Sept. 27, 1938. H. M. GASSTROM 2,131,506

LOCK

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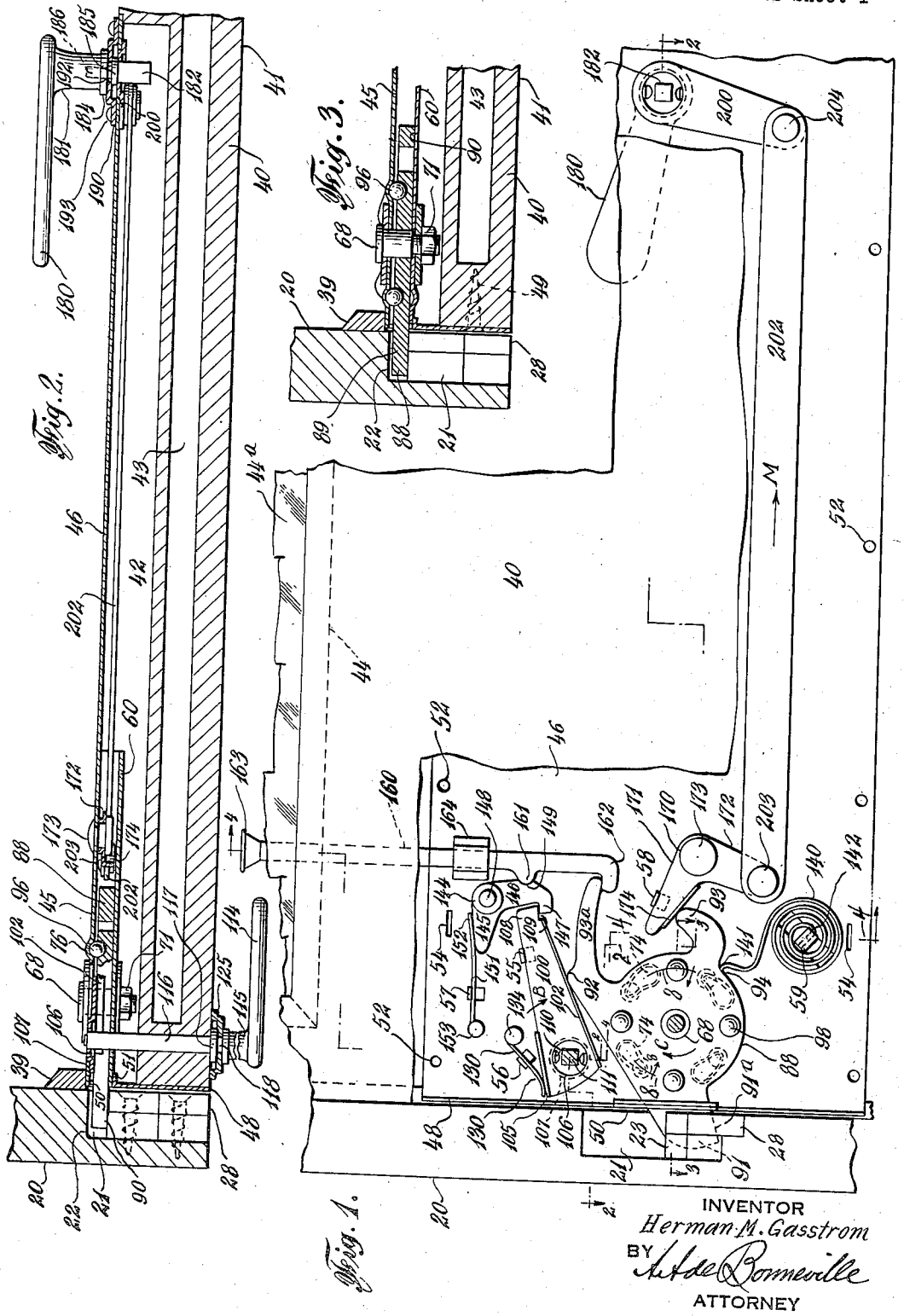


Fig. 1.

Fig. 2.

Fig. 3.

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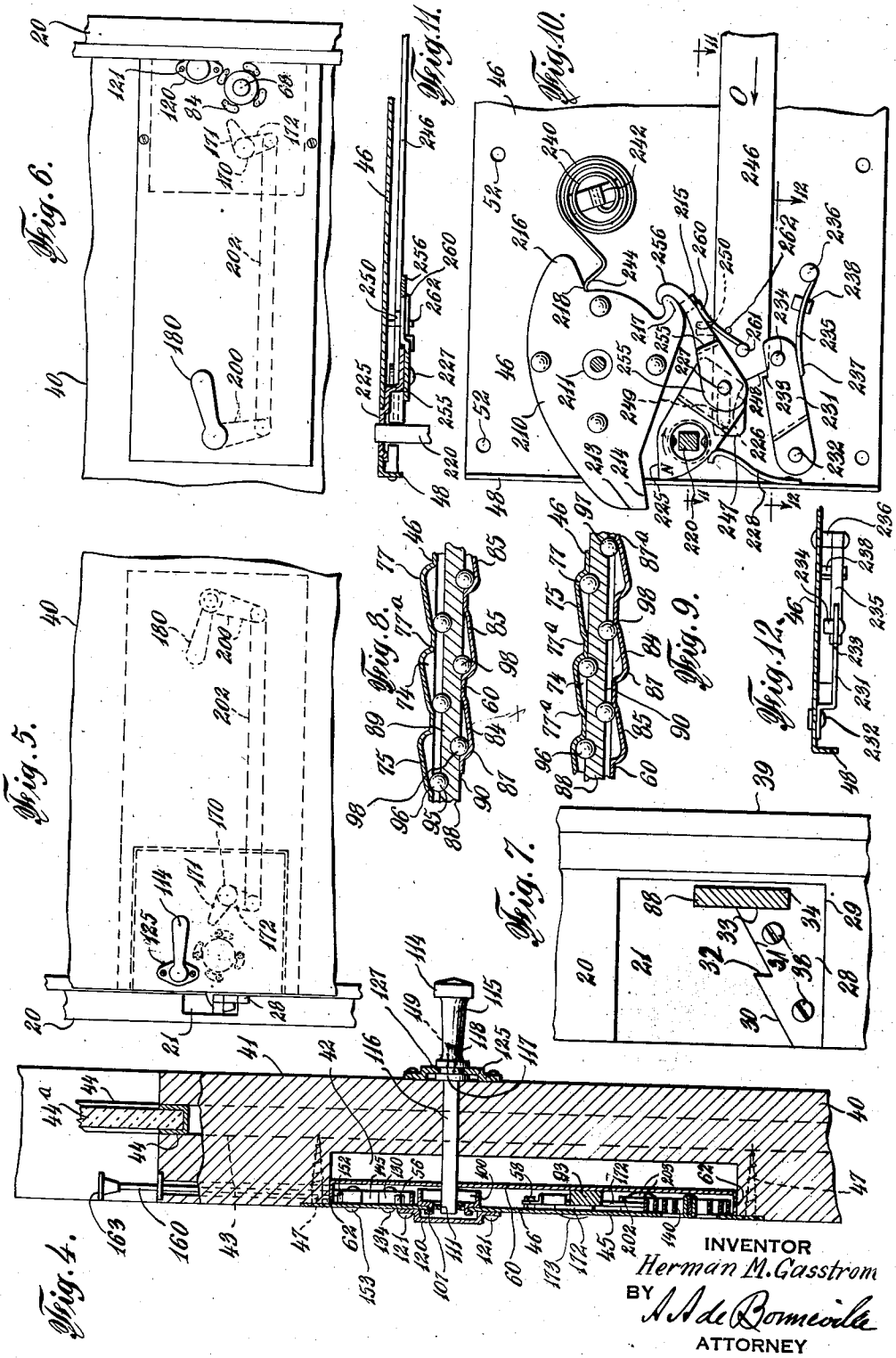


Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

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LOCK

Herman M. Gasstrom, Mount Vernon, N. Y.

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3 Claims. (Cl. 292—242)

This invention relates to a lock and is an improvement of the lock described in my U. S. Letters Patent No. 2,055,197, dated September 22, 1936.

The object of this invention is the production of a lock for a swinging door, by means of which it is tightly clamped in place when closed.

The second object of the invention is the production of a lock specially adapted for the swing door of a vehicle like an automobile, by means of which the said door is prevented from rattling when closed, and specially when the vehicle is moving.

The third object of the invention is the production of a lock for a swinging door, by means of which said door can be locked in place, by means on its outer and inner sides.

The fourth object of the invention is the production of means for a swinging door of a vehicle, by means of which the door cannot be opened by its handle on the outside thereof.

The specific improvements of the present invention relate to a lock with a disc shaped lock bolt and the means for swinging said bolt to different positions.

The organization of the invention includes a disc shaped lock bolt for a lock, which when swung at the same time moves laterally to maintain the door to which the lock is attached in lateral fixed position.

In the accompanying drawings Fig. 1 represents an outside elevation of the door partly broken away of an automobile, with the appurtenances of the invention indicated therewith; Fig. 2 shows a section of Fig. 1 on the line 2, 2; Fig. 3 is an enlarged section of Fig. 1 on the line 3, 3; Fig. 4 represents a section of Fig. 1 on the line 4, 4; Fig. 5 indicates an outside elevation on a reduced scale of the door of the vehicle with its lock and appurtenances; Fig. 6 is a reverse view of Fig. 5; Fig. 7 represents an enlarged fragmentary inside view of the jamb of the door for the lock with its bolt in section; Fig. 8 is an enlarged section of Fig. 1 on the circular line 8, 8, of Fig. 1 when the door is completely closed; Fig. 9 shows a section similar to Fig. 8 before the door of the vehicle is completely closed. Fig. 10 represents a fragmentary portion of Fig. 1 with a modification. Fig. 11 is a section of Fig. 10 on the line 10, 10 and Fig. 12 is a section of Fig. 10 on the line 12, 12.

In the drawings the jamb of the door of a vehicle, in this instance an automobile, is indicated at 20, having the cavity 21 with the inner face 22 and the projecting portion 23, similar in shape to the keeper of the lock for the door.

The keeper of the lock is indicated in its entirety by the numeral 28, and is shown with its bottom face 29, the inclined upper face having the portions 30 and 31, with the locking face 32 between them, and the locking seat having the vertical face 33 and the bottom face 34. The keeper 28 is fastened to the jamb 20 by the screws 38, and a stop 39 is fastened to said jamb 20.

A fragmentary portion of the swinging door of the vehicle is indicated in its entirety by the numeral 40 and is shown with its outer face 41, the cavity 42 and the opening 43. The usual sash 44, with its glass 44a for the door can be lowered in the opening 43.

The housing of the lock is indicated in its entirety by the numeral 45 and is positioned within the cavity 42. The said housing 45 comprises the elongated main member 46 which is fastened to the door 40 by means of the screws 47. The member 46 has extending from one side thereof and at right angles thereto, the flange 48 which latter is fastened to the swinging end of the door 40 by screws 49. An opening 50 with the flange 51 is indicated in the flange 48. Openings 52 are shown in the member 46 for the screws 47. Openings 54 are also indicated in the member 46.

Stop lugs 55, 56, 57 and 58 are pressed out from the member 46 and also the clamping lugs 59 are pressed out from said member 46.

The cover of the housing 45 comprises the main member 60 which is parallel to and spaced from the member 46, and has the flanges 62 integral therewith and at right angles thereto. Lugs, not shown, integral with the flanges 62, extend through the openings 54 of the member 46. The members 46 and 60 are clamped in operative position by the pivot bolt 68 shown with the nut 71.

With the main member 46, see Figs. 8 and 9, are formed the cam cavities 74 having the walls 75 which are arcuate in cross-section as indicated at 76, Fig. 2, and taper upwardly from their peaks 77a to their crowns 77. The cavities 74 are opposite one face of the lock bolt 88 to be described.

The main member 60 has integral therewith the oppositely positioned tapered cam cavities 84 having the walls 85, which are also arcuate in cross-section and taper from their peaks 87a to their crowns 87. The peaks 87a are adjacent to the other face of said lock bolt 88 and the crowns 87 are distant therefrom.

Between the members 46 and 60 is positioned the disc shaped lock bolt 88, having the inner face 89 and the outer parallel face 90, and is supported on the pivot bolt 68. The bolt 88, see Fig. 1, has integral therewith the locking nose 91 having the

bottom face 91*a* and the operating noses 92, 93, the adjusting nose 93*a* and the heel 94 adjacent to the nose 93. In one face of the lock bolt 88 are shown the semi-spherical cavities 95 for supporting the balls 96, and in the outer face of the bolt 88 are formed the semi-spherical cavities 97 for supporting the balls 98. The cavities 95 are positioned between the cavities 97. The locking nose 91 is adapted to extend through the opening 50 of the flange 48. The balls 96 and 98 at the closed position of the door are respectively located in their cam cavities 96 and 98 as indicated in Fig. 8.

A tapered operating lever 100 is shown with the longitudinal flange 102 at one side thereof and at right angles thereto. The lever 100 also has integral therewith the short flange 105 at right angles thereto. The body of the lever 100 has the depressed portion 106 which engages the opening 107 in the member 46 of the housing of the lock. At the swinging end of the lever 100 is indicated the locking end 108 with the latch 109.

Lugs 110 extend from the depressed portion 106 and engage the perimeter of the opening 107. A square shaped opening 111 is shown in the depressed portion 106.

An outside operating handle 114, see Figs. 2, 4 and 5, has integral therewith the stem 115. A square shank 116 extends through an opening of the door 40 and through the square opening 111 of the lever 100. The shank 116 has integral therewith the flange collar 117 and from the latter extends the hub 118. A threaded shank 119 extends from the hub 118 and is in threaded engagement with the stem 115. A cup shaped cover bracket 120 is fastened to the member 46 of the housing for the lock over the opening 107, by means of the screws 121. A cup shaped bracket 125 bears on the outer face 41 of the door 40, and is fastened thereto by bolts. The said bracket 125 is indicated with the circular opening 127, which engages the hub 118. A plate spring 130, bears upon the inner face of the main member 46 of the housing 45, and the lower portion of said spring at one side bears against the flange 105. The outer side of the spring 130 bears against the stop lug 56. The upper end of the spring 130 is engaged by the rivet 134, which extends through the member 46.

A spiral spring 140 having the ends 141 and 142, bears on the member 46 of the housing 45. The end 141 bears against the heel 94 of the nose 93 and the end 142 is clamped between the clamping lugs 59.

A latch bell crank 144 having the arm 145 and the latch arm 146 with the latch heel 147 is pivoted to the member 46 of the housing 45, by means of the pivot 148. A latch cavity 149 is shown in the outer face of the latch arm 146.

A flat spring 151 with the swinging end 152 bears on the member 46, and one end thereof is secured in place by the rivet 153. The said spring 151 at about its central portion bears against the stop lug 57, and its swinging end bears against the arm 145.

An inside vertical adjusting handle is indicated in its entirety by the numeral 160. The adjusting handle 160 at its lower portion has integral therewith at one side thereof the locking lug 161 which coacts with the locking cavity 149, and at its lower end is shown the heel 162. A head 163 for operating the handle 160 is indicated at the upper end of said handle. A U shaped lug 164 extends from the member 46 of the housing 45 for guiding the adjusting handle 160. It will be noted that the handle 160 extends up through the door 40 and above the top edge of the opening 43 for the sash of said door.

An operating bell crank 170 indicated with the arms 171 and 172, is pivoted to the members 46 of the housing 45, by means of the pivot pin 173. A wearing projection 174 is integral with the arm 171 and the said arm 171 coacts with the stop lug 58.

An inside operating handle 180 is indicated with the stem 181 from which latter extends the square shank 182, which projects through the member 46. The shank 182 is indicated with the flange collar 184, and the hub 185, and from the collar 184 extends the threaded shank 186 which latter is in threaded engagement with the stem 181. A cup shaped bracket 190 having the circular opening 192, is provided for the stem 181 and is fastened to the member 46, by means of the screws 193.

From the shank 182 extends the arm 200. A connecting rod 202 has one end pivoted to the crank arm 172 by means of the pivot pin 203, and its other end is pivoted to the arm 200, by means of the pivot pin 204.

Referring to the modification shown in Figs. 10, 11 and 12, the main member 46 of the housing 45 is again indicated with its flange 48. The disc shaped lock bolt is shown at 210 and is pivoted to the member 46 by the pivot bolt 211, similar to 88. The lock bolt 210 is indicated with the locking nose 213 having the bottom face 214, respectively similar to 91 and 91*a*, the lug 215 and the noses 216 and 217. The former is shown with the heel 218. The square shank of the outside handle similar to 114, is indicated at 220, and on which latter is supported the locking operating lever 225.

The lever 225 is shown with the notch 226 at its lower end and a pin 227 extends from said lever 225. A spring 228 has one end fastened to the flange 48 of the member 46 and its free end bears against the lever 225.

A locking lever 231 is pivoted on the pin 232 extending from the member 46 and has the latch end 233. A pin 234 extends from the lever 231. A spring 235 bears on the member 46 and one end thereof extends from the rivet 236. The other end 237 of the spring 235 bears against the lever 231. A stop lug 238 extends from the member 46 and coacts with the spring 235. A spiral spring 240 has one end fastened to the clamping lugs 242 extending from the member 46, and its free end 244 coacts with the heel 218. The connecting rod 246 has the narrow end 247, the inclined end face 248 and the elongated opening 249. The latter opening engages the pin 227 of the lever 225. A lug 250 extends from the connecting rod 246. A hook lever 255 having the hook end 256 has one end pivoted on the pin 227 and its hook end 256 coacts with the nose 217 of the lock bolt 210. A spring 260 has one end supported by the rivet 261 extending from the connecting rod 246 and its other end bears against the lever 255. A pin 262 extends from the connecting rod 246 and coacts with the spring 260. One end, not shown, of the connecting rod 246 is pivoted to an arm not shown, similar to the arm 200 already described, and said arm coacts with an inside operating handle, not shown, similar to 180.

In the drawings, see Figs. 1, 2 and 7, the door 40 is shown in its closed position, with the lock bolt 88 having its face 90 bearing against the vertical face 33 of the locking seat of the keeper

28. In this position the outer face of the member 46 of the housing 45 abuts against the stop 39, and the door 40 is securely locked in its closed position and is prevented from rattling. The end 141 of the spring 140 engages the heel 94 of the bolt 88, to maintain the latter in locked position. The bolt 88 in this position bears against the inner face of the member 60, see Fig. 8, of the cover of the housing of the lock bolt. The balls 96 and 98 at this closed position of the door are respectively located in their cam cavities 74 and 84 as indicated in said Fig. 8.

If the lock is to be opened from the outside, the operator before leaving the vehicle pushes down the inside adjusting handle 160, to disengage the locking lug 161 from the latch cavity 149 of the arm 146 of the bell crank 144 and thereby the latch heel 147 is disengaged from the latch 109 of the operating lever 100. This disengagement results by the end 152 of the spring 150 bearing on the arm 145 of the bell crank 144. The operator then by means of the outside operating handle 114 swings down the operating lever 100 in the direction of the arrow B, which swings the bolt 88 in the direction of the arrow C, Fig. 1 and the locking nose 91 is disengaged from the keeper 28 and the door 40 can be swung open.

If the operator wishes to remain in the vehicle and be protected from any one opening the door from the outside, he pulls up the inside adjusting handle 160, to lock the arm 146 to the operating lever 100.

To open the lock with the inside operating handle 180, the latter is swung down, to move the connecting rod 202 in the direction of the arrow M, Fig. 1, and the arm 171 of the bell crank 170 bears on the nose 93 of the bolt 88, to swing the latter in the direction of the arrow C, and the said bolt 88 is swung in position to open the door 40.

Referring to Fig. 10 to swing the bolt 210 to open the lock with the outside operating handle, the operator moves the connecting rod 246 in the direction of the arrow O, to the position indicated in said Fig. 10 to engage said rod with the pin 234 to disengage the locking lever 231 from the lever 225. In this position of the lever 231 the outside operating handle 114 with its square shank 220 can be turned to open the lock. When the handle 114 is turned in the direction of the arrow N, the hook end 256 of the lever 255 coacts with the nose 217 of the bolt 210 and thereby the nose 213 of the said bolt 210 is disengaged from the keeper 28. Upon the release of the outside operating handle 114 the end 244 of the spring 240 swings the lock bolt 210 to its locked position. To prevent the opening of the lock with the outside operating handle 114, the connecting rod 246 is moved in the direction opposite to the arrow O, to position the outer end of the elongated opening 249 against the pin 227, whereby the pin 234 is disengaged from the bottom edge of the connecting rod 246, and the latch end 233 of the lever 231 is locked with the notch 226 of the lever 225.

To open the lock with the inside handle 180 in this modification, the connecting rod 246 is moved in the direction of the arrow O, and the lever 231 is disengaged from the lever 225, and the hook lever 255 coacting with the nose 217 swings the bolt 210 to enable the door 40 to be opened.

When the bolt 210 swings up, its lug 215 engages the lug 250 of the connecting rod 246 to disengage the lever 231 from the lever 225 and the outside handle 114 can be operated.

When the door 40 is swung to its closed position, the bolt 210 approaches the keeper 88, the bottom 214 of the locking nose 213 slides up on the upper inclined face of the keeper 28 and is ultimately seated in the seat of said keeper having the faces 33 and 34.

By the coaction of the balls 96 with the cam cavities 74, the said balls 96 move from the crowns 77 to the peaks 77a, by virtue of which the outer face of the member 46 of the housing 45 of the lock is positioned to bear against the stop 39.

If the door 40 is in its closed position and is swung open with the inside operating handle 180, the balls 96 and 98 will be positioned with respect to their cam cavities as shown in Fig. 9.

It will be noted, see Fig. 1, when the operator opens the door 40 by means of the inside operating handle 180 and forgets to manually lower the inside adjusting handle 160, to unlock the operating lever 100, in such a case when the lock bolt 88 is swung to its open position the adjusting nose 93a bears on the heel 162 and lowers the adjusting handle 160 to disengage the lug 161 from the latch cavity 149 of the arm 146 of the bell crank 144.

Various modifications may be made in the invention and the present exemplification is to be taken as illustrative and not limitative thereof.

Having described my invention I claim:

1. In combination, a lock, a housing for the lock, a disc shaped lock bolt pivoted in said housing, said bolt having a locking nose integral therewith and also having an operating nose and an adjusting nose integral therewith, an operating lever, having a latch at its free end in said lock adapted to bear on said operating nose, an operating handle for the lock coacting with said lever to force the latter to swing the bolt to its open position, a latch bell crank pivoted to and in said lock, one of the arms of the bell crank having a latch heel adapted to coact with the latch of said lever and having a latch cavity, a spring having one end connected to said lock and its free end bearing on one of the arms of the said bell crank and an adjusting handle extending into the lock, said handle having a locking lug adapted to lock with the latch cavity of said bell crank and having a heel at its lower end adapted to coact with the adjusting nose of said bolt.

2. In combination a lock, a housing for the lock, a disc shaped lock bolt pivoted in the housing, said bolt having a locking nose and having a second and a third nose integral therewith and having a heel adjacent to said second nose, said bolt also having a lug extending therefrom, an operating handle at one side of the lock, a locking operating lever, in the housing of the lock operated by said operating handle, a pin extending from said operating lever, a hook lever pivoted on said pin coacting with the third nose of the disc shaped bolt, an operating handle at the other side of the lock, a connecting rod extending into the housing of the lock, said rod actuated by the latter operating handle, said rod having a lug coacting with the lug of the bolt, said rod having an elongated opening, engaging the pin extending from said operating lever and a locking lever pivoted in the housing of lock below said locking operating lever and adapted to lock therewith, said connecting rod adapted to unlock the locking lever from said locking operating lever.

3. In combination a lock, a housing for the

lock, a disc shaped lock bolt pivoted in the housing, said bolt having a locking nose and a second and third nose and having a heel adjacent to its second nose, said bolt having a lug extending therefrom, an operating handle at one side of the lock, a locking operating lever in the housing operated by means of said handle, said locking operating lever having a notch at its swinging end, a pin extending from said lever, a hook lever pivoted on said pin adapted to engage the third nose of the bolt, an operating handle at the other side of the lock, an arm coacting with the latter handle, a connecting rod having one end pivoted to said arm and the other end of the connecting rod comprising a narrow end with an elongated opening, said connecting rod below its narrow end having an inclined face, said connecting rod having a lug extending therefrom coacting with the lug of the bolt, the pin of said locking operating lever extending through the elongated opening of said connecting rod, a spring having one end fastened to the connecting rod and its free end bearing against said hook lever, a spring having one end fastened to the housing of the lock with its free end bearing said locking operating lever and a locking lever pivoted in the housing below said locking operating lever, the locking lever having a latch end adapted to lock with the notch of the operating lever.

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