

Oct. 31, 1961

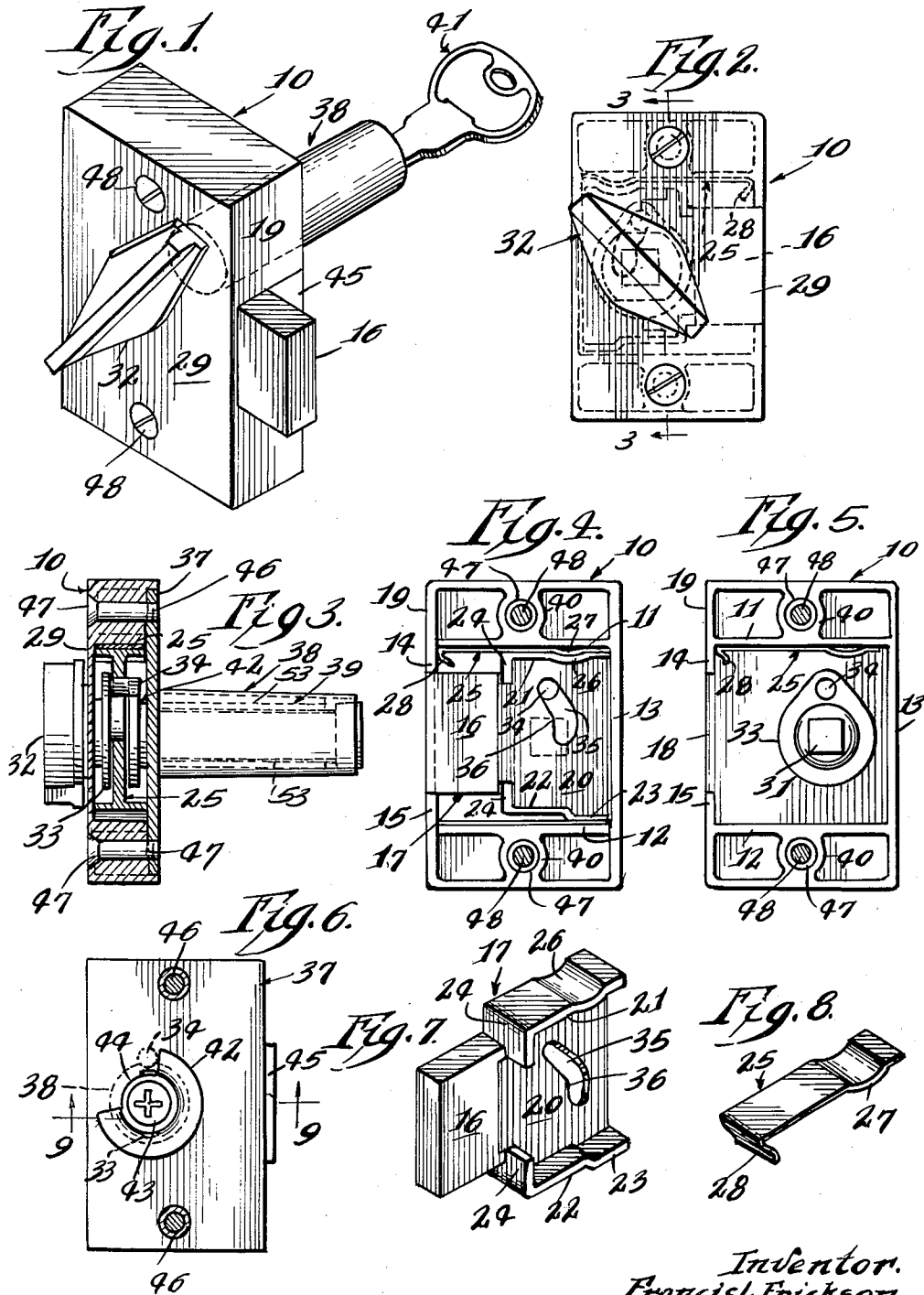
F. L. ERICKSON

3,006,179

RIM LOCK ASSEMBLY

Filed June 12, 1958

2 Sheets-Sheet 1



Inventor.
Francis L. Erickson.

By. Wilson T. Coffer
Attorneys

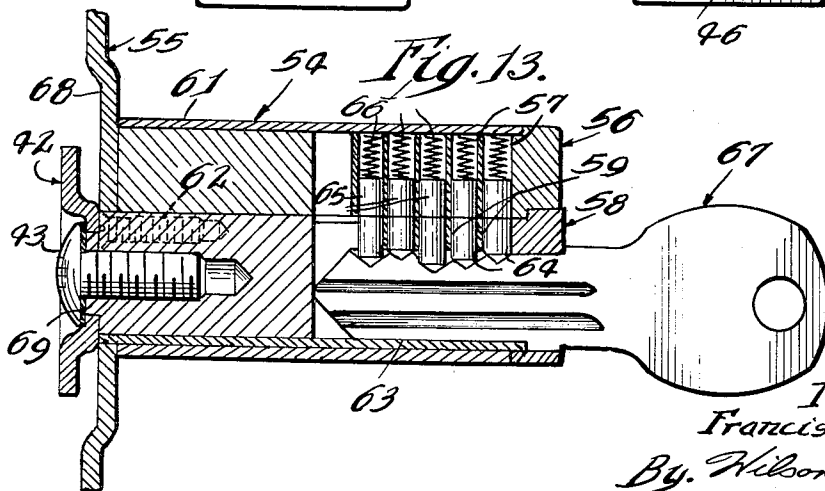
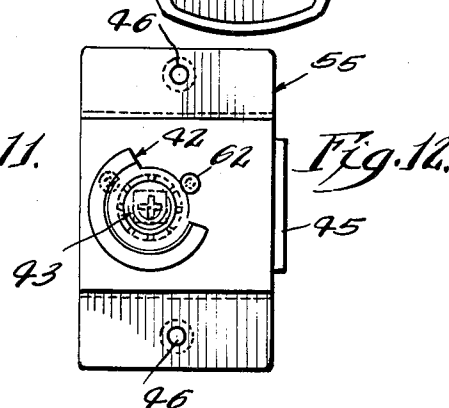
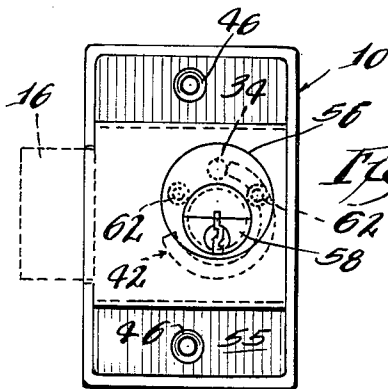
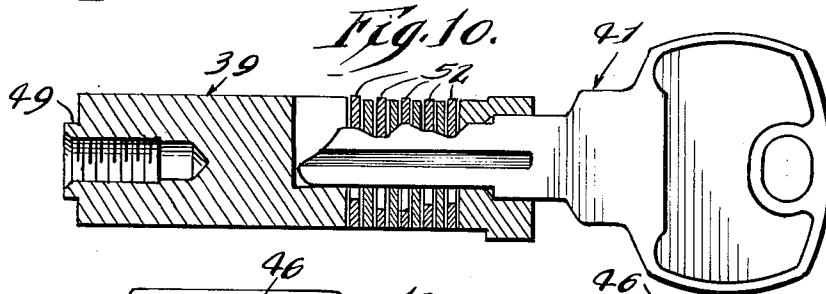
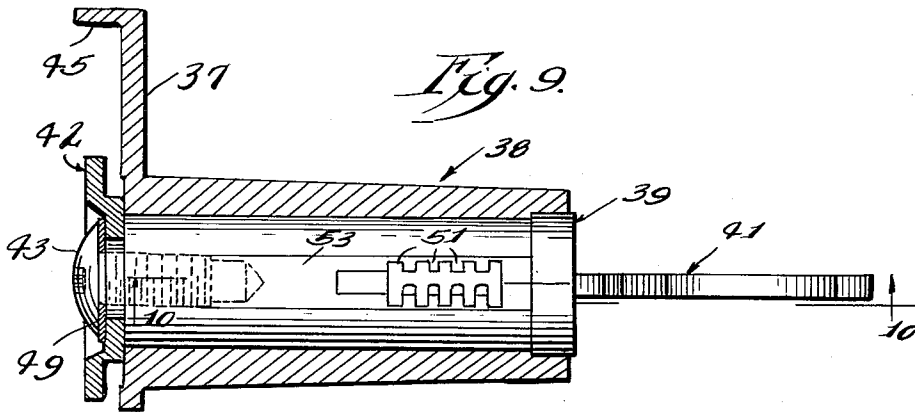
Oct. 31, 1961

F. L. ERICKSON
RIM LOCK ASSEMBLY

3,006,179

Filed June 12, 1958

2 Sheets-Sheet 2



Inventor.
Francis L. Erickson.
By *Wilson & Lippert*
Attorneys.

1

3,006,179

RIM LOCK ASSEMBLY

Francis L. Erickson, Rockford, Ill., assignor to National Lock Co., Rockford, Ill., a corporation of Delaware
Filed June 12, 1958, Ser. No. 741,570
5 Claims. (Cl. 70—129)

The present invention relates to a rim lock assembly and more particularly to a novel one-piece rim lock so constructed as to be readily and easily installed at the interior of the door.

Among the objects of the present invention is the provision of a novel rim lock that is more economical to produce and install than prior types of rim locks in which a wafer or pin tumbler is installed on the exterior of the door and the lock box or housing at the interior of the door.

In the present novel assembly, the plate or pin tumbler lock requires but a single drilled opening through which projects the lock cylinder and its contained lock assembly with the cylinder integral with the back plate of the lock box or housing and the latter with its assembled back plate secured to the interior of the door by two wood or sheet metal screws so that the entire assembly may be quickly and easily installed.

It is, therefore, an important object of the present invention to provide a novel rim lock assembly in which only the lock cylinder and its contained tumbler lock projects to the exterior of the door, the completely assembled lock box being mounted at the interior with only the cylinder and contained lock projecting outwardly through an opening in the door to the exterior thereof.

Another feature of the present invention is the provision of a simplified and compact rim lock assembly comprising a housing at the interior of the door, a lock bolt and actuating mechanism in said housing, a knob for operating said actuating mechanism from the interior of the door to project the bolt to locked or unlocked position, a cylinder and plug sub-assembly carried by and projecting from the back plate of the housing and projecting through a single opening in the door to the exterior thereof for retracting the bolt from locking position or for projecting the bolt to locking position by insertion and turning of the proper key, and means in said housing for dead-locking said bolt.

The present invention further comprehends a novel dead locking feature accomplished by the dual performance of a flat or leaf spring so constructed and arranged with respect to the lock or latch bolt as to tensionally retain the latter in retracted position and when the bolt is extended to locking engagement the spring retains the bolt in dead-locked position.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

In the drawing:

FIGURE 1 is a view in perspective of the novel one-piece rim lock assembly with the lock bolt projected to locking position.

FIG. 2 is a view in front elevation of the rim lock assembly of FIG. 1, but with the knob turned to unlocked position and the lock bolt retracted, and showing dotted the outline of the interior and contained assembly in the housing.

FIG. 3 is a view in vertical cross section taken on substantially the line 3—3 of FIG. 2 and viewed in the direction of the arrows.

FIG. 4 is a view in rear elevation of the bolt box or housing with the rear plate and its cylinder sub-assembly removed and the bolt retracted.

2

FIG. 5 is a view similar to FIG. 4 but with the latch bolt removed to show the knob cam and its eccentric pin for actuating the bolt.

FIG. 6 is a view in front elevation of the interior of the rear plate which carries the integral cylinder and the contained plate tumbler lock assembly and showing the plug cam for actuating the bolt from the exterior of the door.

FIG. 7 is a view in perspective of the latch bolt.

FIG. 8 is a view in perspective of the friction spring.

FIG. 9 is an enlarged view in horizontal cross section through the cylinder and plug assembly of a plate tumbler lock with the key inserted, the view being taken substantially on the line 9—9 of FIG. 6 and viewed in the direction of the arrows.

FIG. 10 is a view in horizontal cross section through the plug assembly taken in a plane substantially on the line 10—10 of FIG. 9 and viewed in the direction of the arrows.

FIG. 11 is a view in rear elevation of an alternate rim lock assembly in which a pin tumbler lock is affixed to or carried by the back plate.

FIG. 12 is a view in front elevation of the interior of the rear plate which carries the pin tumbler lock.

FIG. 13 is a view in vertical cross section through the back plate and the pin tumbler lock including the cylinder, plug and the cam member attached to the plug at the interior of the back plate.

Referring more particularly to the disclosure in the drawing and to the novel illustrative embodiment of the present invention, the disclosed rim lock assembly of FIGS. 1 to 10, inclusive, comprises a housing or box 10 having a rectangular passage therein defined by the spaced upper and lower internal walls 11 and 12, the closed end wall 13 and inturned flanges 14 and 15 at the other end wall for conformably receiving the locking or latching end 16 of a sliding lock bolt 17. This bolt 17 has its projected locking end 16 movable through the slot 18 between the spaced flanges 14 and 15 of the end wall 19 of the housing and is movable into and out of locking engagement with a strike plate (not shown).

The upper and lower edges of the enlarged part or inner end 20 of the bolt 17 are provided with a peripheral flange 21 and 22, respectively, and these flanges so contoured that the flange 22 is provided with a narrow ledge 23 having sliding contact with the internal wall 12 as shown in FIG. 4, and both flanges provided with an inturned shoulder 24. The flange 21 is slightly spaced from the internal wall 11 to receive a leaf or friction spring 25, and this flange 21 is provided with an arcuate depression or concavity 26 adapted to receive a corresponding concavity 27 adjacent one end of the leaf spring when the bolt 17 is moved to retracted position. This spring is also provided at its other or forward end with a short inturned projection 28 against which a shoulder 24 on the flange 21 of the latch bolt engages when the bolt is moved toward its extended or locked position.

Projecting through and journaled in the outer wall or face plate 29 of the latch bolt housing 10 is a shaft 31 affixed to the rear of a knob or handle 32 mounted at the exterior of the housing. Affixed to the inner end of the shaft 31 at the interior of the housing is a cam member 33 carrying an eccentrically mounted pin 34 projecting inwardly into the housing and through an elongated and curved slot 35 in the inner end 20 of the bolt 17 whereby rotating the knob 32 in one direction moves the bolt to its projected position and rotating the knob in the other direction moves the bolt to its retracted position.

The slot 35 has a high point at 36 so that when the bolt is being projected to its fully extended and locked position, the shoulder 24 on the flange 21 of the latch

3

bolt engages the short end or projection 28 of the spring 25 and the knob 32 and the pin 34 on the knob cam 33 must be turned across this high point 36 in the slot of the bolt. The projection 28 of the spring is thereupon compressed by movement of the bolt toward its fully extended and locked position and upon the eccentric pin 34 passing this high point and entering the lower end of the slot 35, the projection 28 of the spring forces the bolt back against the pin and retains the bolt in its dead-locked position.

Affixed or formed integral with the back plate 37 providing a closure for the rear of the housing 10, is a cylinder 38 containing a plate tumbler lock assembly 39 including the revolving plug and tumbler assembly adapted to be turned by a key 41. The plate 37 of this sub-assembly is conformably received within the encompassing walls of the housing 10 and seats upon the internal walls 11 and 12 and the embossments 40 in the housing.

To the inner squared and reduced end of the plug assembly is secured a plug cam 42 by means of a lock washer and plug screw 43. This plug cam is provided with a cut-out 44 into which projects the eccentric pin 34 (shown in dotted outline in FIG. 6) whereby rotating the lock 39 upon insertion of the proper key 41 rotates the cam 42 and moves the pin 34 in its slot 35 to retract the bolt 17.

The back plate 37 is provided with a flange 45 partially closing the slot 18 in housing 10, but allowing for the projection and retraction of the projecting end 16 of the bolt 17. The back plate 37 is also provided with spaced openings 46 aligned with similarly spaced counter-sunk openings 47 in the face plate 29 for the reception of two wood or sheet metal screws 48 for mounting the housing and its back plate to the interior of a door or closure. Thus the door requires but one drilled opening through which is projected the cylinder 38 giving access to its lock from the exterior.

The plate tumbler lock assembly is shown more particularly in FIGS. 9 and 10, and includes a plug 39 having at its inner end a squared reduction 49 received in a conformed opening in the plug cam 42. This plug is diametrically or transversely slotted at 51 to receive multiple spring-biased plug tumblers or plates 52 extending therethrough and the ends capable of being received in a longitudinal slot 53 in the cylinder 38 when the key 41 is withdrawn, and when the proper key is inserted these tumblers are adapted to be retracted from the slot to permit the plug 39 and its cam member 42 to be turned to carry therewith the eccentric pin 34 to retract the latch bolt 17 and unlock the door.

In FIGS. 11, 12 and 13 is disclosed a pin tumbler unit 54 carried by the back plate 55 of the novel rim lock assembly. This pin tumbler unit comprises a cylinder 56 having multiple radially extending recesses 57, a pin tumbler plug 58 also provided with radially extending recesses 59 adapted to be moved into alignment with the recesses 57 in the cylinder 56, and a retainer sleeve 61 encompassing the cylinder.

The cylinder is rigidly secured to the rear of the back plate 55 by spaced screws 62 projecting through openings in the back plate and received in tapped openings in the cylinder 56. The plug 58 is conformably and rotatably received in a cylindrical opening 63 eccentrically arranged in the cylinder 56 and the radial recesses 59 of the plug provided with tumblers 64 and the radial recesses 57 in the cylinder 56 provided with aligned drivers 65 each spring-pressed by a coil spring 66 seating at its upper or outer end against and retained by the retainer sleeve 61. A key 67 is adapted to release the tumblers 64 from locking engagement so that the key and plug 58 may be turned to rotate the cam member 42 and cause the eccentric pin 34 to retract the latch bolt.

The back plate 55 is similar to the back plate 37 (FIGS. 8 and 9) except that it is shown indented at 68 on its inner face and thereat provided with an opening

4

through which projects the square and reduced inner end 69 of the plug 58. This square end is adapted to be received in a conforming opening in the plug cam 42 secured to the plug by a lock washer and plug screw 43, in the manner of the embodiment shown in FIG. 9. As the remainder of this rim lock assembly, including the housing 10 and contained assembly, is similar to that shown in FIGS. 1 to 8, inclusive, further reference thereto is unnecessary.

With either form of the rim lock assembly disclosed herein, the bolt 17 may be projected to its dead-bolt locked position from the interior by turning of the knob 32 through approximately 90°, or from the exterior by turning of the key 41 or 67 through approximately 90°, from unlocked to locked position.

Having thus disclosed the invention, I claim:

1. In a rim lock assembly for mounting upon the interior of a door, a bolt housing, a bolt slidably mounted in said housing and having a locking projection movable into and out of an end wall of said housing, a knob rotatably mounted on said housing at the exterior thereof, a shaft affixed at one end to said knob and rotatable in said housing, a cam member mounted on the other end of said shaft within the housing and provided with an eccentric pin, said bolt having a curved cam slot into which projects and moves said eccentric pin for moving the bolt and its locking projection to retracted position or to projected and locked position upon turning of said knob, its cam member and pin, and a leaf spring in said housing having a concave portion adjacent one end and a projection adjacent the other end, said bolt having a depression for receiving the concave portion of the spring when the bolt is retracted for tensionally retaining said bolt in unlocked position, a shoulder on said bolt engaging and flexing the projection on said spring when the bolt is moved toward its projected, locking position in which the pin is moved to adjacent one end of the slot, said slot having a high point adjacent said one end whereby as the pin rides over this high point, the compression on the projection of the spring is relieved and this projection forces the bolt inwardly against the pin to retain the bolt in dead-locked position.

2. A rim lock assembly for a door, comprising a sub-assembly including a bolt housing, a bolt received and slidably mounted in said housing and having a locking projection movable into and out of said housing, a knob rotatably mounted on said housing, a shaft affixed at one end to said knob and rotatable in said housing, a cam member mounted on the other end of said shaft within the housing and provided with an eccentric pin, said bolt having an elongated curved slot into which projects said eccentric pin for moving the bolt and its locking projection to retracted position or to projected and locked position upon turning of said knob and its cam member, a leaf spring in said housing having means for tensionally engaging and retaining said bolt in retracted position and means for retaining said bolt in dead-locked position when projected into locking engagement, said elongated slot having a high point adjacent the end occupied by the pin when the bolt is moved to its locking position whereby as the pin rides over this high point, said leaf spring forces the bolt inwardly against the pin to retain the bolt in dead-locked position, and a sub-assembly at the rear of said housing and including a back plate providing a closure for the rear of said housing, a cylinder projecting from said back plate and through an opening in the door to the exterior thereof, said cylinder containing a lock accessible from the exterior and adapted to be turned upon insertion and turning of the proper key and a cam at the interior of the back plate engaging and turning said eccentric pin upon turning of said lock for moving said bolt.

3. A rim lock assembly for a door, comprising a sub-assembly including a bolt housing, a bolt received and slidably mounted in said housing and having a locking

5

projection movable into and out of said housing, a knob rotatably mounted on said housing, a shaft affixed at one end to said knob and rotatable in said housing, a cam member mounted on the other end of said shaft within the housing and provided with an eccentric pin, said bolt having an elongated curved slot into which projects said eccentric pin for moving the bolt and its locking projection to retracted position or to projected and locked position upon turning of said knob and its cam member, a leaf spring in said housing having a concave portion adjacent one end and a projection adjacent the other end, said bolt having a depression for receiving the concave portion of the spring when the bolt is retracted for tensionally retaining said bolt in unlocked position, a shoulder on said bolt engaging and flexing the projection on said spring when the bolt is moved toward its projected, locking position in which the pin is moved to adjacent one end of the slot, said slot having a high point adjacent said one end whereby as the pin rides over this high point, the compression on the projection of the spring is relieved and this projection forces the bolt inwardly against the pin to retain the bolt in deadlocked position, and a sub-assembly at the rear of said housing and including a back plate providing a closure for the rear of said housing, a cylinder projecting from said back plate and through an opening in the door to the exterior thereof, said cylinder containing a lock accessible from the exterior and adapted to be turned upon insertion and turning of the proper key, and a cam at the interior of the back plate engaging and turning said eccentric pin upon turning of said lock for moving said bolt.

4. A rim lock assembly for mounting upon the interior of a door with said door provided with an opening there-through through which projects a lock cylinder and contained lock, comprising a sub-assembly including a bolt housing, a bolt received and slidably mounted in said housing and having a locking projection movable into and out of an end wall of said housing, means on the exterior of said housing for moving said bolt and its locking projection into retracted position to unlock the door and into projected position in which the locking projection is moved to locking position, a rotatable cam member in said housing and connected to said means and provided with an ec-

6

centric pin, an elongated curved slot in said latch bolt within the housing and receiving said pin whereby rotation of said means in one direction retracts said bolt to unlocked position and rotating said means in the opposite direction projects the bolt into locking engagement, and a leaf spring in said housing having a concave portion adjacent one end and a projection adjacent the other end, said latch bolt having a depression for receiving the concave portion of the spring when the bolt is retracted for tensionally retaining said bolt in unlocked position, a shoulder on said bolt engaging and flexing the projection when the bolt is moved toward its projected, locking position, and a sub-assembly including a back plate providing a closure for the rear of the housing, a cylinder carrying a tumbler lock and plug projecting through the opening in the door to the exterior thereof, and a cam rotatably mounted on the inner face of said back plate and rotatable with the plug of said tumbler lock, said last mentioned cam having a cutout into which projects said eccentric pin whereby said bolt may also be operated from the exterior of the door by insertion of the proper key into and turning of the plug of said tumbler lock to thereby rotate said cam and pin and actuate said bolt.

5. A rim lock assembly for mounting upon the interior of a door as set forth in claim 4, in which said cam comprises a circular plate with said cut-out extending through an arc of approximately ninety degrees about its periphery.

References Cited in the file of this patent

UNITED STATES PATENTS

918,327	Jordon	Apr. 13, 1909
1,446,865	Tueckmantel	Feb. 27, 1923
1,591,010	Best	July 6, 1926
2,058,517	Schoorel	Oct. 27, 1936
2,119,175	Niederrenk	May 31, 1938
2,174,958	Backhouse	Oct. 3, 1939
2,447,190	Lickteig	Aug. 17, 1948

FOREIGN PATENTS

493,617	Great Britain	Oct. 10, 1938
761,691	Great Britain	Nov. 21, 1956
855,898	France	Feb. 26, 1940
1,124,543	France	July 2, 1956