May 17, 1960 J. D. LESLIE ET AL 2,937,045

DOOR HANDLE ASSEMBLY

Filed Oct. 14, 1955 2 Sheets-Sheet 1

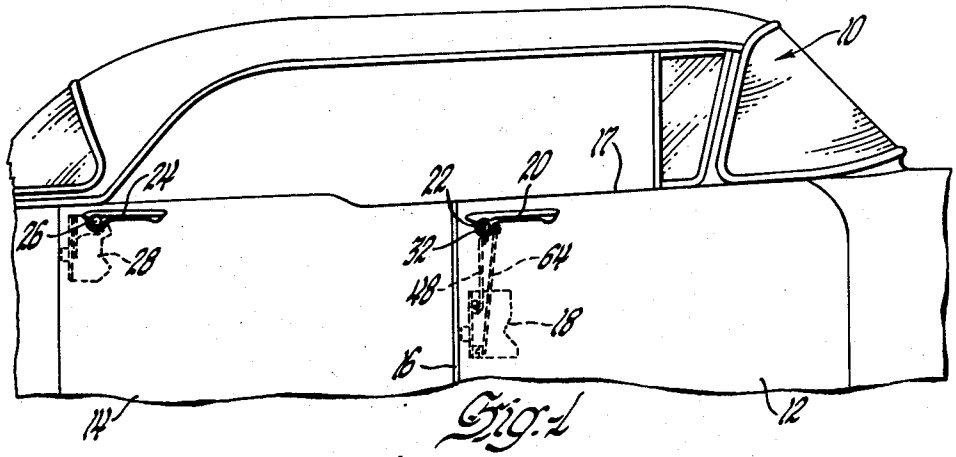


Fig. 1

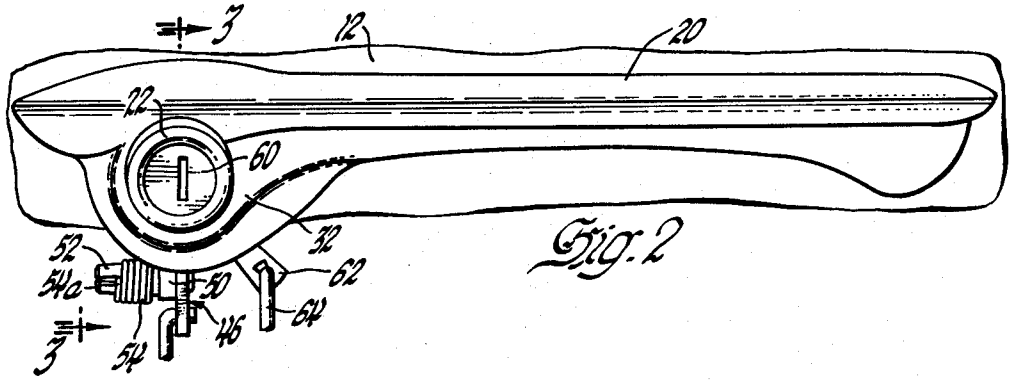


Fig. 2

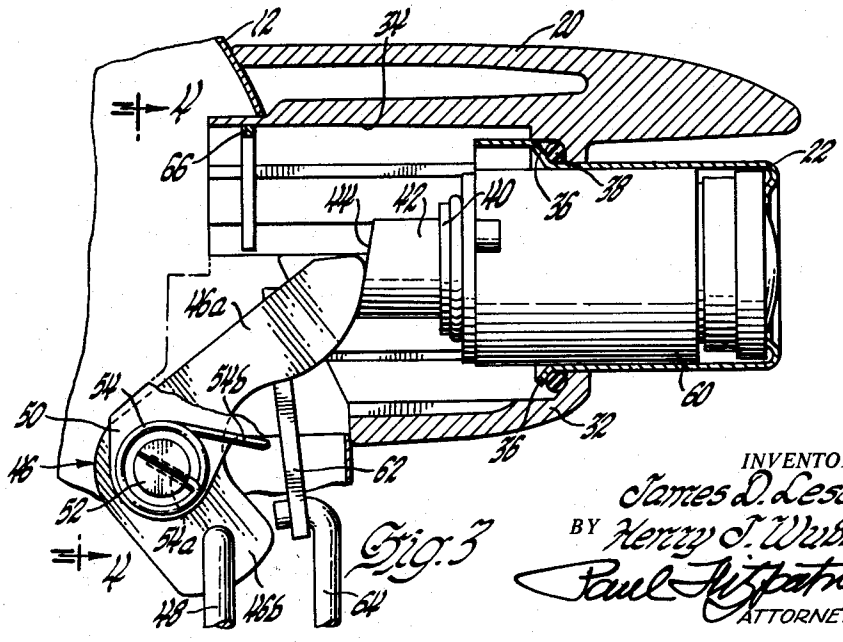


Fig. 3

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DOOR HANDLE ASSEMBLY

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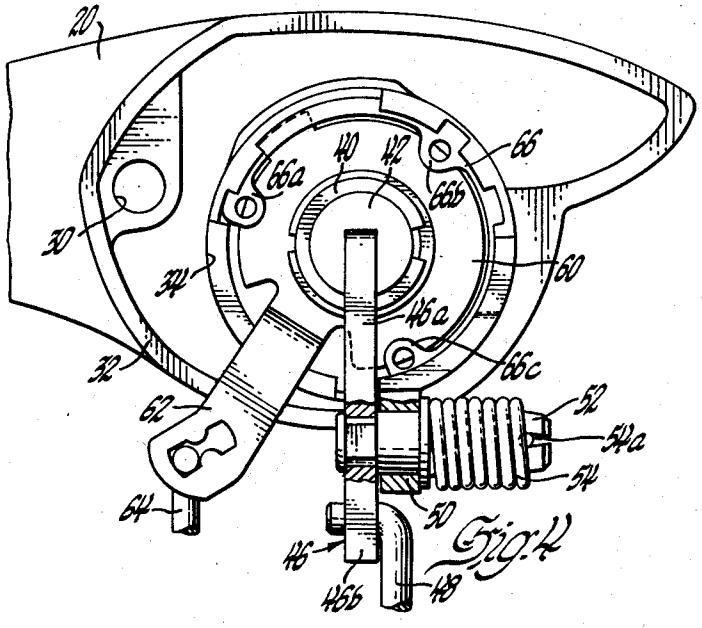


Fig. 4

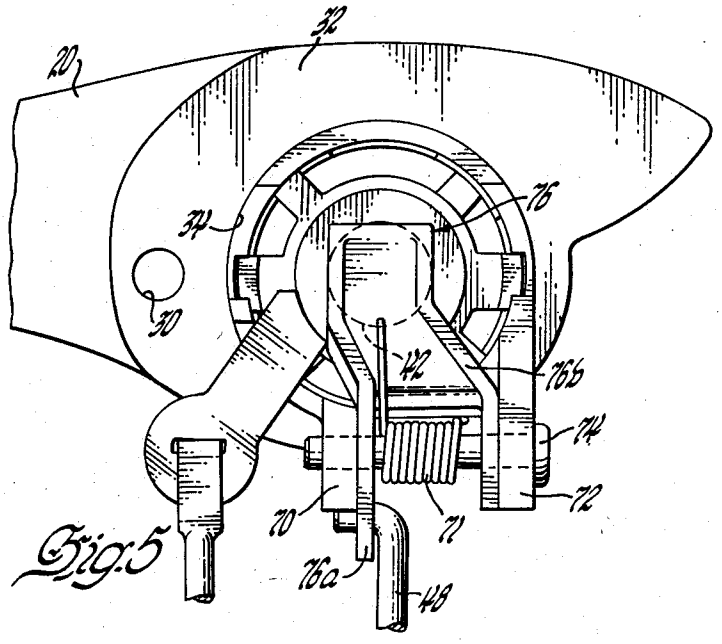


Fig. 5

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2,937,045

DOOR HANDLE ASSEMBLY

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Application October 14, 1955, Serial No. 540,529

1 Claim. (Cl. 292—336.3)

This invention relates to a door handle combination, and more particularly to an outside door handle arrangement for an automobile.

One feature of the invention is that it provides an improved door handle combination; another feature of the invention is that it provides a handle and push button assembly which is less subject to freezing than conventional handle assemblies; a further feature of the invention is that the handle is constructed in a manner to counteract a rotative tendency of the push button assembly during operation, thereby minimizing friction and preventing jamming of the push button; and still a further feature of the invention is that it provides a handle having a lock cylinder with an integral unlocking lever.

Other features and advantages of the invention will be apparent from the following description and from the drawings, in which:

Fig. 1 is a fragmentary side elevation of an automobile having the improved door handle combination;

Fig. 2 is an enlarged view of the door handle illustrated in Fig. 1, parts of the automobile body being broken away to show underlying structure;

Fig. 3 is a further enlarged vertical transverse section through the door handle taken along the line 3—3 of Fig. 2;

Fig. 4 is a vertical section taken along the line 4—4 of Fig. 3; and

Fig. 5 is a view similar to Fig. 4 but showing a modified form of the invention.

For practical reasons of convenience as well as because of styling considerations, automobile outer door handles are located near the automobile body belt line. However, in some body constructions it is impossible, due to space limitations, to mount the door latch immediately adjacent the outer door handle so that direct operation of the latch by the outside handle push button cannot be obtained and the remotely located latch is connected by a rod to the handle assembly, a bell crank lever being utilized to change the direction of the force exerted by the operator when he presses the push button. In conventional door handles utilizing a push button, there is a gripping handle which is fixedly mounted on the door and which has a housing for a slidable push button assembly. Inside this housing there is a coil spring which returns the push button to its normal position after it has been operated. Often moisture accumulates in the housing so that the entire push button assembly is subject to freezing. As a feature of this invention, this coil spring is eliminated from the housing and the push button return spring comprises a torsion spring located outside the push button housing, thus making one less part in the housing and improving the operation, particularly during cold weather.

The bell crank lever which connects the push button to the latch operating rod and which changes the direction of push button force swings through an arc so that its direction of movement is angular to the direction of the movement of the push button. This imparts a rotative

force to the push button about an axis transverse to the direction of push button movement, tending to cause the push button to jam in its slidable bearing, despite the fact that this surface may be made of nylon or a like material having a low coefficient of friction. As a further feature of this invention, the terminal surface of the push rod, which surface is engaged by the bell crank lever, is formed at such an angle to a plane normal to the direction of push button movement that friction between this surface and the lever is minimized. This reduces the rotative tendency of the push button, minimizes friction and prevents jamming of the push button during operation.

In installations in which the locking cylinder is carried in the push button assembly (as for example in front doors) direct locking operation is impossible and the locking cylinder must be connected through a locking lever and a rod to the remotely located door latch. This invention provides a device in which the locking lever is formed integrally with the locking cylinder, thereby resulting in the utilization of fewer parts than is conventional and facilitating assembly of the structure.

Referring now more particularly to the drawings, **10** represents an automobile having a front door **12** and a rear door **14**. The front door is hingedly mounted along its front edge on the automobile body in conventional manner and the rear door is hingedly mounted along its front edge on a body pillar **16** which terminates at the belt line **17** of the car. The front door is latched by a door latch **18** which cooperates with a striker on the body pillar **16** and which may be of any known construction but which preferably is of the type shown in the application of James D. Leslie, filed September 13, 1955, as Serial No. 534,034, now Patent 2,877,043 and entitled "Rotary Bolt Door Latch."

The latch is operated from outside the car by a handle combination including a gripping handle **20** which houses a push button **22**. Because of the presence of the rear door hinges on the center body pillar **16**, there is no space to locate the latch **18** and its associated striker directly adjacent the push button **22** and the latch is remotely located several inches below the push button and is connected to the push button by rods later to be described.

The rear door has a similar gripping handle **24** with a push button **26** for operating a latch **28**. In the automobile shown, the rear door latch is located immediately adjacent the door handle and is operated directly by the push button.

Figs. 2 to 4 show the detailed construction of the gripping handle **20**, its push button **22** and the associated operating means forming the handle combination. The gripping handle **20** is provided with threaded holes **30** at each end thereof so that the handle may be fixedly mounted on the door. The handle has an enlarged butt portion **32** at one end which is hollow to provide a housing **34** for the push button assembly. This assembly includes the push button **22** formed as a cup-shaped member having an annular flange **36** to prevent the push button from being pulled from the housing. This flange seats against a sealing ring **38** to minimize the entrance of moisture, dust and the like into the housing **34**. The push button operates a push rod **40** which terminates in a nylon button **42** having an inclined end surface **44** (Fig. 3) for engagement by one arm **46***a* of a bell crank lever **46**. The other arm **46***b* of this lever is connected by a rod **48** to the door latch.

A mounting bracket **50** is formed integrally from the wall of the housing **34** and projects inwardly and downwardly from said wall so that it is spaced below a projection of the axis of movement of the push button **22** and push rod button **42**. A stud **52** is mounted on the bracket

50 and forms a pivotal mounting for the bell crank lever 46. A torsion spring 54 surrounds the stud, having one end 54*a* anchored in a notch in the end of the stud and having the other end 54*b* engaging the wall of the housing 34 so that the spring exerts a constant force against the bell crank, urging the arm 46*a* into engagement with the surface 44 of the push rod button in order to yieldably bias the push button to the operative position shown.

In the past, it has been conventional to bias the push button by a coil spring in the housing 34. Since the sealing ring 38 does not form a perfect seal, moisture sometimes enters the housing and in cold weather the parts freeze together. The elimination of the coil spring from the housing reduces the probability of freezing since the spring 54 is so located that it is not affected by moisture which enters the housing.

Since the bell crank is pivoted below the axis of movement of the push rod button 42, it swings through an arc during operation of the button, and the bell crank exerts a rotative force on the push button assembly in a direction transverse to the direction of movement of the push button, which tends to jamb the push button. In order to minimize this rotative force, the end surface 44 of the button 42 is inclined. As shown in the drawings, this surface slopes upwardly and outwardly to increase the angle of engagement between the surface 44 and the arm 46*a* of the bell crank lever. This inclination of the end surface at an angle to a plane transverse of the direction of push button movement reduces friction between the parts during movement of the push button and minimizes the possibility of jamming.

When the door handle combination described above is used in a front door, it may be provided with a conventional locking cylinder 60 which is rotatably mounted within the cup-shaped push button and through which the push rod 42 extends. This cylinder may be rotated by means of a suitable key through an arc to lock and unlock the door latch. A locking lever 62 is bent integrally from the end piece of the locking cylinder, this lever being connected by a rod 64 to a locking member on the door latch. The provision of the locking lever 62 formed as an integral part of the locking cylinder eliminates one part found in conventional door latches and therefore facilitates assembly of the handle combination. A stop ring 66 seats in a groove in a wall of the housing 34 near the inner end thereof. This ring has a plurality of tabs 66*a*, 66*b*, and 66*c*, and the ring is engaged by the inner end of the locking cylinder when the push button is operated to limit inner movement of the push button assembly. Tabs 66*a*, 66*b* and 66*c* serve to prevent the end of the locking cylinder from passing by the stop ring in the event of misalignment of the cylinder.

Fig. 5 shows a modified form of the invention in which the single hung bearing for the stud 52 is replaced by a double hung bearing. In this modification, there are two support brackets 70 and 72 preferably formed integrally with the handle and a stud 74 is mounted between these brackets so that the stud is supported at both of its ends. The bell crank is formed as a yoke 76 having arms 76*a* and 76*b* articulated on the stud and a torsion spring 71 surrounds the stud and has one end engaging the bell crank lever and the other end engaging the housing to bias the lever and the push button to their operative position.

While we have shown and described certain embodiments of invention, it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as set forth in the appended claim.

We claim:

An automobile latch operator of the character described, including: a gripping handle having a hollow portion forming a housing, said housing located below said handle and including a thin wall bearing surface portion, a push button assembly slidably mounted in said bearing surface portion, a cylindrical push rod carried by said push button assembly and extending inwardly from said push button assembly in said housing, said push rod having a planar terminal surface, a lever pivotally mounted on an extension integral with said housing about an axis positioned inwardly and downwardly from said planar terminal surface, the pivotal axis of said lever being perpendicular to a first plane passing through the axis of said push button assembly, said lever being operatively connected to a latch mechanism, said lever having a free arm that engages said planar terminal surface, said free arm being cammed by said planar terminal surface upon inward movement of said push button assembly during operation of the latch mechanism, said surface being inclined to the axis of said push rod and located in a second plane perpendicular to said first plane, said inclined surface facing in a direction inwardly and upwardly from said push rod so as to minimize the friction force acting between said planar terminal surface and said free arm during the entire camming engagement between said surface and said free arm and thereby prevent jamming rotation of said push button assembly in said thin wall bearing surface portion about an axis lying substantially perpendicular to the axis of said push button assembly when said push button is actuated inwardly towards said lever.

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