

(No Model.)

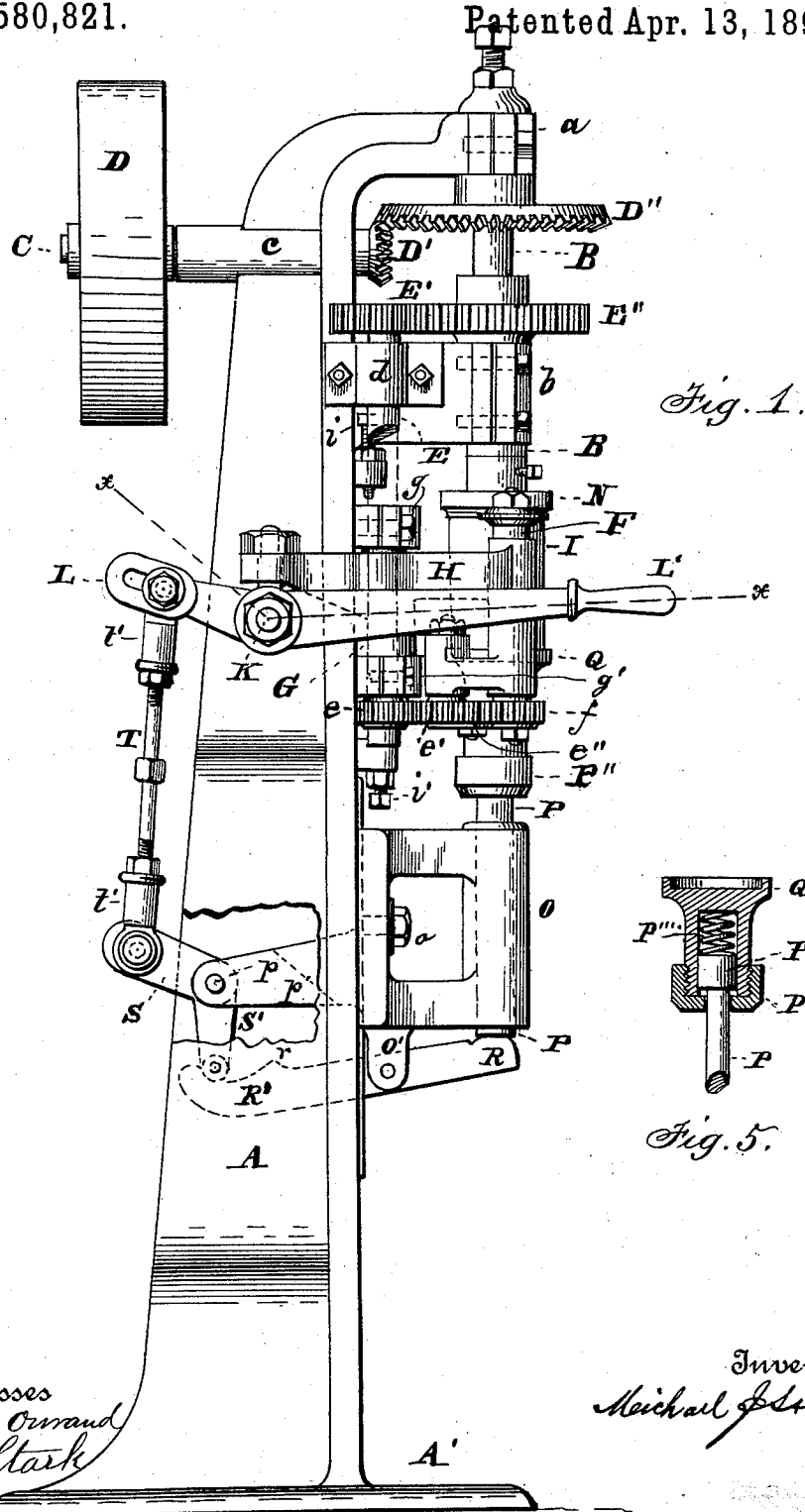
3 Sheets—Sheet 1.

M. J. STARK.

MACHINE FOR GROOVING EDGES OF TOPS AND BOTTOMS OF ROUND METALLIC CANS.

No. 580,821.

Patented Apr. 13, 1897.



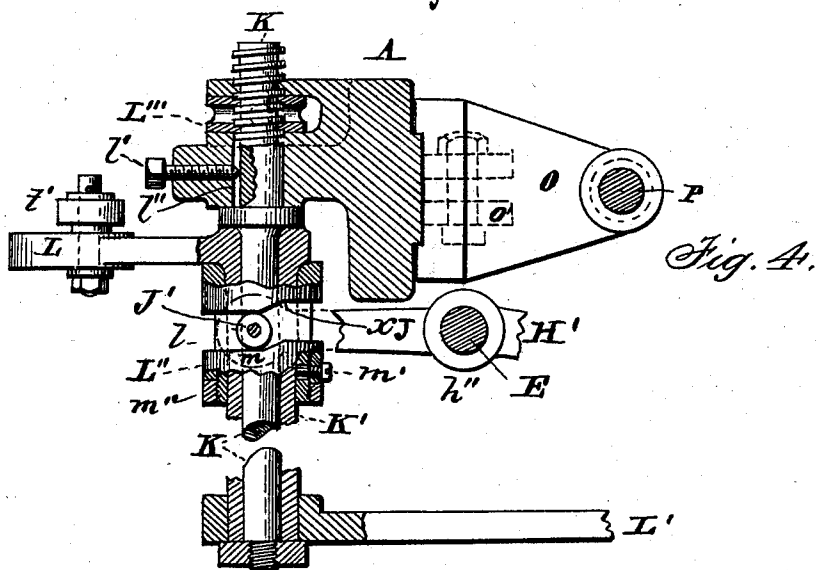
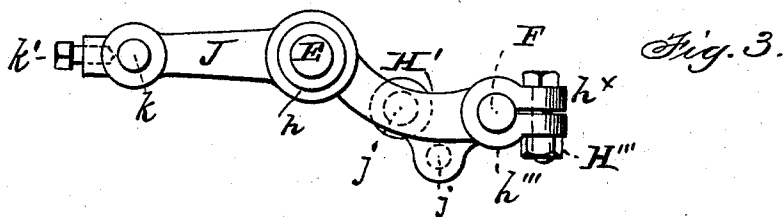
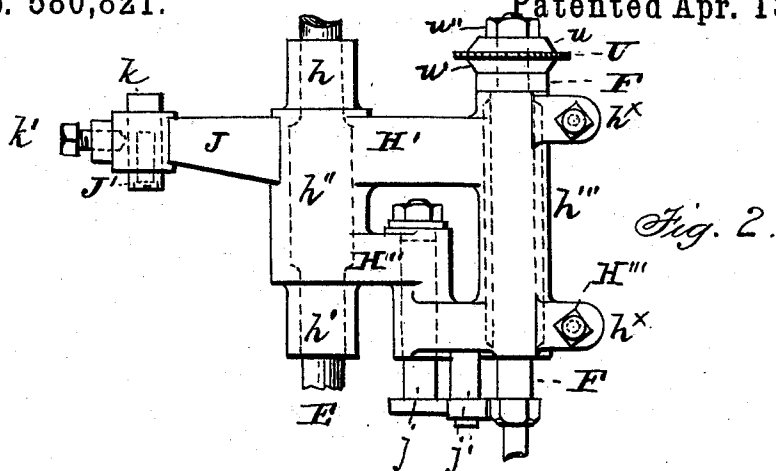
Witnesses
Frank L. Ormand
M. J. Stark

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3 Sheets—Sheet 2.

**MACHINE FOR GROOVING EDGES OF TOPS AND BOTTOMS OF ROUND
METALLIC CANS.**

Patented Apr. 13, 1897.



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(No Model.)

3 Sheets—Sheet 3.

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FIG. 6.

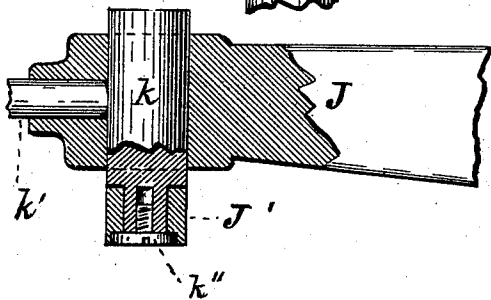
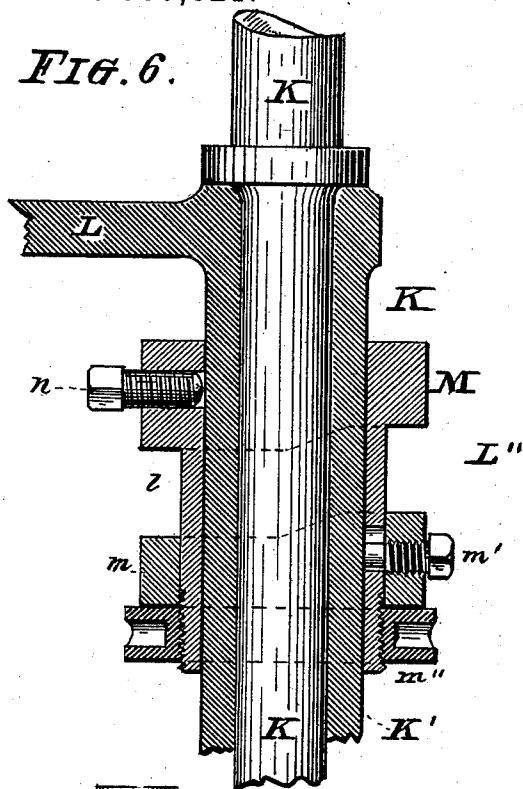


FIG. 9.

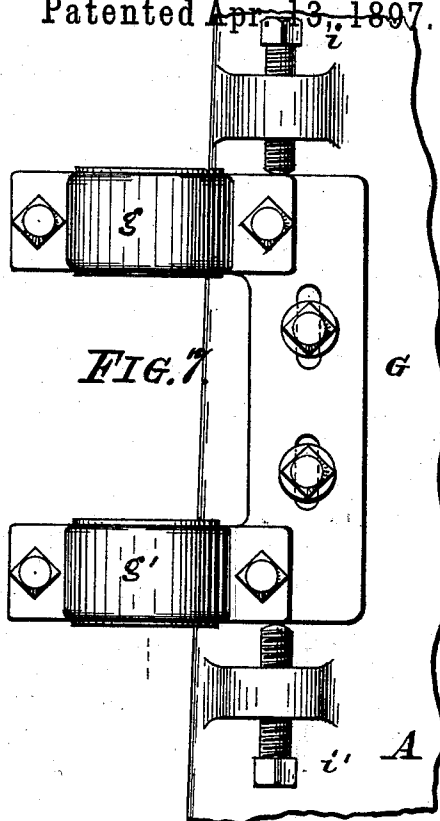
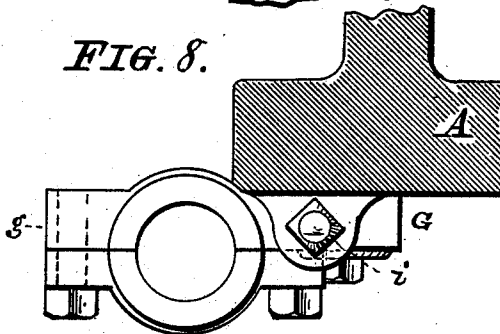


FIG. 8.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR GROOVING EDGES OF TOPS AND BOTTOMS OF ROUND METALLIC CANS.

SPECIFICATION forming part of Letters Patent No. 580,821, dated April 13, 1897.

Application filed October 14, 1896. Serial No. 608,815. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL J. STARK, a citizen of the United States, and a resident of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Machines for Grooving the Edges of the Tops and Bottoms of Round Metallic Cans; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheets of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has general reference to improvements in machines for producing the groove in the edges of tops and bottoms of round metallic cans whereby the said can may be opened by striking upon the top or bottom thereof; and it is especially designed to produce the groove described and claimed in the Letters Patent of the United States granted to F. N. Russell on the 2d day of April, 1895, No. 536,970, in a thorough and efficient manner.

In the drawings already referred to, which serve to illustrate my said invention more fully and form a part of the present specification, Figure 1 is a side elevation of my improved can-grooving machine. Fig. 2 is a similar view of the swinging frame carrying the cutter by means of which the said groove is produced. Fig. 3 is a plan of the same. Fig. 4 is a sectional plan in line *xx* of Fig. 1, and Fig. 5 is a vertical sectional elevation of the yielding holder for the can. Fig. 6 is a sectional plan of the cam mechanism drawn on a larger scale. Fig. 7 is a front elevation of the U-shaped plate within which the swinging arm is journaled. Fig. 8 is a plan of the same, and Fig. 9 is a sectional elevation of the arm J with its stud and roller.

Like parts are designated by corresponding letters of reference in all the figures.

This machine consists, essentially, of a strong standard or column of either rectangular or T-shaped cross-section, terminating at its lower end in a large and ample base-plate A' and having its upper end turned at right angles to form a bearing *a* for the upper end of the spindle B, a second bearing *b*,

projecting from said column A a suitable distance below the bearing *a*, being provided to properly support said spindle B at two points or places.

About midway between the two bearings *a* *b* the column A has a bearing *c*; within which revolves a shaft C, carrying at its outer end a pulley or pulleys D and on its inner end a bevel-pinion D', engaging a bevel-wheel D'', placed upon the spindle B, as clearly illustrated in Fig. 1.

From the bearing *b* of the column A projects a bearing *d*, which is arranged to receive a vertical shaft E, carrying at its upper end a pinion E', engaging a spur-wheel E'', fastened to the spindle B below the bevel-wheel D'', and on its lower end a pinion *e*, which through the intervention of several intermediate gear-wheels *e'* and *e''* engages a pinion *f*, secured to the lower end of a cutter-spindle F, as will hereinafter more fully appear, it being now understood that revolving the pulley D will cause its motion to be communicated to the spindle B and the cutter-spindle F (in opposite directions at their adjacent sides) through the medium of the bevel-gearing D' D'' and the gear-wheels E' E'' and *e e' e''* and the respective shafts C and E.

Upon the face of the column A there is adj-justably secured a U-shaped plate G, having bearings *g g'* to receive the journals *h h'* of a swinging frame H. (Shown in detail in Figs. 2 and 3.) These journals, as well as that portion of the swinging frame connecting them, are hollow to permit the passage of the vertical shaft E, which said shaft E fits this passage (a snug revolving fit) so as to receive a steady support within these journals at its lower end. From the tubular portion *h''* of this swinging frame radiate two curved arms H' H'', carrying on their outer ends a tubular sleeve *h'''*, within which the cutter-spindle F revolves, said sleeve being longitudinally slotted and provided with clamping-screws H''', passing through lugs *h^x* on the sleeve *h'''*, as plainly depicted in Figs. 2 and 3, to enable the sleeve being contracted, and thereby to snugly embrace the cutter-spindle F without, however, preventing it from revolving in the sleeve. The lower arm H'' of this swinging frame is Z-shaped, and it has two studs *j j'*,

the former to receive the intermediate gear-wheel e' and the latter to receive the intermediate gear-wheel e'' . (Shown in Fig. 1.) Opposite the arm H' of the swinging frame H there is a further arm J , carrying a vertically-adjustable stud k , held in position by a set-screw k' and receiving at its lower end a hardened roller J' . This swinging arm H is vertically adjustable on the column A by means of set or adjusting screws $i i'$, bearing upon the U-shaped plate G , heretofore mentioned, to enable the cutter U on the cutter-spindle F to be brought into proper vertical position relative to the edge of the top or bottom of the can I to be operated upon when in proper position in the machine.

Through the column A , about midway of its height, is passed a screw-threaded stud K , upon which is located a cam mechanism by means of which the swinging frame H is manipulated and which consists, as shown in Fig. 4, of a sleeve K' , having at one end an arm or lever L and on its opposite end a handle-bar L' . This sleeve revolves upon the stud K , and it carries upon its outer surface a cam L'' , so designed as to engage in its Z-shaped groove l the roller J' , already referred to, and thereby to move the arm J away from and toward the column A , and consequently the tubular sleeve h'' with its spindle and cutter in the opposite directions. The Z-shaped groove in the cam permits of a positive movement of the swinging arm H , but in order to enable adjustment being made so that the cutter may be brought nearer to or farther away from the can I the stud K is rendered adjustable by means of an adjusting-nut L''' , properly arranged in the body of the column A , so that by revolving said nut in one direction or the other the stud is moved farther out of or toward the column A , and thereby carries with it the sleeve K' , the cam, and all the mechanism connected with it in a manner readily comprehended. A set-screw l' , bearing upon the stud K within a groove l'' in said stud, prevents the latter from revolving, and when tightly screwed up retains the stud in a fixed position.

The cam L'' is either formed in one piece or made of separate pieces, the details of which are shown in Figs. 4 and 6, and it consists of a body portion M , secured upon the stud K by a set-screw n , and having on one end a projecting flange the inner face of which forms one part of the roller-groove l and a collar m upon said body portion having its inner face formed to correspond with the inner face of the flange of the body portion. This collar is secured upon the body portion by a set-screw m' , but may be moved toward the flange of the body portion by an adjusting-nut m'' on the end of the screw-threaded body portion of the cam and thereby contract the width of the groove l to compensate for wear, it being understood that the groove to be produced in the edge of the top or bottom of the can is of such a nature that the utmost

accuracy and most positive action of all the parts of the mechanism are required to prevent the cutter from more than just cutting through the edge of the top or bottom of the can without touching the body thereof.

Upon the lower end of the main spindle B is placed a chuck N , which embraces the top or bottom of the can I , it being immaterial whether the edge of the top or of the bottom of the can is grooved for producing the opening effect, and thereby revolving the same with the spindle. To bring this can into proper position, I locate upon the face of the column A a tail-stock O , held to the column by a bolt o , said tail-stock carrying a spindle P the upper end of which is provided with a holder Q , engaging the lower end of the can I and holding it tightly to the revolving chuck N . From the lower side of this tail-stock project lugs O' , within which is pivoted a lever R , upon one end of which bears the lower end of the tail-stock spindle P , while the other end of the lever R is formed into the shape of a segment of a circle R' , having its center in the pivotal bolt p of a bell-crank S , which is journaled within a slotted arm p' , projecting from the said tail-stock O . One arm of this bell-crank connects with the arm L of the cam-sleeve K' by a connecting-rod T , constructed with means whereby it may be lengthened and shortened, as hereinafter to be described.

The cutter U is removably placed upon the upper end of the cutter-spindle between two washers $u u'$, and fastened by a nut u'' , as clearly shown in Fig. 2. This cutter is shaped with teeth to correspond with the shape of the groove to be produced, though in experimenting I have found that a perfectly smooth disk will push a groove into the edge of the can, but will not operate as satisfactorily as a cutter with teeth, as stated.

To operate this machine, it is assumed that the pulley D is revolved at a suitable speed, which will set all the mechanism revolving the can and the cutter into action. The handle-bar L' is lifted up, thereby moving the cutter on the end of the swinging arm away from the chuck N , moving the bell-crank S so that its arm S' is disengaged from the lever R' , and allowing the latter to rise, and thereby its opposite end to drop, and with it the tail-stock spindle P and its holder Q , the weight of this holder and the tail-stock spindle being sufficient to depress the arm R and to cause the arm R' to rise, assisted by a spring, (not shown,) if necessary, in this action. In this position the can I is placed upon the holder Q and then the handle-bar L' depressed. This will first of all cause the arm R' to be depressed by the arm S' striking the projection r on said arm R' and to lift the can I upward into the chuck N and thereby to cause the can to be revolved. A further depression of the handle-bar L' holds this lever R securely in its described position by the bell-crank arm S' by reason of its now moving over the seg-

mental portion of this lever, while the cam L" has, with its groove, arrived at the point x , where this groove has an inclined portion which causes the swinging frame to move with the cutter toward the can and thereby to produce the groove in the edge of the top or bottom thereof, the position of all the parts of the machine at this moment being shown in the drawings. A few revolutions of the can and cutter are sufficient to produce the groove mentioned, when the lifting of the handle-bar causes, first, the cutter to recede from the can and then the holder to drop and release the can, which may now be removed by the operator and the operations proceeded with on the next can, an expert operator being readily able to handle and groove five thousand cans and more in a day of ten hours' working time.

In cans as commercially obtainable there is a slight variation in the height of the body which in this machine must be compensated for, since if the machine is adjusted to properly hold the highest can a slightly shorter can would not be pushed into the chuck sufficiently to revolve it. To make up for this variation, I make the holder Q yielding in the following manner: The tail-spindle P is formed with a head P', as shown in Fig. 5, and the holder Q is screw-threaded at its lower end and fitted with a cup-shaped nut P'', through which the smaller part of the tail-spindle P passes. A spiral spring or elastic cushion P''' is placed into the bore of the holder Q and bears upon the head P' to push the holder upward. The upward movement of the tail-stock spindle is so adjusted that in its normal movement the distance between the chuck N and holder Q is slightly less than the height of the can, so that when the latter is placed in position this elastic medium will be compressed, and thus act upon the can with a force due to said compression.

I have already mentioned that the distance which the cutter moves toward and from the can is fixed by the shape of the cam, but that adjustment of this distance relative to the center of revolution of the can may be varied by adjustment of the stud upon which the cam moves. In the present instance this adjustability of the stud is sufficient to compensate for wear or difference in diameter of the cutters and to enable cans of different diameters to be operated upon, it being understood that each diameter of can requires its own chuck and holder, while a difference in height of the bodies is compensated for by changing the position of the tail-stock with its appurtenances and by lengthening or shortening the connecting-rod T to suit the circumstances. For this purpose I construct the connecting-rod, as shown in Fig. 1, of a rod having centrally an angular portion for the application of a wrench and having both its ends threaded with a screw-thread (one a right and the other a left thread) and screw this rod into two single eyes t' t'' , the sockets of which are corre-

spondingly screw-threaded. A turnbuckle of the usual and well-known construction may be substituted for this adjusting device of the connecting-rod without departing from my invention.

This machine is what I term "semiautomatic," that is to say, the machine requires an operator to place the cans in position and to manipulate a lever to cause the operating parts to perform their functions, and I have for the present confined the mechanism to a semiautomatic one to enable the operator to see each groove as he or she handles the can and ascertain that the groove produced is as near right as such a machine can produce them.

Having thus fully described my invention, I claim as new and desire to secure to me by Letters Patent of the United States—

1. In a machine for operating upon metallic cans while revolving, the combination, with a suitable standard or column, of means for revolving the can, suitable means for revolving the cutter, the cutter mounted in a moving frame, cam mechanism for moving the said frame, and a suitable clamping device for holding and releasing the can, as and for the object set forth.

2. In a can-grooving machine of the kind described, a suitable standard, mechanism for clamping and for revolving the can, a swinging frame carrying a revoluble cutter, means for positively moving the swinging frame a predetermined distance and means for varying the distance of the cutter from the center of revolution of the can, as described.

3. In a can-grooving machine of the kind described, a suitable standard, mechanism for clamping and revolving the can, a revolving cutter, means for moving the cutter toward and from the can, and further means for vertically adjusting the position of the cutter, as and for the purpose set forth.

4. In a can-grooving machine of the kind described, a suitable standard having bearings as described, mechanism for revolving the can, a pivoted frame carrying a cutter, means for revolving this cutter from the mechanism revolving the can, cam mechanism actuated by a handle-bar to partly revolve the cutter-frame upon its pivots, and means for raising and lowering the can-holding mechanism, as and for the purpose stated.

5. In a can-grooving machine of the kind described, the combination, with a suitable standard having a spindle provided with means for revolving it and with means for chucking the can, of a revolving cutter mounted upon a spindle within a swinging frame and driven by a shaft passing centrally through the pivots of the swinging frame, and suitable means for partly revolving said frame a predetermined distance, as and for the object set forth.

6. In a machine for grooving cans as described, the combination with a suitable standard having a revolving spindle provided

with a chuck, holding mechanism to force the can into the chuck and hold same there while being acted upon, a pivoted frame carrying a spindle provided with a cutter, mechanism for revolving said cutter simultaneously with the can, and means substantially as described for oscillating the cutter-frame simultaneously with the mechanism for clamping the can, as described.

7. In a machine for grooving cans as described, the combination, with suitable mechanism for chucking and revolving the can, of a U-shaped plate having bearings as described, a swinging cutter-frame journaled in said bearings, and suitable means for elevating and lowering said plate, as stated.

8. In a machine for grooving cans as described, the combination with suitable mechanism for revolving the can, of suitable mechanism for clamping and releasing the can, consisting of a lever pivoted to the tail-stock of the machine, a revoluble spindle resting upon one end of said lever and carrying a holder for the can, a bell-crank bearing with one arm upon the curved portion of said lever and connected with the other arm with a handle-bar and suitable connecting mechanism, as stated.

9. In a machine for operating upon cans while revolving, the combination, with a suitable standard, of mechanism for actuating the swinging frame and adjusting the same relative to the position of the cutter and the center of revolution of the can, consisting of a stud screw-threaded at one end, a revoluble nut upon said stud located in a slotted aperture in said standard, a sleeve upon said stud,

an arm on said swinging frame and a roller revolving upon a stud on said arm within the groove of said cam, as set forth.

10. In a machine for grooving cans as described, an adjustable cam for the swinging frame, consisting of a stud, a sleeve upon said stud a body portion upon said sleeve and having a cam-shaped shoulder, a collar upon said body portion having in its face a counterpart of the cam to form in conjunction with the cam-shaped shoulder on the body portion the cam-groove proper, and an adjusting-nut upon said body portion, as and for the object stated.

11. In a machine for grooving cans, the mechanism for enabling cans of different length being admitted in the machine, consisting of a revolving chuck, a vertically-adjustable tail-stock carrying the tail-stock spindle, a holder on said tail-stock spindle, lugs projecting from the lower face of the tail-stock, a lever pivoted in said lugs, a slotted arm projecting from the back of the tail-stock, a bell-crank pivoted in said arm, one arm of said bell-crank acting upon a curved portion of said lever as described, a connecting-rod connecting with one end with the other arm of the bell-crank and with the other end with suitable operating mechanism, as and for the object set forth.

In testimony that I claim the foregoing as my invention I have hereunto set my hand in the presence of two subscribing witnesses.

MICHAEL J. STARK.

Attest:

MICHAEL J. STARK, Jr.,
WM. O. STARK.