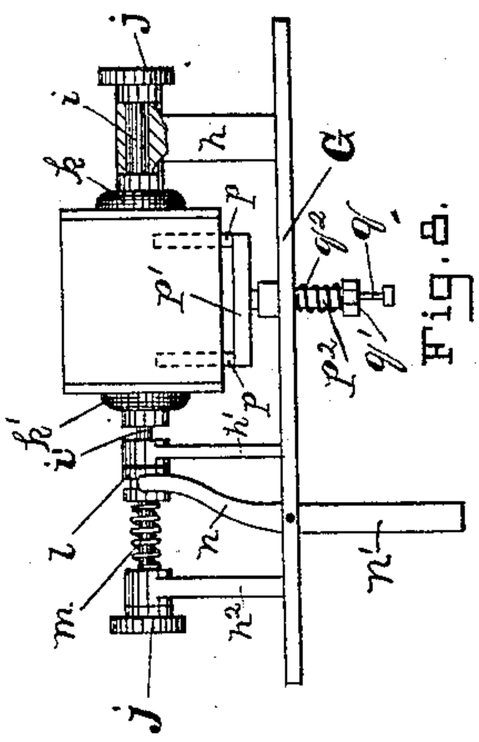


Fig. 8.



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UNITED STATES PATENT OFFICE.

STEPHEN J. SENECA, OF HAVRE DE GRACE, MARYLAND.

CAN-SOLDERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 452,584, dated May 19, 1891.

Application filed January 28, 1891. Serial No. 379,394. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN J. SENECA, a citizen of the United States, residing at Havre de Grace, in the county of Harford and State of Maryland, have invented certain new and useful Improvements in Can-Soldering Machines, of which the following is a specification.

This invention relates to machines for soldering the end seams of cans, and is of that class which comprises an acid or flux bath, a molten-solder bath, a track, and can-holders mounted on endless chains which travel on the said track and which automatically receive and rotate the cans and carry them through the flux and solder baths and also discharge them from the machine.

The invention will first be described, and then pointed out in the claims.

In the accompanying drawings, illustrating the invention, Figures 1 and 2 are nearly vertical sections of the machine on the line 1 2 of Fig. 5, each showing an opposite end of the machine. Figs. 3 and 4 are nearly horizontal sections on the line 3 4 of Fig. 5, each figure showing an opposite end of the machine. Fig. 5 is an end view of the machine. Fig. 6 is a vertical cross-section of the machine on the line 6 6 of Fig. 1. Fig. 7 shows two views of the movable journal-boxes *c*, in which the cross-shaft turns. Fig. 8 shows an enlarged view of the can-holder. Fig. 9 shows one of the disk-clamps which is provided with air-escape holes. Fig. 10 shows a bottom view of the cross-bar which supports the can-holder. Fig. 11 shows two views of the can-centering device. Fig. 12 shows two views of the feed-trough.

The frame of the machine is composed of two rails A, one at each side, two intermediate standards A′ A^2, and two end standards B′ B^2, respectively. The main shaft *a* is at one end, and its journals are in boxes *a′* on the front end standard B′. It is provided with two sprocket-wheels C and near one end with a miter gear-wheel D. The shaft has an inclined position, and the end having the gear-wheel is higher than the other, as will be hereinafter set forth. The gear-wheel D, just referred to, intermeshes with a pinion-wheel D′, mounted on a supplemental shaft *b*, provided with a fixed driving-pulley *b′* for imparting motion to the machine, and a loose pulley b^2. At the other end of the machine is a cross-shaft *c*, mounted in boxes *c′*, which are movable in slides *d*. This shaft, like the other, is provided with two sprocket-wheels C′, and also has one end elevated higher than the other. Between the two sprocket-wheels C′ this shaft has a pulley E, which will be hereinafter referred to.

Each of the movable boxes *c′* previously mentioned is moved in a slideway *d* by means of a screw-shaft N, having one end connected with the said box *c′* and the other passing through a threaded hole in the end of the slideway-frame *d*, the object being to increase or lessen the distance between the two end shafts *a c* at the opposite end of the machine when the screw-shaft is turned.

Two endless chains F, one on each side of the machine, pass over and connect the sprocket-wheels C C′ at the opposite ends of the machine. The upper stretch of each of these chains between the sprocket-wheels slides along the horizontal track-rails *e*, supported by the standards of the machine and extending between the sprocket-wheels on the respective cross-shafts. These two chains carry the can-holders and both have the same speed. The lower stretch of each of the said endless chains, (see Figs. 2 and 3,) after leaving the sprocket-wheels C at the front end of the machine, pass under a pair of friction-rollers *f*—*i. e.*, one chain passes under one roller—which depress the chains. After leaving the said friction-rollers *f* the chains pass to and under a second pair of rollers *f′*, similar to the first pair and at the same elevation. The chains then pass to and over a third pair of rollers *g*, located at the first intermediate standard A′, which partly elevate them. The chains then pass to a fourth pair of rollers f^2 and are again depressed, and thence pass on a horizontal line to and under a fifth pair of rollers f^3, (see Fig. 3,) and then to and over a sixth pair of rollers *g′*, located at the second intermediate standard A^2, which again elevate them, and from this sixth pair of friction-rollers the chains pass to the sprocket-wheels C′ on the end shaft of the machine. The third and sixth pair of rollers *g g′* are on a lower plane than the others. It will now be seen that the lower stretch of the

two chains is successively depressed and elevated—that is, they are in their depressed state while passing from the front sprocket-wheels C to the first pair of friction-rollers *f*, and remain depressed until they pass the second pair of friction-rollers *f'*. They then pass in an upward incline direction from this pair to the third pair *g*, and therefrom on a downward incline to the fourth pair f^2, and remain depressed until the fifth pair of rollers f^3 is passed, from which they again pass in an upward incline direction to and over the sixth pair of friction-rollers *g'*, and thence to the rear sprocket-wheels C'.

The parts comprising each can-holder consist of the following: A cross-bar G is attached to the two chains F and is carried thereby. This bar has three arms *h h'* h^2, which form bearings for the shafts *i i'* of the can-clamps. One of these shafts *i* has on one end a roller *j* and on the other a clamp-disk *k*. The other two arms *h'* h^2 form bearings for the shaft *i'*, having an endwise as well as a rotary movement. This shaft is also provided on one end with a roller *j* and on the other with a clamp disk *k'*. This shaft *i'* between the said two arms has a fixed grooved collar *l*, and between this collar and the arm h^2 is a spiral spring *m*, whose tendency is to force the sliding shaft and clamp-disk *k'* toward the other clamp-disk *k*, in order to clamp a can-body. A retracting-lever *n* is pivoted on the cross-bar G, and has a forked end which engages the groove of the collar *l*, previously mentioned. The other end *n'* of the lever acts on a stationary cam *o* at the rear end of the machine. The function of this lever is to actuate the movable can-clamps when the can-holder is to receive or discharge a can, as hereinafter explained.

A device is employed to cause a can to be centered when clamped between the two disks *k k'*. This device comprises two curved arms *p*, which fit the cylindric side of the can-body. These curved arms are attached to a cross-bar *p'*, which extends in the direction of the length of the can-holders. Attached to the cross-bar is a square bar p^2, which extends loosely through and slides in a square hole in the cross-bar G. When the curved arms *p* are in one position, the center of the circle described by the radius of the curved arms will be coincident with the centers of the can-clamping disks. The end of the said square bar p^2 has a threaded hole, which receives an adjustable bolt *q*, provided with a lock-nut *q'*. A spiral spring q^2 encircles the square bar p^2 between the cross-bar G and the said lock-nut *q'*, its object being to keep the can-centering arms *p* retracted normally away from the side of the can-body, so as to avoid interference therewith while they are passing through the flux and solder baths and over a cooling-pipe L, hereinafter set forth. The head of the said adjustable bolt *q* comes into contact with a pulley E, mounted on the shaft *c* between the sprocket-wheels C', and thereby is depressed against the tension of the spring when the cross-bar G of the can-holder travels upon the periphery of these sprocket-wheels. In thus depressing these parts the can-centering arms *p* are brought into the proper position for centering.

A rotary motion is imparted to the can-clamping disks *k k'* and the can-bodies in the following manner: The rollers *j* on the disk-shafts while the lower stretch of the endless chains F is passing between the sprocket-wheels C C' come into contact with and roll upon track-rails H, extending lengthwise of the machine, one rail being on each side thereof. These track-rails have raised portions H', corresponding in position with those rollers *g g'* which elevate the chains F while the latter are in motion, as before described. It will now be seen that the can-holders on the lower stretch of the chains, when passing from the sprocket-wheels C at the front end of the machine to the wheels C', will be continually rotated by the rollers *j*, traveling along the rails H.

A flux bath or trough I extends lengthwise of the machine between the front standard B and the first intermediate standard A', and is supported on cross-pieces I' in the standards, and by means of adjusting-screws *t* can be raised or lowered. This trough preferably contains a flux or acid heated by one or more burners *r* beneath the trough. The solder bath or trough J is similarly mounted between the two intermediate standards A' A^2, and the solder, like the flux or acid, is heated and melted by one or more burners *s*. It will be seen that in the present instance the flux and solder baths are below the lower track-rails H and begin and end where the chain-elevating rollers *g g'* are located. At these points the can-holders are raised, so that the can-bodies in passing into and out of the flux and solder baths, respectively, will be lifted over the end edges of said baths or troughs.

As before stated, the can-bodies are clamped and released by the can-holders automatically and in the following manner: The clamping and releasing are effected at the same end of the machine—to wit, at the rear end—where an inclined feed-trough K contains the unsoldered can-bodies *v*. Projecting from the lower end of this trough and toward the sprocket-wheels are two rods *u*, having upwardly-turned ends, upon which the can-bodies roll. From these rods the can-bodies *v* are taken by the can-holders in the following manner: The free arm *n'* of the retracting-lever which controls the can-clamps is operated by the cam *o*, previously referred to, and which is mounted partly on the frame A and loosely on the shaft *c* and extends beneath the latter. The can clamps or disks *k k'* are opened when the said lever-arm *n'* engages with the cam *o* below the center of the said shaft *c*, and the can-centering arms *p* are brought into their proper position by the pul-

ley E depressing the bolt *q*. The disks *k k'* remain open until the said can-centering arms *p* come into contact with the foremost can-body on the trough-rods *u*, at which time the lever-arm *n* suddenly leaves the cam *o*, and the endwise-movable clamp-disk *k'* is allowed to move toward the other clamp-disk *k*, and thereby clamp the can-body, which is then carried up and over the wheels C' to the front end of the machine, and thence down, and returns. One end seam of the can on this return stretch passes first through the flux and then through the solder bath, and finally over a cold-air pipe L, having teats or openings *w*, whereby blasts of air are discharged onto the cans, while on the return stretch the cans are rotated by the action of the rollers *j*. After the can-bodies have passed over the cold-air pipe L the lever-arm *n'* again comes into contact with the cam *o* previously mentioned, whereby the can-clamps are spread apart and the can released therefrom. The can then rolls down an inclined discharge-trough M, by which it may be conveyed to any desired point. After a lot of cans have thus passed through the machine to solder one end the same cans may be passed through a second time to solder the other end; or it is obvious two machines may be employed together and all cans made to pass through both machines, one machine to solder one end and the other machine to solder the opposite end.

The object of mounting one sprocket-wheel shaft *c* in boxes *c'*, movable in slideways *d*, is to enable the chains F to be drawn to any desired tension by the adjusting-screw N, previously described.

It is essential to the operation of this machine, in view of the construction of the parts and their organization, that the can-holders shall have an inclined position—inclined endwise—while moved along the lower level or lower stretch of the chains. This inclination allows the lower end of each can to dip into the flux-bath I and solder-trough J. For this reason the end shafts *a c* are inclined, as before stated, and the body parts of the machine are inclined.

It is obvious that various changes and modifications might be made in the parts of the machine without departing from my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a can-soldering machine, the combination of a frame, a revoluble driving-shaft extending crosswise of the frame and at one end thereof and provided with suitable pulleys or sprocket-wheels, a second revoluble shaft extending crosswise of the frame and at the other end also provided with suitable pulleys or sprocket-wheels, an endless carrier to pass over the said pulleys or sprocket-wheels, can-holders mounted on said endless carrier, each can-holder comprising two rotary shafts each having a can-clamping disk and a spring for normally keeping said disks in the clamping relation, a roller on each of said can-holder shafts, a retracting-lever to operate said can-clamps, a retracting can-centering device connected with each can-holder, a track extending lengthwise of the machine and on which the rollers of the can-holder shafts travel, a cam to automatically operate the retracting-lever of the can-clamp, and means for operating the retracting can-centering device.

2. In a can-holder for can-soldering machines, the combination of a bar G, having arms which serve as shaft-bearings, two shafts mounted in said bearings to rotate and each having a can-clamping disk on one end, a roller on the opposite end of each of said shafts for imparting a rotary motion to the said disks, a spring for keeping the said disks in the clamping relation, a retracting-lever pivoted on said bar to operate the clamping-disks against the tension of the spring, a can-centering device to bring the center of the can-body coincident with the centers of the clamp-disks, said centering device being attached to a bar p^2, which slides through the said bar, a spring to retract the centering device, and a suitable pulley E to depress the said can-centering device against the tension of the spring.

3. In a can-holder for can-soldering machines in which the can-bodies are rotated, the combination of two disks to clamp the opposite ends of the can-body, a can-centering device comprising curved arms which fit the cylindric side of a can-body, a spring to normally retract the arms away from the side of the can to avoid interfering with its rotation, an adjustable bolt *q*, connected with the supporting-bar of the can-centering device and which when depressed brings the said curved arms in the centering position, and means to depress the said bolt *q* and can-centering device.

4. In a can-soldering machine, the combination of a frame, two revoluble cross-shafts, both in an inclined position, one at one end and the other at the other end of the frame and provided with suitable pulleys or sprocket-wheels, an endless carrier to pass over the said pulleys or sprocket-wheels, can-holders mounted on the endless carrier and having two disks to clamp the ends of the can-bodies, rollers connected with the said disks to impart a rotary motion to the can-bodies, two series of friction-rollers *f g*, mounted on the frame, one series having their axes on a lower plane than the other, the endless carrier passing under the rollers of one series and over the rollers of the other series, whereby it is successively lowered and raised and the can-bodies also lowered and raised correspondingly, a track on which the rollers of the can-clamping disks travel, said track extending lengthwise of the frame and having raised portions at those points where the endless carrier is raised, so that the rollers of the can-clamps will be continually rotated, and a flux

bath and a solder bath, both below the said track, each beginning and ending at the points where the track is raised, for the purpose set forth.

5. In a can-soldering machine, the combination of a frame, a flux bath and a solder bath, two revoluble cross-shafts, both in an inclined position, one at one end and the other at the other end of the frame, and provided with suitable pulleys or sprocket-wheels, an endless carrier to pass over the said pulleys or sprocket-wheels, a track extending lengthwise of the machine, can-holders mounted on said endless carrier, each can-holder comprising two rotary shafts, each having a can-clamping disk, a spring for normally keeping the said disks in the clamping relation, a roller on each of said can-holder shafts to travel upon the said track, and thereby while traveling impart a rotary motion to the said clamping-disks, a retracting-lever pivoted on the can-holder support to spread the clamping-disks, an inclined feed-trough in the proximity of the passage of the can-holders, a stationary cam to operate the retracting-lever and cause the can-clamps to open and drop a soldered can just before reaching the feed-trough and then to release the retracting-lever to allow the can-clamps to close at the time the can-holder reaches the feed-trough, so as to clamp one of the unsoldered can-bodies, and a discharge-trough to carry off the cans dropped from the can-holders.

6. In a can-soldering machine, the combination of a frame, a flux bath and a solder bath, two revoluble cross-shafts, both in an inclined position, one at one end and the other at the other end of the machine, and provided with suitable pulleys or sprocket-wheels, an endless carrier to pass over the said pulleys or sprocket-wheels, a track extending lengthwise of the machine, can-holders mounted on said endless carrier, each can-holder comprising two rotary shafts, each having a can-clamping disk, a spring for normally keeping the said disks in the clamping relation, a roller on each of said can-holder shafts to travel upon the said track, and thereby while traveling impart a rotary motion to the said clamping-disks, a retracting-lever pivoted on the can-holder support to spread the clamping-disks, an inclined feed-trough in the proximity of the passage of the can-holders, a stationary cam to operate the retracting-lever and cause the can-clamps to open and drop a soldered can just before reaching the feed-trough and then to release the retracting-lever to allow the can-clamps to close at the time the can-holder reaches the feed-trough, so as to clamp one of the unsoldered can-bodies, a discharge-trough to carry off the cans dropped from the can-holders, and a retracting can-centering device connected with each can-holder and operated by a pulley on one of the said inclined cross-shafts.

In testimony whereof I affix my signature in the presence of two witnesses.

STEPHEN J. SENECA.

Witnesses:
JNO. T. MADDOX,
F. P. DAVIS.