Dec. 17, 1968 M. R. HUTCHINS 3,416,337

LOCKING COVER FOR A COIN BOX

Filed Nov. 23, 1966 2 Sheets-Sheet 1

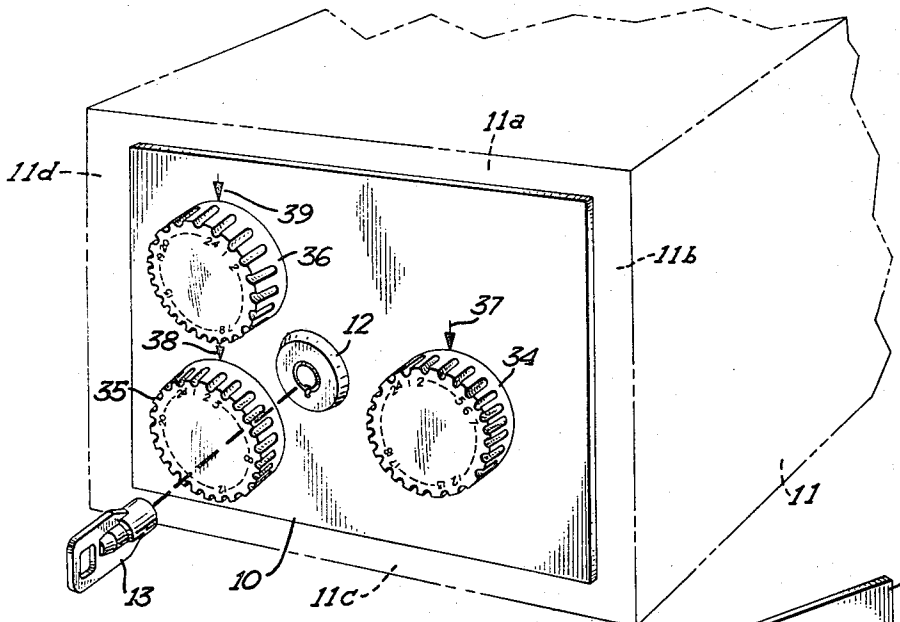


FIG 1

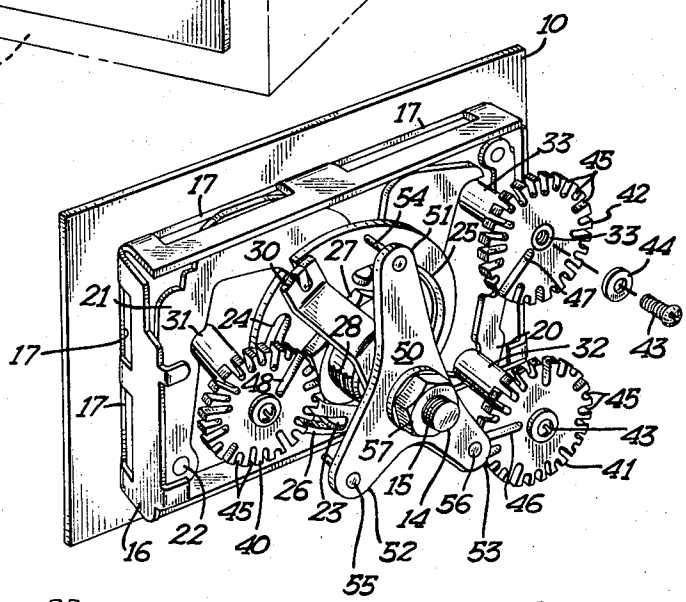


FIG 2

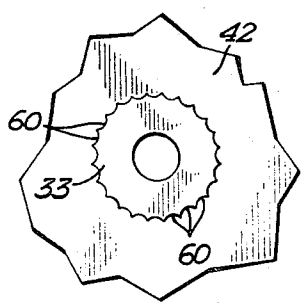


FIG 4

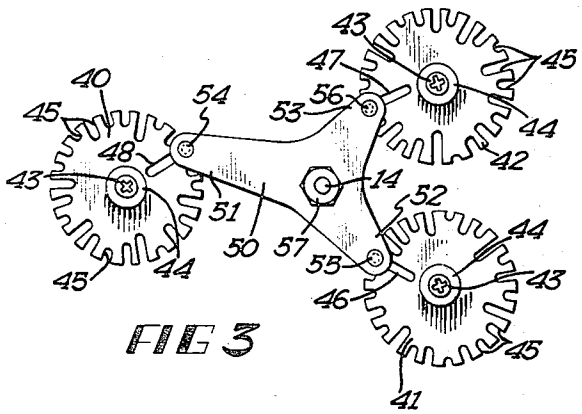


FIG 3

INVENTOR.
MARLYN R. HUTCHINS
BY Schroeder, Siegfried & Ryan
ATTORNEYS

Dec. 17, 1968 M. R. HUTCHINS 3,416,337

LOCKING COVER FOR A COIN BOX

Filed Nov. 23, 1966 2 Sheets-Sheet 2

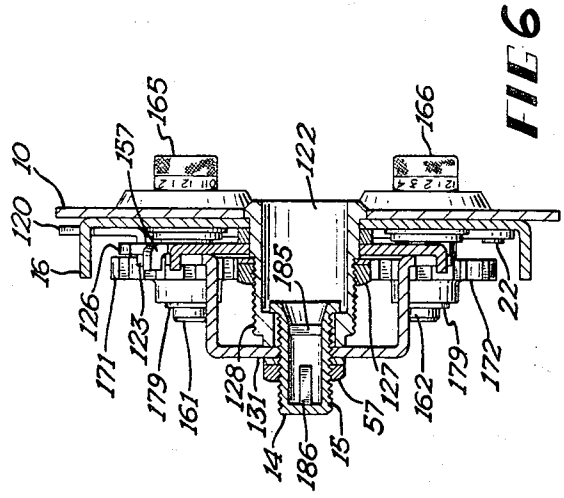


FIG 6

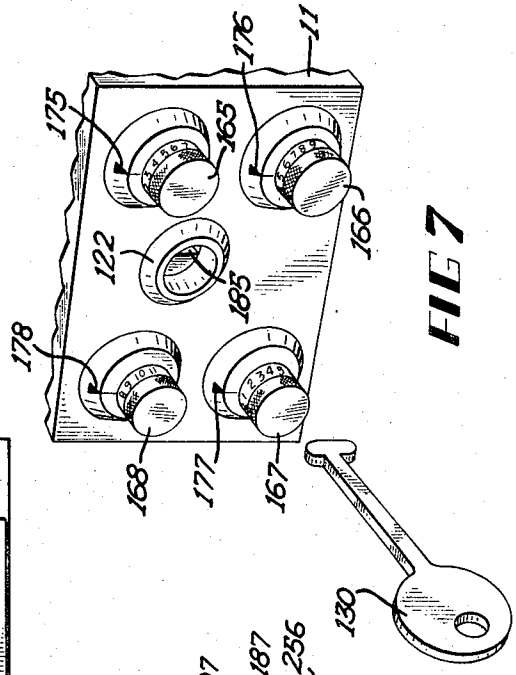


FIG 7

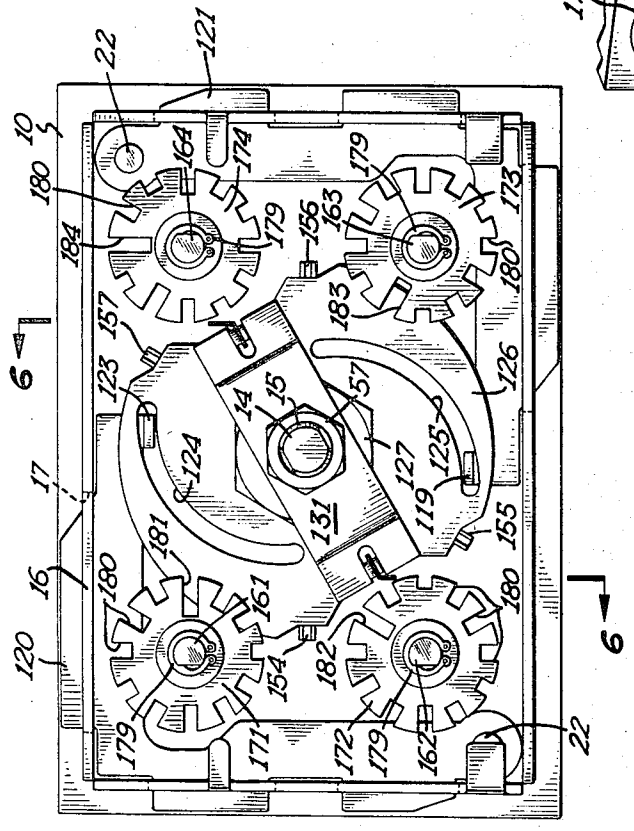


FIG 5

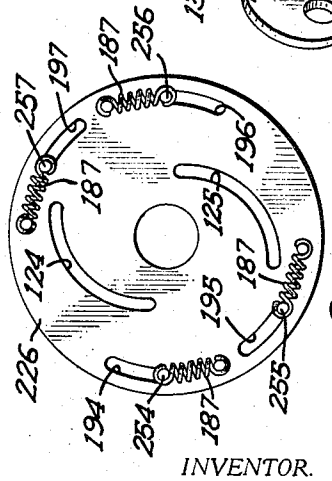


FIG 8

INVENTOR.
MARLYN R. HUTCHINS
BY Schroeder, Siegfried & Ryan
ATTORNEYS

United States Patent Office 3,416,337 Patented Dec. 17, 1968

3,416,337

LOCKING COVER FOR A COIN BOX

Marlyn R. Hutchins, Minneapolis, Minn., assignor, by mesne assignments, to Raven Industries, Inc., Sioux Falls, S.D., a corporation of South Dakota

Filed Nov. 23, 1966, Ser. No. 596,489
9 Claims. (Cl. 70—284)

ABSTRACT OF THE DISCLOSURE

The disclosure is directed to an improved combination lock mechanism in which it is made difficult to interpret the position in which the lock may be opened because the tumblers of the lock have random depth slots formed therein at random positions. The movable part of the lock is supplied with numerous pins which engage numerous slots in rotatable discs and upon all the pins engaging a slot deeper than all others, the bolt mechanism may be moved. At any other position, movement of the movable part of the lock causes at least one pin to engage a slot of one disc before all others, the disc receiving the first engagement with a pin receiving such pin in random order representative of the random order and depth of the slots in the disc making it difficult to determine which pin and disc combination prevents the lock from being operated.

This invention relates to the field of locking devices and more particularly relates to a closure member or locking cover for a coin box used with coin operated appliances.

It is well known that coin operated devices are commonly used with self-service establishments using washers, dryers, amusement devices, and vending machines and of course there are other devices which are operated by the public which require the deposit of a coin, or coins. Since a number of these devices are generally located in a remote area or in a building which is unattended, the coin boxes become attractive to those who seek to break or pry them open and obtain the money therefrom. Since the public does frequent these places of use, the vandals usually must work very quickly to open the coin box and make off with the contents. In some instances, additional protection has been gained by reinforcing the front of the box through which the coins are generally removed by the operator of the equipment to impede or stop the "jimmying" of the box.

More recently however, certain establishments are experiencing difficulty through the use of boxes which use a key for unlocking the box where keys have been provided or made to fit the locks. Of course once the key is obtained, the box may be opened without any difficulty and in a very short period of time making it possible for a vandal to secure the contents of all of the coin boxes in a given establishment in a very short period of time.

The present invention contemplates using the present key operated structure and using another lock of the combination type which has disc like tumblers with slots formed therein of random depth with the exception of the one slot which accepts a pin to move therein during the opening and closing of the lock mechanism. Through the use of the random depth slots, the operator is then at a great difficulty in rotating the dials to attempt to learn the combination of the lock. Also, provisions have been made to readily change the combination of the lock and this feature along with the feature of using the random slots makes the combination lock almost entirely free of lock "picking."

It is therefore a general object of this invention to provide a mechanism for a coin box having a plurality of combination tumblers and key operated lock to control the same.

It is a more specific object of this invention to provide combination tumblers and a locking mechanism, both of which must be rotated to a specific angular position for opening and closing.

It is still another object of this invention to provide a plurality of combination tumblers, each having random depth slots formed therein for engaging a cooperating pin.

It is a further object of the present invention to provide a plurality of combination tumblers which have random depth slots formed therein and are rotationally adjustable to provide new combinations which are difficult to "pick."

These and other objects and advantages of the invention will more fully appear from the following description, made in connection with the accompanying drawings, wherein like reference characters refer to the same or similar parts throughout the several views, and in which:

FIG. 1 is an isometric view of the locking mechanism as seen from the front of a coin box for coin operated equipment;

FIG. 2 is an isometric view of the locking mechanism as seen from the rear when the device is removed from the coin box;

FIG. 3 is a plan view of the back of the locking mechanism showing a spider with pins engaging the disc tumblers;

FIG. 4 is a partial plan view of a disc tumbler and its cooperating shaft showing the keying arrangement for securing one to the other;

FIG. 5 is a plan view of the back of a modified locking mechanism in which the spider element has been eliminated and in which four disc tumblers have been used;

FIG. 6 is an elevational section view taken along lines 6—6 of FIG. 5 showing the relationship of the tumblers to the camming disc;

FIG. 7 is an isometric view of the front of the modified locking mechanism; and

FIG. 8 is a plan view of a modified camming disc in which the pins that engage the tumblers are spring loaded.

As seen in FIG. 1, a plate **10** is secured over the front opening of the coin box **11**. A lock **12** is secured in the center of plate **10** and is operated through the use of a key **13**. Any suitable lock may be used and one that has been found to be appropriate is that manufactured by the Chicago Lock Company, Model HSC101. On the back or rear side of plate **10**, it will be seen that the rotatable portion of lock **12** is formed into a stud **14** which carries threads formed thereon. Secured to plate **10** by suitable means such as welding, is a bracket member **16** which has the bracket located such that plate **10** extends beyond the sides and ends of bracket member **16**. Situated around the edge of the depending portion of bracket member **16**, are a plurality of slots **17**. It will of course be understood that slots are formed on all four sides of the depending portion of bracket member **16** although visible only on two sides as shown in FIG. 2. A pair of substantially right angle arms **20** and **21** lie flat against bracket member **16** adjacent plate **10** and parallel thereto. The arms are pivoted about a pair of pivot points such as a stud **22**. Each arm has an upturned portion (only one of which is shown, as numeral **23**). The upturned portions ride in a pair of slots **24** and **25** which are spiralled outwardly from the center towards the edge and are formed in a camming disc **26**. Camming disc **26** is secured to rotatable stud **14** and is held in place by a nut **27** which engages screw threads

28 on the outer shell portion of lock 12. A compression bracket 30 has a hole formed in the center which slips over threaded stud 14 and engages camming disc 26 to insure that it lies flat against arm members 20 and 21. The portion just described is available in the form of a locking cover or member which is manufactured by Modern Meters, Inc., Macon, Ga.

In addition to the mechanism just described, three shafts 31, 32 and 33 extend through plate 10 at locations thereon which are close to the apexes of an equilateral triangle, the center of which is formed by lock 12 and threaded stud 14. Shaft 31 has a knob 34 secured thereto, shaft 32 has a knob 35 secured thereto and shaft 33 has a knob 36 secured thereto. Each of the knobs carry indicia from the numbers 1 through 24 and the knobs may have the indicia aligned with three different pointers 37, 38 and 39 used with knobs 34, 35 and 36 respectively.

Three discs 40, 41, and 42 are secured to shafts 31, 32, and 33 respectively by suitable means such as a screw 43 and a washer 44. Each of the discs has a plurality of slots 45 formed therein which correspond in number to the number of indicia on each of the knobs and the slots bear the same angular relationship as the indicia. It will be noted that the slots 45 are of random depth and it is not necessary that any of the three discs 40 through 42 have the same angular relationship with each other. Elongated slots 46, 47 and 48 are formed in discs 41 through 43 respectively in place of one of the slots 45 just described.

A spider 50 has three legs 51 through 53 which extend over the edges of discs 40 through 42 respectively. Three pins 54, 55, and 56 extend through spider legs 51 through 53 respectively and engage the slots formed in discs 40 through 42 respectively. Spider 50 is held in place on top of bracket 30 by a nut 57 which is threaded over thread 15 and holds spider 50 in place to rotate with stud 14.

For reasons pointed out earlier, it will be desirable at times to change the combination on each disc tumbler and a means is provided as shown in FIG. 4 for doing so wherein an enlarged view of disc 42 is shown. A plurality of notches or grooves 60 are formed in shaft 33 and disc 42 which correspond in number to the indicia shown on the front of knobs 34 through 36 which in this case is 24 positions. Thus the combination may be changed by merely removing screw 43 from each of the shafts and resetting the disc tumblers.

In operation, it will be recognized that through the use of the combination tumblers, key 13 and lock 12 may be replaced by a knob connected to threaded stud 14 or a tool like a screwdriver, either of which will rotate upon setting each of knobs 34 through 36 to the proper combination for opening or unlocking the arm members. To secure maximum protection, the key 13 is used in lock 12 and the spider 50 is rotated with camming member 26 so that not only does the operator have to make use of the key 13 but must also know the combination of the three disc tumblers 40 through 42. Through the use of the random depth slots 45, all of which are too shallow to permit a rotation of spider 50, the vandal is prevented from determining with any ease, the location of slots 46 through 48 which permit opening of the lock and removal of the plate 10. It will of course be recognized that arms 20 and 21 engage four flange members 11*a* through 11*d* around the opening which secure the panel to the coin box. Since the device may be made from the existing structure which is generally operated with a key, it may be necessary to vary the links of the arms of spider 50 and this can be accomplished by changing the diameter of discs 40 through 42. That is, disc 42 may be larger than discs 40 and 41 in some instances with a resulting shortening of the length of spider arm 53.

A modification of the structure just described is shown in FIGS. 5 through 7 in which spider element 50 is eliminated. A pair of substantially right angle arms 120 and 121 lie flat against bracket member 16 adjacent plate 10 and parallel thereto. The arms are pivoted about a pair of pivot points such as stud 22. Arms 120 and 121 have upturned portions 123 and 119 respectively which ride in a pair of slots 124 and 125 respectively, of a camming disc 126. Slots 124 and 125 are spiralled outwardly from the center of camming disc 126 towards the edge thereof. Camming disc 126 is secured to rotatable stud 14 and is held in place by a nut 127 which engages screw threads 128 on the outer shell portion of a hollow tubular member 122. A bracket 131 has a hole formed in the center which slips over threaded stud 14 and engages camming disc 126 to insure that it lies flat against the arm members. In addition thereto, four upstanding pin portions 154, 155, 156 and 157 are formed from the outer periphery of camming member 126. As will be shown later, they engage slots in tumblers which are yet to be described.

In addition to the mechanism just described, four shafts 161, 162, 163 and 164 extend through plate 10 at locations thereon which are near the corners of a rectangle, the center of which is formed by member 122 and stud 14. Shaft 161 has a knob 165 secured thereto, shaft 162 has a knob 166 secured thereto, shaft 163 has a knob 167 secured thereto and shaft 164 has a knob 168 secured thereto. Each of the knobs carry indicia from the numbers 1 through 12 and the knobs 165 through 168 are aligned with four pointers 175 through 178 respectively. Shafts 161 through 164 each have a flat spot formed on the rear ends to accommodate a flat spot on the hub of four discs 171 through 174 respectively. The discs are secured to shafts by suitable means such as a retaining ring 179. Each of the discs has a plurality of slots 180 formed therein which correspond in number to the number of indicia on each of the knobs and the slots bear the same angular relationship as the indicia. The slots are formed of random depth as described previously. Each of the discs 171 through 174 contain an elongated slot 181 through 184 respectively in the manner described previously.

As can readily be seen, pins 154 through 157 are constructed and arranged to engage the slots in discs 171 through 175 respectively. Thus it will be recognized that a greater number of combinations may be obtained through the use of the four discs as compared to three discs described previously.

In addition thereto, it may be desirable to eliminate the key and lock and a different type of tool 130 (FIG. 7) may be employed which has a T-shaped end. The T-shaped end is passed through a vertical slot 185 formed in the stem end of stud 14. On the inward side of the hollow stud, is a lug or ledge 186 that engages the ends of the T-shaped tool so that stud 14 may be rotated to lock and unlock the combination type structure as previously described.

As a further improvement, reference is made to FIG. 8 where another camming disc 226 is formed with a pair of slots 124 and 125 in the same manner as that previously described. Instead of the pins being formed in the manner described previously or secured in a fixed manner to the camming disc, four slots 194 through 197 are formed in a circular manner near the periphery of disc 226. The circular slots 194 through 197 are located in the same relative position as pins 154 through 157 (as found in FIG. 5). Slidably secured in each of the slots are four pins 254 through 257 which have a shoulder above and below the slot to insure that the pin portion extends transversely to disc 226 in an upwardly extending direction. Four springs 187 are secured to the four pins 254 through 257 and are under tension to urge the pins in a counterclockwise direction against the end of slots 194 through 197. Where the discs may have inadvertently been rotated previous to securing the locking mechanism to the coin box, some of the pins may strike the discs having the slots formed therein. By the use of the structure as shown in FIG. 8, the pins are merely moved in the slot upon engaging any part of the corre-

sponding disc. Once the disc is rotated to the locked position, (such as found in FIG. 5) it will be noted that the pins are disposed away from the discs and are not in engagement therewith. Once the disc **226** is rotated clockwise to unlock plate **10** from the coin box, each of the pins will be urged against the end of the slot so that a solid bearing position is obtained when they engage the respective tumbler discs such as numbers **171** through **174.**

Thus it will be seen that a device has been shown and described which helps secure a locking mechanism to a coin box for coin operated appliances. It will especially be seen that through the use of the random selection of the depth of the slots used in the tumblers, determining the location of the key slot will be almost an impossibility.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of the invention which consists of the matter shown and described herein and set forth in the appended claims.

What is claimed is:

1. A locking mechanism for a coin box having a lock portion secured thereto comprising:

(a) plate means having a plurality of bores formed therein, one of which is substantially centrally located from all others;

(b) arm means movably secured to the rear of said plate means and adapted to move away from and towards said substantially centrally located bore and cooperate with the lock portion of the coin box;

(c) lock means rotatably secured to said plate means and extending to the front and rear thereof through said substantially centrally located bore, said lock means engaging said arm means and imparting movement thereto;

(d) a plurality of rotatable means secured to said plate means and extending to the front and rear thereof through said plurality of bores other than said bore substantially centrally located, said rear portions having a predetermined number of radially extending slots of random depth having a predetermined limit formed around the edges thereof in random order, at least one of which is deeper than all others;

(e) and pin means secured to said lock means having a plurality of pins, each for engaging said slots in one of said cooperating plurality of rotatable means to allow said lock means to be rotated and cause said arm means to move when said pin means are aligned for engagement and are engaged with said deeper slots, thereby engaging and releasing said plate means with respect to the coin box.

2. The invention as set forth in claim **1** wherein said lock means includes:

(f) a key operated lock rotatable upon said pin means engaging said slots deeper than all others.

3. The invention as set forth in claim **1** wherein said pin means includes:

(g) a spider secured to said lock means constructed and arranged to hold said plurality of pins to depend therefrom and engage said slots.

4. The invention as set forth in claim **1** wherein said rotatable means include:

(h) a plurality of shafts rotatably secured in said bores and extending therethrough;

(i) a pluraiity of knobs secured to said shafts in front of said plate means, each of said knobs carrying indicia and affording means to impart rotation to said shafts;

(j) and a plurality of discs secured to said shafts on the rear side of said plate means, said discs having said slots formed therein.

5. The invention as set forth in claim **4** including:

(k) keyway mechanisms having one portion formed in each of said discs and another portion formed in each of said shafts, said keyway mechanisms permitting said discs to be secured to said shaft at different rotational positions corresponding in number as great as there are positions of indicia on said knobs.

6. The invention as set forth in claim **4** wherein:

(l) said plurality of discs are of different diameter and said pin means are cooperatively located to engage said slots on said discs.

7. The invention as set forth in claim **1** wherein said lock means includes:

(m) a camming disc having at least one spirally extending slot formed therein engaging said arm means, and having a plurality of rim portions formed into pins and extending into the path of said slots in said rotatable means when said lock means is rotated.

8. The invention as set forth in claim **7** wherein said plurality of rotatable means includes:

(n) four discs releasably secured to four shafts, each of said discs having the same plurality of radial slots formed there.

9. The invention as set forth in claim **7** including:

(o) a plurality of circular oriented slots formed in said camming disc near the periphery thereof, said pins being slidably secured in said circular oriented slots, and projecting transversely therefrom to cooperate with said slots in said rotatable means;

(p) and spring means secured between said pins and said camming disc to urge said pins against the ends of said circular oriented slots when said lock means is rotated to release said plate means from the coin box.

References Cited

UNITED STATES PATENTS

345,340	7/1886	Volke	70—312 XR
381,903	5/1888	Bergman	70—293 XR
697,651	4/1902	Neidl	70—292
1,240,114	9/1917	Baum	70—317
1,396,550	11/1921	Beaver	70—309
2,293,942	8/1942	Klahn	70—82
2,540,172	2/1951	Nieratka	70—304
3,045,467	7/1962	Herlong	70—322

MARVIN A. CHAMPION, *Primary Examiner.*

R. L. WOLFE, *Assistant Examiner.*

U.S. Cl. X.R.

70—288, 312