(No Model.) 3 Sheets—Sheet 1.

T. VAN KANNEL & G. E. LOCKWOOD.

CAN CAPPING MACHINE.

No. 411,695. Patented Sept. 24, 1889.

FIG. 1.

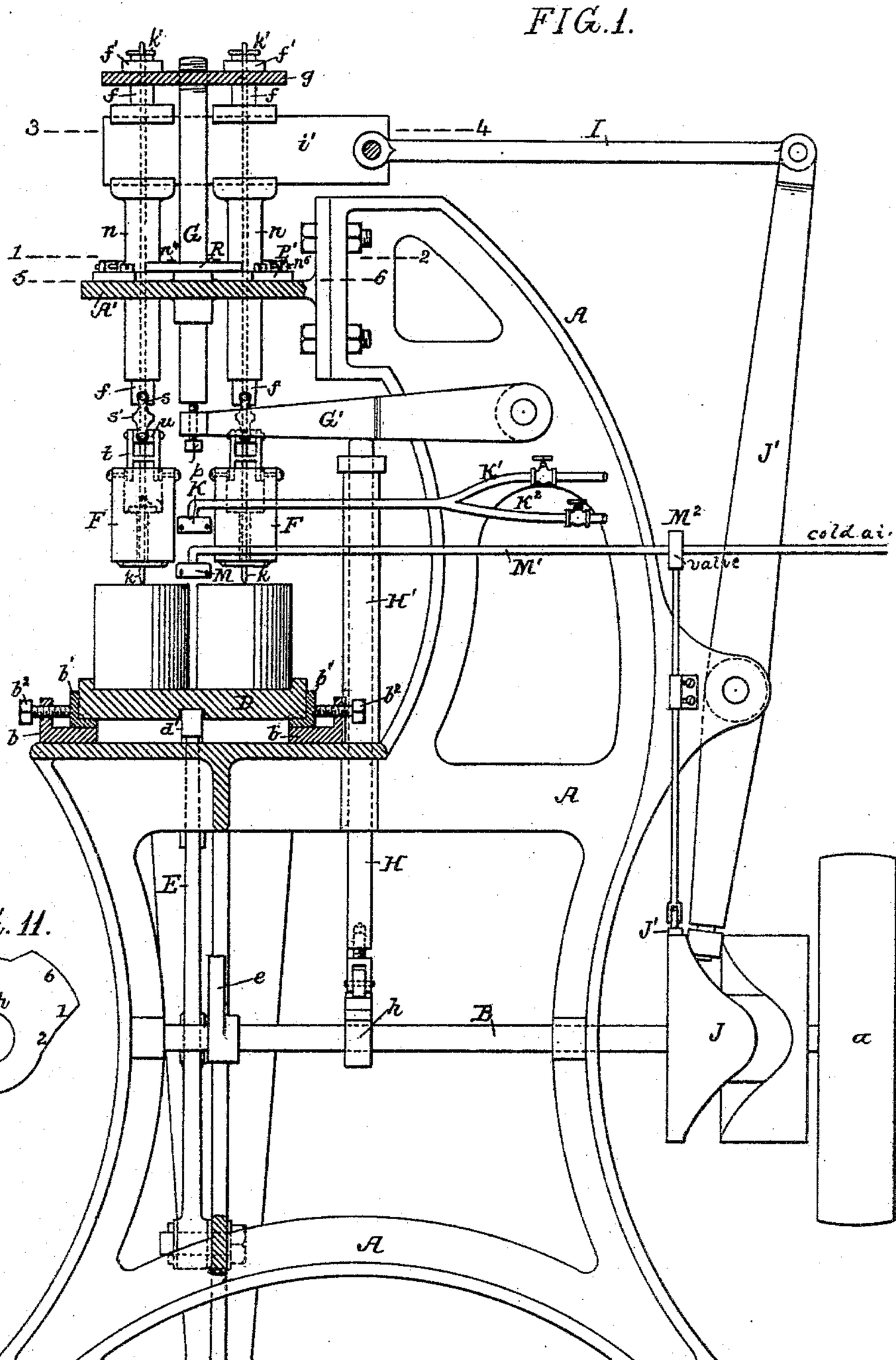

FIG. 11.

Witnesses:
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William S. Sumner.

Inventors:
Theophilus Van Kannel &
George E. Lockwood
by their Attorneys
Howson & Howson

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T. VAN KANNEL & G. E. LOCKWOOD.

CAN CAPPING MACHINE.

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FIG. 8.

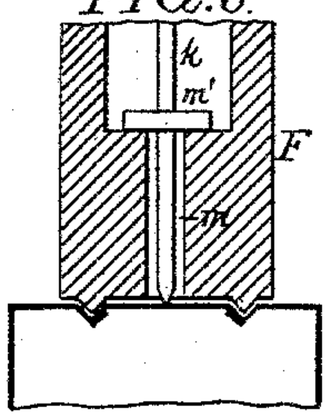


FIG. 9.

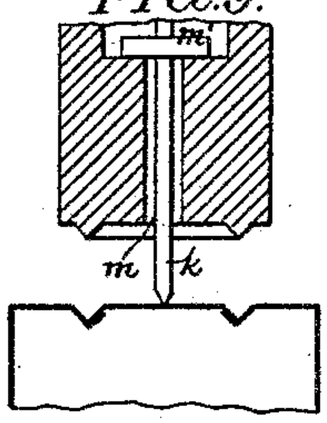


FIG. 10.

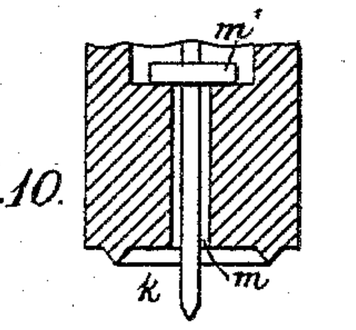


FIG. 2.

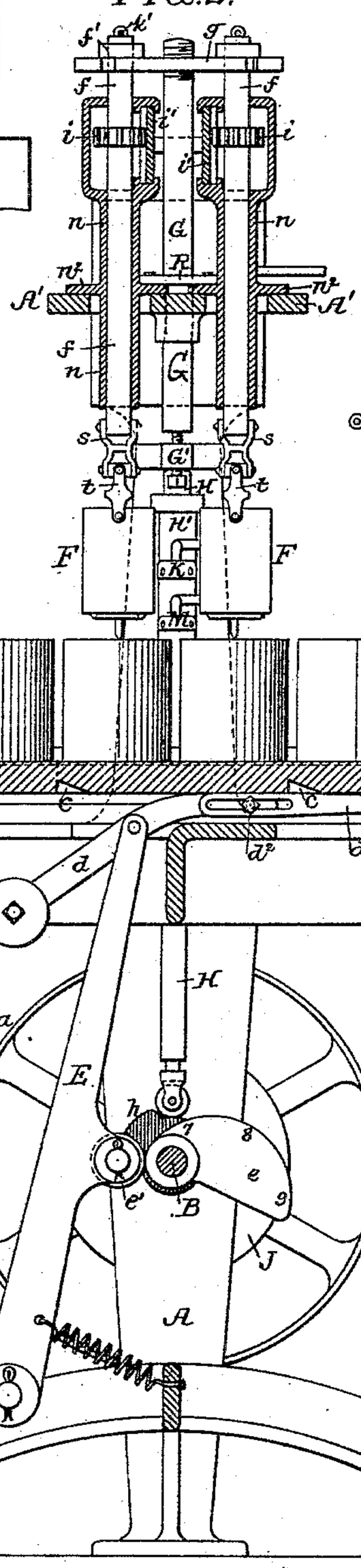


FIG. 4.

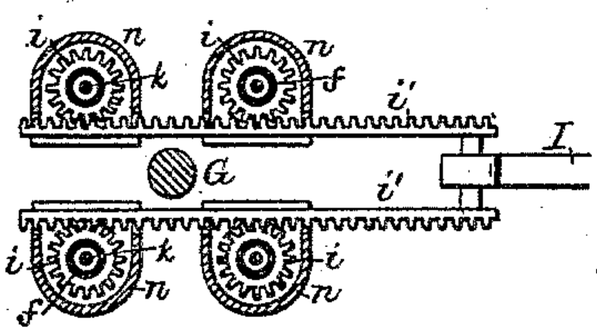
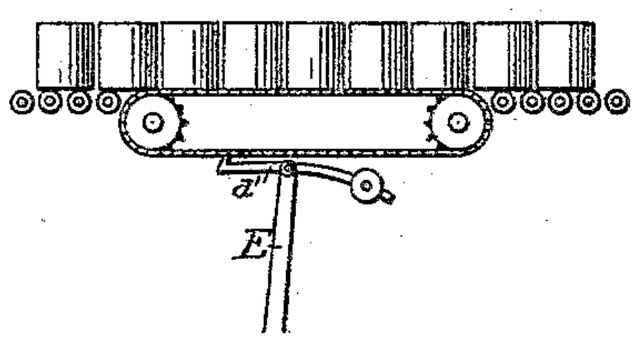


FIG. 15.



Witnesses:
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(No Model.) 3 Sheets—Sheet 3.

T. VAN KANNEL & G. E. LOCKWOOD.

CAN CAPPING MACHINE.

No. 411,695. Patented Sept. 24, 1889.

FIG. 3.

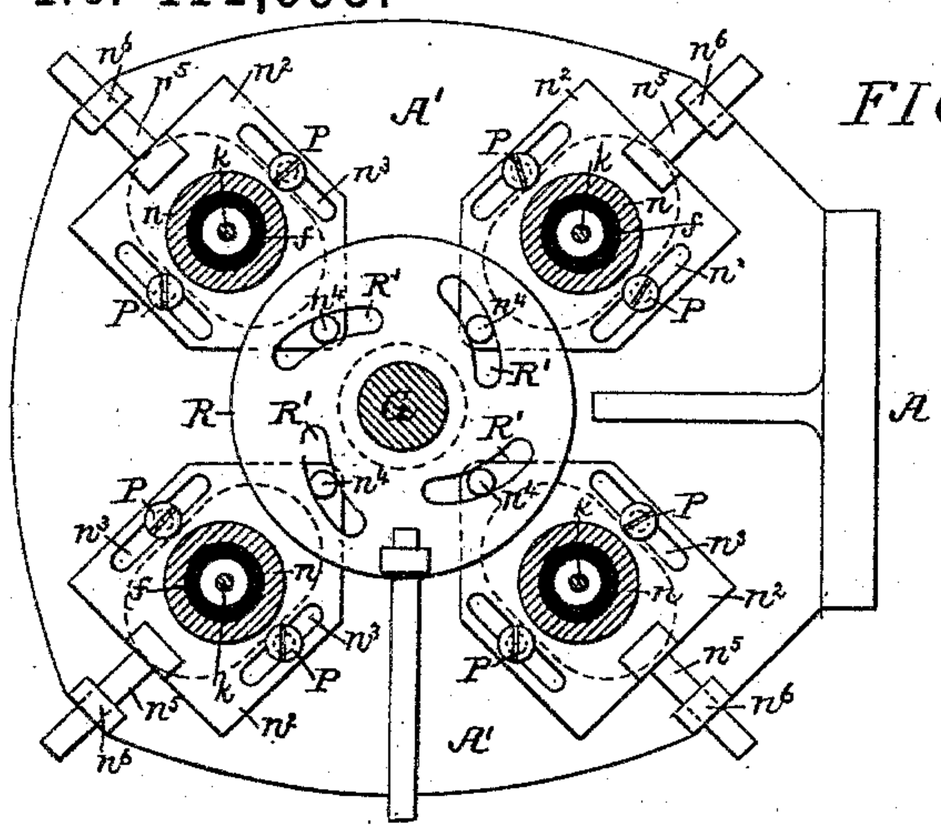


FIG. 5.

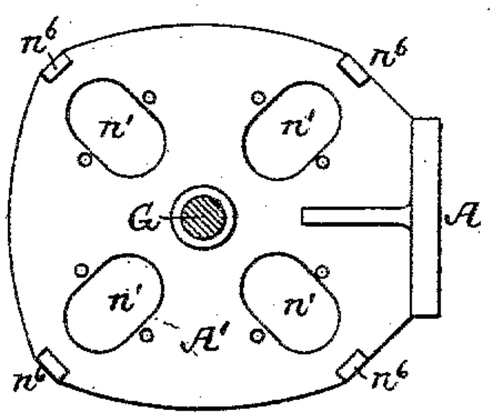


FIG. 7.

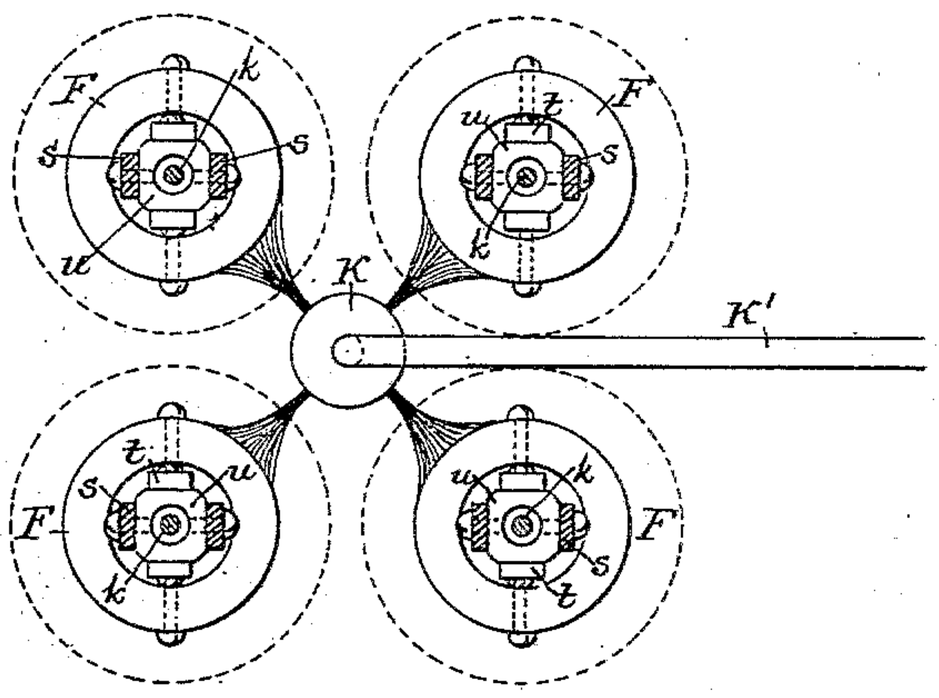


FIG. 6.

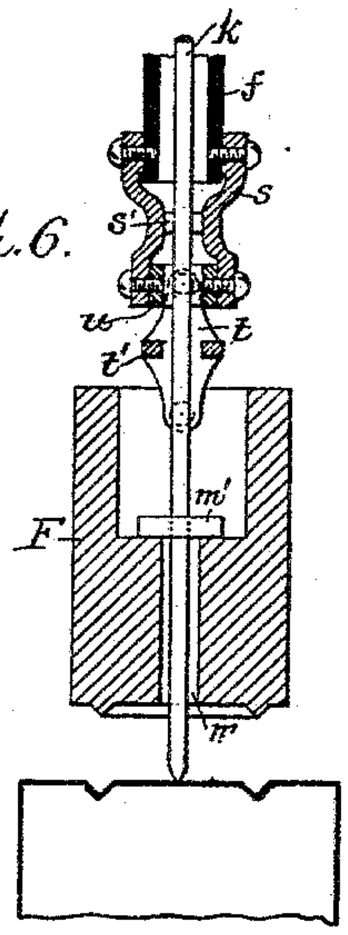


FIG. 12.

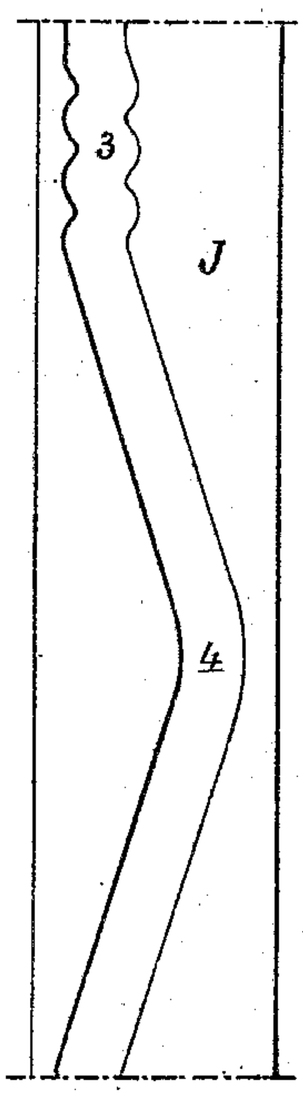


FIG. 13.

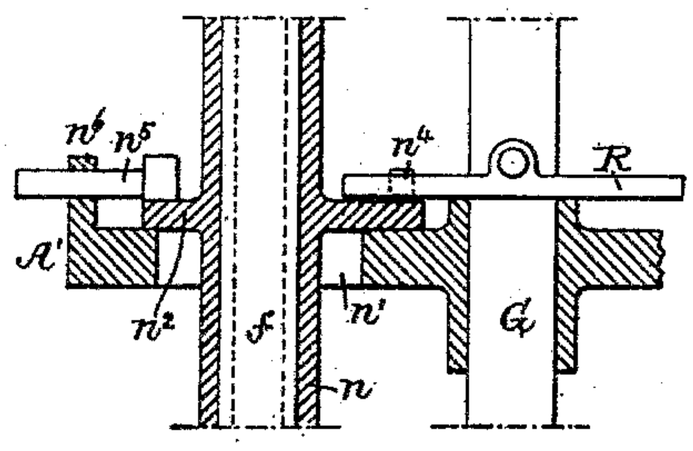
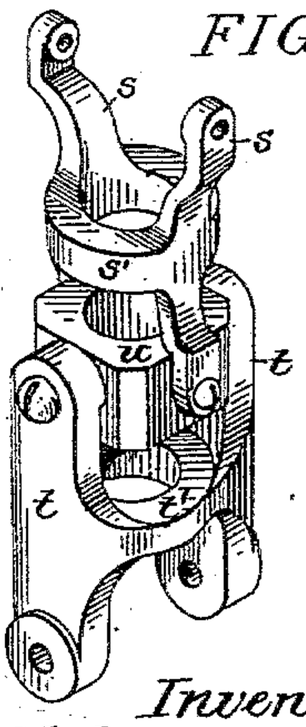


FIG. 14.



Witnesses:
Alex. Barkoff
William D. Bowers.

Inventors:
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George E. Lockwood
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UNITED STATES PATENT OFFICE.

THEOPHILUS VAN KANNEL AND GEORGE E. LOCKWOOD, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO GEORGE H. COLKET, OF SAME PLACE.

CAN-CAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 411,695, dated September 24, 1889.

Application filed March 12, 1889. Serial No. 303,030. (No model.)

To all whom it may concern:

Be it known that we, THEOPHILUS VAN KANNEL and GEORGE E. LOCKWOOD, citizens of the United States, and residents of Philadelphia, Pennsylvania, have invented certain Improvements in Can-Capping Machines, of which the following is a specification.

Our invention comprises certain details in the construction of a can-capping machine with the view of rendering the same practically automatic in its action, insuring the effective soldering of the caps of the cans, and providing for the capping of cans of different sizes.

In the accompanying drawings, Figure 1 is a longitudinal section of the machine, partly in elevation. Fig. 2 is a transverse section of the machine, partly in elevation. Figs. 3, 4, and 5 are sectional plan views, respectively, on the lines 1 2, 3 4, and 5 6, Fig. 1. Fig. 6 is an enlarged sectional view of the capping-iron and its hanger. Fig. 7 is a plan view of a set of capping-irons, the section being taken on the line 7 8, Fig. 6. Figs. 8, 9, and 10 are diagrams illustrating the different positions assumed by the capping-iron. Fig. 11 is a view of one of the cams of the machine. Fig. 12 is a view in a flat plane of part of another one of the cams. Figs. 13 and 14 are enlarged views of parts of the machine, and Fig. 15 is a diagram illustrating a modified form of can-carrier.

A represents the main frame of the machine, to suitable bearings in the lower part of which is adapted the driving-shaft B, which has at the rear end a pulley *a* for receiving a driving-belt from any available counter-shaft. Extending transversely across the front part of this frame are guides or ways *b*, having laterally-adjustable tracks *b'*, upon which can travel the tray D, containing the cans, this tray being movable across the machine by means of a weighted pawl *d*, engaging with suitable notches *c* in the under side of the tray, the pawl being hung to the upper end of a lever E, which is fulcrumed upon a suitable stud near the base of the machine and carries an anti-friction roller *e'*, acted upon by a cam *e* on the shaft B. The hooked end *d'* of the pawl *d* is adjustable longitudinally in respect to the pivoted portion of the pawl, and can be secured in position after adjustment by means of a set-screw d^2, adapted to a slot in said portion *d'* of the pawl, whereby the forward limit of movement of the pawl may always be so regulated as to bring the cans properly under the capping-irons, the tracks *b'* for the tray being adjusted by suitable set-screws b^2, so as to be adapted to trays of any required width.

In vertical sleeves *n*, carried by a projecting plate or head A' of the frame A, are guided spindles *f* of the capping-irons F, four of these spindles being shown in the present instance, and the upper end of each spindle having a collar *f'*, which bears upon a yoke *g*, carried by the upper end of a rod G, guided centrally in the head A' of the frame A and acted upon by an arm G', which is vibrated by means of a cam *h* on the shaft B, this cam acting through the medium of a rod H, vertically guided in a suitable bearing H' on the frame.

On each of the capping-iron spindles *f* is a pinion *i*, these pinions engaging with opposite racks *i'*, operated by a bar I, which is reciprocated by means of a cam J on the shaft B, this cam acting through the medium of a lever J', as shown in Fig. 1. As the racks have no vertical movement, they are of a depth equal to the extent of rise and fall of the capping-iron spindles, so that the pinions *i* are in gear with the racks at all times.

Each of the capping-iron spindles *f* is hollow, and through said spindle passes a weighted rod *k*, the lower end of which projects through an opening *m* in the bottom of the capping-iron F, so that on the descent of said iron this projecting end of the rod strikes the cap of the can before the iron reaches the same, the weight of the rod being sufficient to hold the cap firmly in place while the soldering of the same is being effected.

The rod *k* is free to move vertically in the capping-iron spindle, so that it will serve to hold the cap not only during the soldering operation, but for a certain time before the capping-iron reaches the operative position and for a certain time after the capping-iron is raised from this position, the rod being then raised with the iron by reason of the contact

of the top of the spindle *f* with the projecting pins *k'* at the top of the rod.

In order to save time in the operation of the capping-irons, and yet prevent the latter from dropping forcibly on the cans, that portion of the cam *h* which permits the descent of the rod G and the irons has two portions 1 and 2, the former acting first and being comparatively abrupt, while the portion 2 is much less abrupt, (see Fig. 11,) so that the irons are lowered rapidly at first; but the speed of descent is checked before the irons strike the cans, and injury to the cans or displacement of the solder is thus prevented.

The operation of soldering is effected, as in other machines, by placing a ring or segment of solder in the groove in the top of the can which receives the flange around the edge of the cap, the heated capping-iron being then lowered onto the solder and one or more turns or partial turns imparted to said iron, so that the solder melted by the heat of the iron will be caused to flow evenly and smoothly throughout all portions of the groove in the top of the can. We find that in order to best insure this result the capping-iron should first have a few short quick vibrations to start the solder, and these should be followed by the longer vibrations to distribute the solder around the groove. The cam J therefore has two portions 3 and 4, as shown in Fig. 12, the portions 3 imparting the first short quick movements to the iron and the portions 4 the following slower and more extended movements. The capping-irons are heated by a burner-head K, located centrally in respect to the series of irons and discharging a jet of flame onto each of said irons, as shown in Fig. 7, the burner-head being supplied with properly-regulated volumes of air and gas by means of valved pipes K' and K².

In order to set the solder after the soldering operation is completed, it is advisable to direct a blast of air upon the tops of the cans; but this blast should be cut off during the time that the soldering operation is actually being performed, otherwise it will have a tendency to cool the capping-irons. We therefore locate the blast-head M beneath the burner-head K and provide the blast-pipe M' with a valve M², the stem of which is acted upon by a cam J', preferably formed on the cam J, whereby said valve is opened to permit the blasts of air to strike the tops of the cans after the capping operation is completed, the flow of air being cut off, however, while the capping-irons are in operation.

The caps should be held down on the cans while the solder is being set; hence the cam *h* has two lifting portions 5 and 6, so that the capping-iron is first lifted from the operative position, Fig. 8, to a position, Fig. 9, which will not lift the retaining-rod *k* from the cap, the final rise to the position Fig. 10 taking place after the solder has been set.

We have shown the machine as provided with four capping-irons, the cans being placed upon the carrying-tray in two rows, and two cans of each row being simultaneously acted upon. As the cans vary in size, however, it is important that the capping-irons should be adjustable from and toward each other in both directions, and in order that this operation may be readily and accurately effected the guide-sleeves *n* for the spindles of the capping-irons are adapted to radial slots *n'* in the head A' of the machine, as shown in Fig. 5, so that they can be adjusted radially from and toward the axis of the lifting-shaft G, and the distance apart of the capping-irons, both longitudinally and transversely, can thus be varied to accord with the diameters of the cans being acted upon. Each sleeve has a flange n^2, with radial slots n^3 for the reception of set-screws P, which are screwed into the head A', and thus serve not only to guide the sleeves *n* in their radial movements, but also to lock said sleeves in position after they have been properly adjusted.

The adjustment of the sleeves *n* is effected by a dial R, having cam-slots R' for the reception of pins n^4 on the flanges n^2 of the sleeves, said flanges also having outer guide-pins n^5, adapted to slide in apertured lugs n^6 on the head A.

The adjustment of the capping-iron spindles necessitates the expansion and contraction of the duplex rack which actuates the pinions *i* of said spindles; hence the racks *i'* are adapted to longitudinal guides formed in the expanded upper ends of the sleeves *n*, as shown in Fig. 2, so that the racks are adjusted simultaneously with the sleeves, the racks sliding freely in and out on the laterally-projecting pins, which serve as the means of connecting said racks to the bar I. (See Fig. 4.)

It will be observed that the capping-irons are simply suspended from the yoke *g*, and the rod G of said yoke rests upon a set-screw *p*, carried by the operating-arm G', so that the descent of the rod and its yoke may always be sufficient to permit a capping-iron to properly act upon a low can, the higher cans simply stopping the irons at an earlier period in their descent, and the yoke sliding on the spindles of such irons in completing its downward movement.

Cans are very frequently of such character that the tops of the cans are not in a true horizontal plane; hence in order that a capping-iron may accommodate itself to the angle of the can-top it becomes necessary for the iron to have a loose driving-connection with the spindle, the latter being held with comparative rigidity in its bearings. Lateral or longitudinal movement of the iron is also required in some cases, in order to permit it to act properly on a can which is a little out of its proper position. We therefore suspend each capping-iron from its spindle by means of a duplex universally-jointed hanger such as shown in Figs. 6 and 14. This hanger comprises two pairs of links *s* and *t* and an independent pivot-block *u*, the upper ends of the

top pair of links being hung to the lower end of the spindle *f* and their lower ends to the ring *u*, while the upper ends of the lower pair of links are hung to said ring *u* and their lower ends to the upper portion of the capping-iron, the pivots of the one pair of links being at right angles to those of the other pair. By this means not only is a gimbal or universal pivot joint connection provided, but the iron is free to move bodily in any direction, owing to the swinging of the links. Each pair of links is preferably stiffened by a central bridge piece or connection *s' t'*, perforated for the passage of the rod *k*. Because of this free movement of the iron the opening *m* in the bottom of the iron is of considerably greater diameter than the can-retaining rod *k*, the opening being covered by a disk *m'*, carried by said rod inside the iron, the rod, however, being free to move vertically through the disk which rests at all times upon the bottom of the iron.

It will be noticed on reference to Fig. 2 that the cam *e*, which operates the pawl-arm E, whereby the can-carrying tray is traversed, is so formed as to impart first a slow forward movement by the part 7, then a more rapid movement by the part 8, and then a final slow movement by the part 9, so that there is not that risk of splashing or discharging a portion of the contents of the cans which there would be if the movement of the same was started or stopped suddenly.

By employing a central lifting-rod in connection with a series of capping-irons located equidistantly from said rod the strain upon the latter is equalized and the operation of the lifting-irons is facilitated.

In carrying out our invention it is not absolutely necessary to employ a tray as a means of carrying the cans, as it will be evident that an endless slatted belt passing around suitable guide-rolls at each side of the machine may be employed in place of the tray, as shown, for instance, in Fig. 15, the vibrating arm and its pawl serving to impart intermittent movements to said endless belt in the same manner as it now imparts such movements to the tray.

Although we prefer to construct the machine with four capping-irons, as shown and described, more or less than this number may be used, if desired.

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. The combination of the capping-iron spindle and means for raising and lowering and rotating the same, with a capping-iron universally jointed to said spindle, whereby it is free to assume different angles in respect thereto, substantially as specified.

2. The combination of the capping-iron spindle and means for raising, lowering, and rotating the same, with a capping-iron and a universally-jointed and laterally-swinging connection between said spindle and iron, said connection comprising two links and four sets of pivots, two of which are at right angles to the other two, substantially as set forth.

3. The combination of the capping-iron and its spindle with a universal-joint connection between the two, comprising upper and lower links and an interposed pivot-block, the pivots of one pair of links being at right angles to those of the other pair, substantially as set forth.

4. The combination of the frame of the machine, a can-carrier mounted so as to be free to traverse thereon and having openings or notches therein, a lever carrying a pawl for engaging with said notches, and a cam acting on said lever and having that portion of its surface which imparts the forward thrust divided into three parts, the first and last of which impart slow movement to the lever, while the intermediate portion imparts a rapid movement, substantially as specified.

5. The combination of the notched can-carrier guided on the frame of the machine, the vibrating lever, and a pawl carried thereby and engaging with the notches of the can-carrier, said pawl being made in two parts, one adjustable longitudinally in respect to the other, all substantially as specified.

6. The combination of the traversing can-carrier, a series of capping-irons, a lifting-rod having a yoke from which said capping-irons are suspended, an arm acting on said lifting-rod, and a cam and cam-rod, whereby said arm is actuated, substantially as specified.

7. The combination of the capping-irons, the lifting-rod therefor, and an operating-cam for said rod having the portion which controls the descent of the rod in two parts, the first abrupt and the second less abrupt, substantially as specified.

8. The combination of the capping-irons, the lifting-rod therefor, and an operating-cam for said rod having two lifting portions, with an intermediate dwell, whereby there are two steps in the rise of the capping-irons, substantially as specified.

9. The combination of a series of capping-irons having spindles with pinions thereon, means for raising and lowering said spindles, and a vertically confined and reciprocated rack the width of which is equal to the extent of rise and fall of the spindles, substantially as specified.

10. The combination of the series of capping-irons and their spindles having pinions, means for raising and lowering said spindles, vertically-confined racks equal in width to the extent of rise and fall of the spindles, a lever connected to said racks, and a cam for acting upon said lever, substantially as specified.

11. The combination of the capping-irons having spindles with pinions thereon, racks for operating said pinions, and a rack-operating cam having two portions, one for impart-

ing short quick movements to the rack and the other for imparting longer movements, all substantially as and for the purpose set forth.

12. The combination of the capping-iron and its hollow spindle, the universal-joint connection between the two, a retainer-rod passing through an enlarged opening in the bottom of the iron, and a disk covering said opening and confined laterally to the retainer-rod, but vertically unconfined thereto, as set forth.

13. The combination of the can-carrier, the capping-iron, the blast-pipe and its valve, and a shaft having a cam for effecting the raising and lowering of the capping-irons, and a cam for opening and closing the valve in the blast-pipe, whereby the blast may be cut off during the soldering operation and while the capping-irons are in action, substantially as specified.

14. The combination of a series of capping-irons and radially-adjustable bearings for the spindles of the irons, whereby the latter may be simultaneously adjusted both longitudinally and laterally to suit different sizes of cans, substantially as specified.

15. The combination of a series of capping-irons, radially-guided bearings for the spindles of the irons, and a cam-disk for effecting the radial adjustment of the spindle-bearings, substantially as specified.

16. The combination of the capping-irons laterally adjustable in respect to each other to suit different sizes of cans and having spindles with driving-pinions thereon, with a duplex operating-rack for said pinions, said racks being likewise adjustable laterally, substantially as specified.

17. The combination of the capping-iron spindles, the guided sleeves therefor radially adjustable on the frames, pinions on the spindles, and a laterally-adjustable duplex rack gearing with said pinions and adapted to guides on the sleeves of the spindles, as set forth.

18. The combination of the can-carrying tray and a supporting-guide therefor having laterally-adjustable tracks or ways for the tray, as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

THEOPHILUS VAN KANNEL.
GEORGE E. LOCKWOOD.

Witnesses:
WILLIAM D. CONNER,
HARRY SMITH.