Dec. 20, 1955 G. HAGSTROM 2,727,773

DOOR LATCH

Filed June 24, 1953 3 Sheets-Sheet 1

Fig 1.

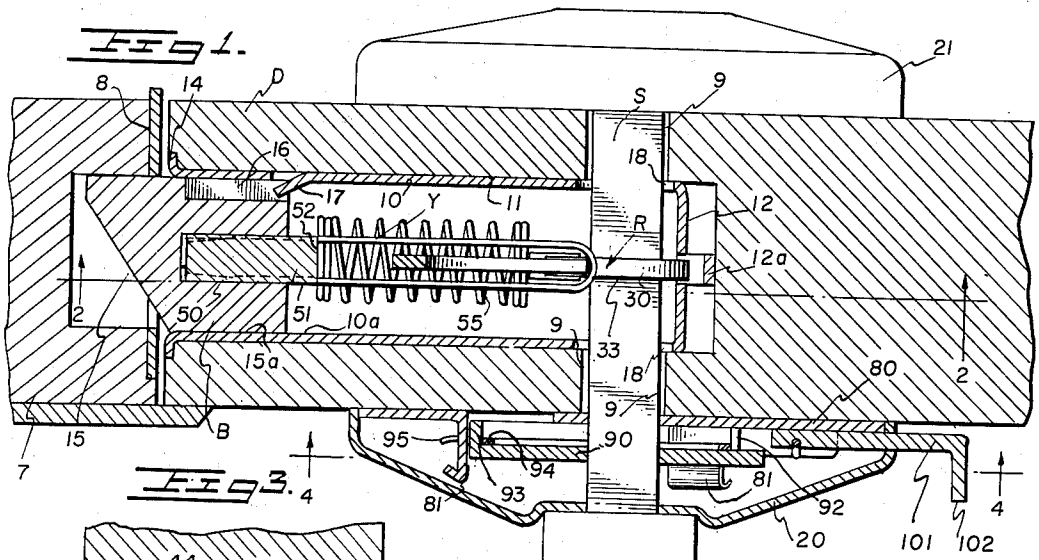
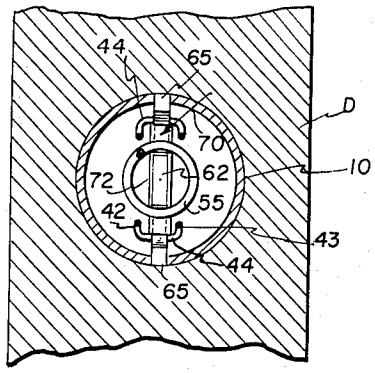


Fig 3.



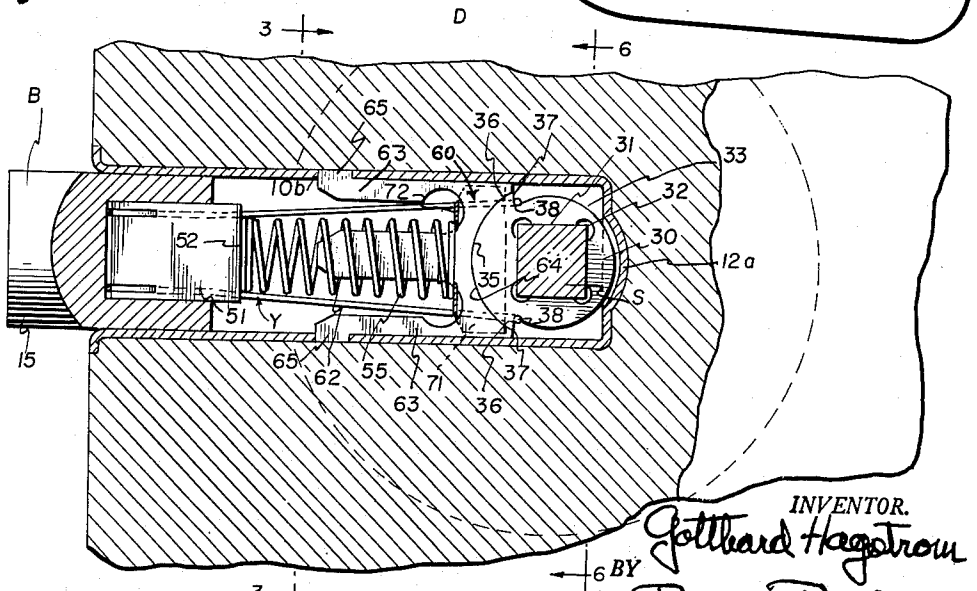


Fig 2.

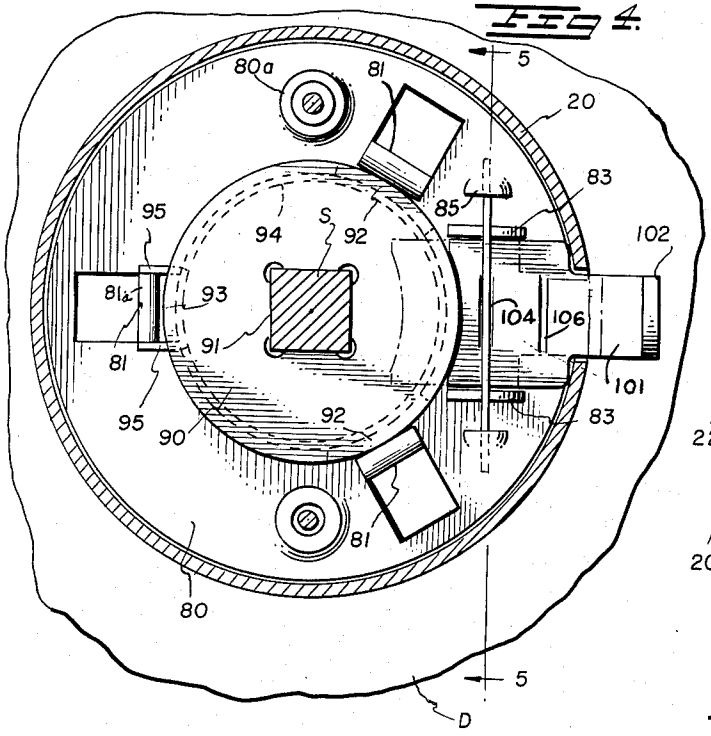
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DOOR LATCH

Filed June 24, 1953 3 Sheets-Sheet 2

Fig 4.



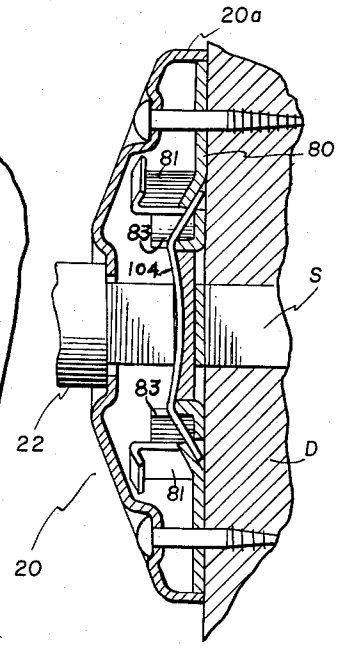


Fig 5.

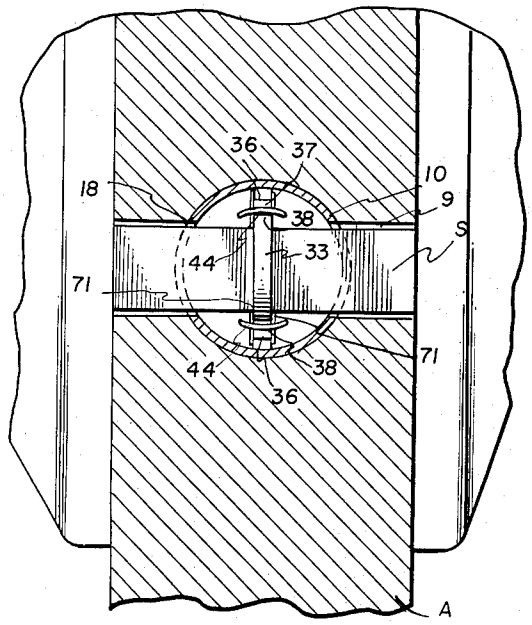


Fig 6.

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DOOR LATCH

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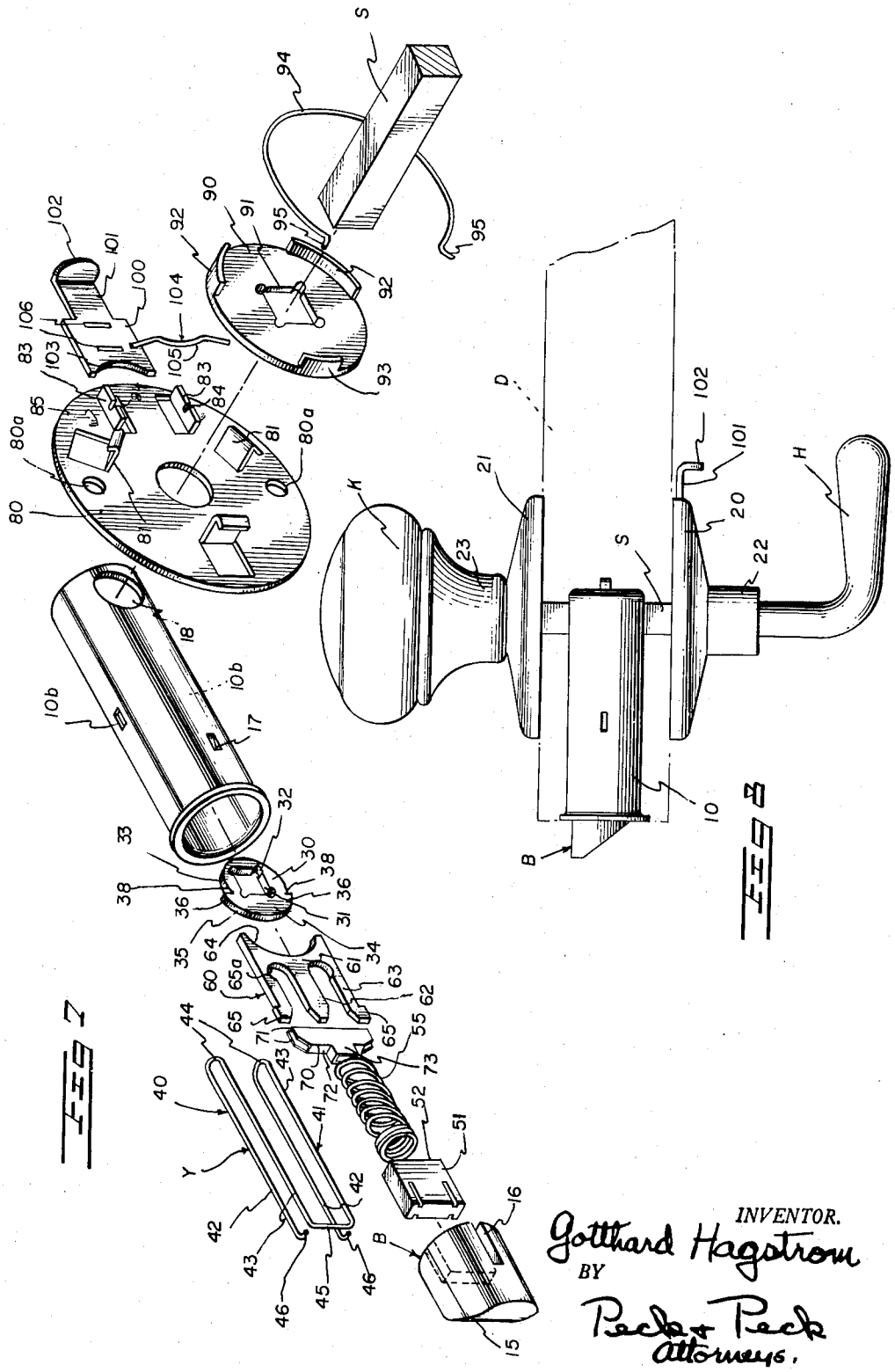


FIG 2

FIG 1

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2,727,773

DOOR LATCH

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Application June 24, 1953, Serial No. 363,796

23 Claims. (Cl. 292—169)

The invention is directed to certain improvements in a door latch, and particularly a door latch of the type generically designated in the art as a screen door latch; and the nature and objects of the invention will be readily recognized and understood by those skilled in the art in the light of the following explanation and detailed description of the accompanying drawings illustrating what I now believe to be a preferred embodiment or mechanical expression of my invention, from among various other forms, embodiments, adaptations, designs, constructions and combinations of which my invention is capable within the broad spirit and scope thereof as defined by the claims hereto appended.

A primary object of my invention is to provide a simplified design and construction of door latch of the so-called "screen door" types, which will be relatively inexpensive to manufacture and assemble and which will be extremely easy to install in operative mounted position in a door or other closure with which the latch is to be used.

Another object is to provide a design and construction of such type of latch unit which will have the foregoing characteristics while maintaining the relatively small dimensional requirements preferred for this type latch with a maximum length of stroke for the latch bolt being retained and provided by the unit.

A further object is to provide a flexible yoke for operative connection between a spindle operated hub or rollback and a reciprocatory latch bolt, which flexible yoke will be of such a design as to not only be adapted for use with latches of the so-called screen door types, but also to latch mechanisms generally and of various types and sizes.

Another object is to form a latch bolt operating yoke member of spring wire to provide pivot members having arcuate or circular type bearing surfaces for rotative bearing engagement with a hub or rollback or other operating member for actuating the yoke member.

Another object is to provide a rollback for operative connection with such a yoke member with arcuate or circular type bearing surfaces complementary to and in rotative bearing engagement with the circular type bearing surfaces of the yoke member.

A further object is to eliminate the necessity for the use of special, non-conventional spindles in latch units of the so-called screen door types.

A further object is to provide a design and construction of latch unit of the screen door type with which there can be used a standard or conventional spindle which can be readily assembled into mounted operative position during the installation of the latch in a door with a minimum of difficulty and without special operations by the installer.

A further object is to provide a door latch mechanism having a latch bolt biased by a relatively light spring with a simplified auxiliary spring arrangement in operative engagement with the latch spindle and mounted within one

of the mounting roses for the latch unit to supplement the action of the latch bolt biasing spring.

And a further object is to provide a simple lock combined in operative association with such auxiliary spring arrangement in the mounting rose for easy locking of the latch mechanism.

With the foregoing and various other objects, features and results in view which will be readily apparent from the following detailed explanation of the selected example, my invention consists in certain novel features in design and construction and in combinations and sub-combinations of parts and components, all as will be more fully and particularly referred to and specified hereinafter.

Referring to the accompanying drawings in which similar reference characters refer to corresponding parts and elements throughout the several figures thereof:

Fig. 1 is a longitudinal, horizontal sectional view through a latch unit of my invention in installed position in a door, a portion only of the door and the door frame and keeper being shown in horizontal section with the door in closed position and the latch bolt of the latch unit engaged in the keeper.

Fig. 2 is a vertical sectional view longitudinally of the installed latch mechanism of Fig. 1, taken as on the line 2—2 of Fig. 1.

Fig. 3 is a transverse sectional view through the installed latch mechanism or unit of Fig. 1 and through a portion of the door, taken as on the line 3—3 of Fig. 2.

Fig. 4 is a vertical, transverse sectional view through the spindle, inner rose and auxiliary spring mechanism of the latch unit of Fig. 1, taken as on the line 4—4 of Fig. 1, the auxiliary spring and its mounting, together with the spindle lock, being shown in elevation.

Fig. 5 is a transverse sectional view through the lock and auxiliary spring mechanism taken as on the line 5—5 of Fig. 4.

Fig. 6 is a vertical sectional view through the door and the installed latch unit of the invention, taken as on the line 6—6 of Fig. 2.

Fig. 7 is an exploded view of the latch mechanism showing the component parts thereof in perspective and separated but in the relative positions to be assumed thereby when assembled.

Fig. 8 is a view in top plan of a complete latch unit as assembled in installed position in a door, a portion of the door being indicated in dot and dash outline.

There is in the art to which this invention relates a general class of door or closure latches generically referred to and designated as latches of the "screen door" types. Such types of latches are primarily and essentially mechanisms for latching a light-weight type of door or closure, such as a screen door, and are usually characterized by a relatively light-weight construction of relatively small over-all length and width dimensions, particularly when of the so-called tubular types for mounting in a circular cross-section bore in a door or other closure. I have selected primarily for purposes of explanation and not of limitation, a tubular type screen door latch unit embodying the several features of my present invention, although it is to be understood that certain of such features are not limited to adaptation and use in the so-called "screen door" types of latches, but are capable of adaptation and embodiment in various other types and characters of closure latch and lock mechanisms.

In the example embodiment of my invention, referring now to the accompanying drawings, the latch unit may include as basic components a tubular, circular cross-section case 10 having reciprocally mounted in one end thereof a latch bolt B and at the opposite end thereof having a standard or conventional square or angular sec-

tion spindle S extending therethrough and being provided at one end with a handle H and at the opposite end with a knob K. The spindle S mounts thereon within the case 10 an actuating member such as the hub or rollback R which is operatively connected with the latch bolt B by a flexible, resilient spring wire yoke member Y, this yoke member Y being fixed at its forward end to the latch bolt B and at its inner or rear end being operatively coupled in rolling bearing engagement with the rollback R for retraction by rotation of spindle S in either direction.

The tubular, circular cross-section case 10 of the example latch unit hereof is provided for mounting in a circular section bore 11 which is formed in the usual manner extending into a door D from and through the outer free edge of the door, as will be clear by reference to Figs. 1 and 2 in connection with Fig. 8. In this instance the case 10 may be formed of one piece, as by drawing the case from a blank. The case is provided at the inner end thereof with a closed end wall 12 and at its opposite, or outer end is formed open for slidably receiving therein and therethrough a circular cross-section latch bolt B for reciprocation in the case between projected, latching position and retracted unlatching position. The case 10 at its open forward end is formed with a radially outwardly extending flange 14 therearound for seating in the outer free edge of the door with the outer side surface of the flange 14 being positioned substantially flush with the door edge surface. (See Figs. 1 and 2.) The latch bolt B is provided with the usual bevel 15 across the outer end thereof with the major body portion of the latch bolt positioned in case 10 being circular in cross-section and having an external diameter such that the outer surface 15*a* thereof has slidable bearing and guided engagement with the complementary, circular inner surface 10*a* of the case. On the side of its major length, that is the side thereof opposite the bevel 15, the latch bolt B is provided with a straight open side and open inner end slot 16 therein which slidably receives a tongue 17 cut out and bent inwardly from the adjacent side wall of the case 10. This tongue 17 functions to constrain the latch bolt B to straight line reciprocation within the case 10 against rotation or angular displacement therein relative to the case.

The case 10 of the unit is provided adjacent its inner closed end 12 with diametrically opposite, axially aligned openings 18 therein and the door D is provided with bores 9 transversely therethrough in axial alignment with the openings 18, respectively, in the case 10, as will be clear by reference to Fig. 1. The spindle S in mounted and assembled position with the latch unit on a door is extended transversely through the door and the case 10, being received in and through the aligned case openings 18 and door bores 9. The spindle S is primarily mounted and journalled on and extending through an inner rose 20 and an outer rose 21 suitably secured to the inner and outer sides, respectively, of the door D and rotatably receiving therethrough and journalling thereon the spindle S for rotation therein. In this instance the inner end of the spindle S mounts the operating handle H while the outer end of the spindle mounts the operating knob K with the hub 22 of handle H and the hub 23 of knob K being fixed to the spindle and having rotative bearing engagement against adjacent bearing surfaces, respectively, provided on the inner rose 20 and outer rose 21. Thus, in the manner usual in this art the spindle S may be rotated in either direction by turning either the handle H or the knob K.

A hub or rollback R, referring now to Figs. 2 and 7 in particular in connection with Fig. 1, is mounted on spindle S within and centrally of the case 10 for rotation in either direction by and with the spindle. This rollback R comprises a plate 30 formed with a square opening 31 therethrough for receiving and fitting onto the square section spindle S for rotation therewith without play or lost motion relative thereto. The corners 32 of the square opening 31 in rollback R are preferably each formed with a radius (see Fig. 2). The body plate 30 of rollback R is of circular form in plan and provides the circular edge 33 thereon extending around one side thereof, that is, the rear side opposite the latch bolt B when the rollback R is in assembled position in the latch unit. At and across the forward side thereof spaced forwardly of the axis of rotation of the rollback R, the plate 30 is formed of increased width or diameter to provide a segmental portion 34 having the outer edge 35 thereof formed curved or arcuate on a circle having a greater radius than but concentric with the circular edge 33 of the body 30. The opposite ends of the enlarged width, segmental portion 34 of plate 30 provide the oppositely extending lugs 36 which are formed at their rearwardly facing edges to provide the straight planar surfaces 37 (see Fig. 2). In accordance with an important feature of my invention I provide at the inner ends of the rear edge surfaces 37 of the lugs 36, the arcuate, circular form surfaces 38 which provide bearing recesses or sockets transversely across the rollback R at the inner ends of the rear edges 37 of the lugs 36, and which join such rear edge surfaces with the circular edge 33 of the rollback R.

In the example embodiment, the diameter of the rollback R is such that in mounted position thereof assembled on the spindle S, the rollback extends rearwardly from the spindle a distance greater than the distance between the spindle and the rear end closing wall 12 of the case 10. In order to provide operating clearance between the rollback R and the end wall 12 of case 10, as well as to provide constraining structure to maintain the rollback R against displacement axially of the spindle S from proper assembled position thereon, I lance or cut out a section 12*a* from end wall 12 to provide a rollback receiving slot therethrough and I form this section longitudinally curved outwardly to provide its inner surface as arcuate and generally complementary to but having operating clearance with the adjacent curved edge 33 of the rollback (see Fig. 2). In this manner rollback R is constrained against displacement on spindle S while having operating clearance with end wall 12 of case 10.

The yoke member Y which operatively connects and couples the rollback R on spindle S with the reciprocal latch bolt B provides a major contribution of my present invention. This yoke member Y is flexible and resilient and following the teachings of the invention as expressed in the example embodiment hereof, may be formed from a single length of wire of circular cross section, such for example as music or so-called piano wire. Referring to Fig. 7 in particular, the yoke member Y as expressed in the example form is comprised of two spaced arms 40 and 41 each of identical form and construction and each comprised of two substantially parallel lengths of wire 42 and 43 integrally joined at one end by a bight or curved section 44. The curved end sections 44 of each of the arms 41 and 42 are at the adjacent opposite ends, respectively, of the arms, and, if desired, as in the example hereof, these end sections 44 may be curved inwardly toward each other transversely of the yoke (see Fig. 7). The wire lengths 43 of each of the arms 40 and 41 at the ends thereof opposite the curved sections 44, are joined by a straight length of wire 45 extending transversely therebetween to form a base bridging and spacing arms 41 and 42 the desired distance apart at that end of the yoke member Y. Each straight length 42 of the arms 40 and 41 terminates in an inturned transverse end 46 extended toward but spaced a slight distance from the adjacent end of the opposite wire length 43 of each arm. In this manner a single length of music wire of circular cross-section may be bent-up to form the opposite spaced arms 40 and 41 with the opposite ends of the original length of wire terminating as the opposite inturned ends 46 of each of wire lengths 42 of the arms 40 and 41. The yoke member Y thus formed is flexible and resilient with the

arms 40 and 41 being joined at one end by the transverse, base forming wire length 45, so that the arms may be flexed or spread apart at their free ends to thus resiliently vary the spacing therebetween for a purpose to be later explained.

The base end of the yoke member Y, that is the end joined by the wire length 45, is fixed to the latch bolt B. In this example the fixed attachment of the yoke to the latch bolt is carried out by providing in the rear or inner end of the latch bolt B a socket or chamber 50 of rectangular cross-section which opens through the rear end of the latch bolt. This rectangular socket 50 is centered in the latch bolt B and has width and length dimensions to relatively snugly receive thereinto the base end of the yoke Y with the ends 46 and base 45 of the yoke engaged against the inner end wall of the socket, as will be clear by reference to Figs. 1 and 2. The yoke member Y is fixed and secured in position in the latch bolt B by driving or forcing into the rectangular socket 50, a wedge block 51 which is positioned between the arms 40 and 41 of the yoke member and which is of a length and of an external shape to wedge into the socket 50 between the yoke member arms 40 and 41 with the inner end of this wedge block 51 being preferably, although not essentially, engaged against the ends 46 and the base 45 of the yoke member arms. In the example embodiment hereof the wedge block 51 has a length such that when it is in fully seated yoke member wedging and securing position in the socket of the latch bolt B, it will extend a distance inwardly or rearwardly from the inner end of the latch bolt with the inner end of the wedge block being formed to provide a flat seating surface 52 thereacross.

With the latch bolt B reciprocally mounted in the forward or outer end of case 10 and with the yoke member Y fixed and attached thereto as referred to above, the spaced arms 40 and 41 of yoke member Y extend rearwardly through the case 10 to the rollback R on the spindle S and the free, spaced closed ends of the arms are fitted over the oppositely extending lugs 36, respectively, of the rollback with the arcuate or curved connecting wire sections 44 of each arm being received in and having rotative bearing engagement with the curved or arcuate surfaces 38 which form the bearing recesses at the inner ends of the rollback lugs, respectively. Preferably, although not essentially, the arcuate bearing surfaces 38 of the rollback have the same radius of curvature as the radius of curvature of the circular cross-section of the wire portions 44 at the ends of the arms 40 and 41 of yoke member Y, so that a smooth minimum friction, rolling bearing fit is formed between each rollback bearing surface 38 and the wire section 44 of the yoke member that is received therein. In the illustrated adaptation of this feature of the invention, the spacing between the arms 40 and 41 of the yoke member Y at the base 45 thereof is less than the distance between the arcuate bearing surfaces 38 on the rollback R at the inner ends of the lugs 36. Hence, with the yoke member in assembled position coupled with the rollback R, the arms 40 and 41 must be sprung and spread apart and thereby placed under tension with the wire sections 44 pressed and maintained thereby in bearing engagement in the bearing surfaces 38, and on and against the curved surface 33 of the rollback in the operation of the latch. This assembled and coupled position of the flexible, resilient yoke Y with the arms thereof sprung apart and engaged over lugs 36 into their positions in the bearing recesses 38 on the rollback is clearly shown in Fig. 2.

Thus I have provided minimum friction bearing couplings between the yoke member Y and the rollback R on the spindle S for minimum wear and precision functioning of the latch unit in the operation and use thereof. When the spindle S is rotated in one direction, one of the lugs 36 of the rollback R will be rocked rearwardly and thus will draw the yoke member rearwardly to retract the latch bolt B into a non-latching position within the

case 10. As the rollback R and such rearwardly swung lug 36 move through an arcuate path, the wire length 44 at the end of that arm of the yoke engaged with the rearwardly moving lug rotates or rolls as a spindle or pivot pin in its arcuate bearing recess 38 at the inner end of such lug, so that a rolling bearing coupling is effected with wear reduced to a minimum over a maximum period of time of operation and use of the latch unit. As the rearwardly moving lug 36 of the rollback R is swung through its arcuate path, the opposite lug 36 is swung forwardly away from that arm of yoke member Y with which it is associated, this latter arm being, of course, moved rearwardly with the yoke and having its closed end 44 riding on the adjacent curved surface 33 of the rollback with this arm, due to the flexibility and resilience of the yoke member Y, yieldingly flexing outwardly as it rides on and is forced outwardly by the arc of the curved surface 33. When the rollback R is rotated in the reverse direction back to its normal position, the inactive arm of the yoke member due to the resilience or spring thereof will flex inwardly along surface 33 to again engage in its bearing recess 38. Upon rotation of spindle S in the reverse direction from normal position thereof the opposite lug 36 of rollback R from the lug first above referred to will be swung rearwardly, with the bearing section 44 of the yoke arm associated with that lug functioning as a spindle or pivot pin in rolling bearing engagement in the arcuate bearing recess 38 in which it is normally received and engaged.

The latch bolt B is spring loaded by a spring 55 which continuously acts thereon to yieldingly displace the latch bolt to its projected, latching position. In the present embodiment of a latch unit of my invention the spring 55 is relatively light to exert light biasing forces on the latch bolt and this spring is mounted under compression between the inner end of the wedge plug 51 by which the yoke is fixed to the latch bolt and a fixed support member 60 which is secured in the case 10 and which also provides a bearing for the rollback R, as hereinafter explained. The spring 55 is of the coil type having so-called closed opposite ends presenting flat seating surfaces and the spring is mounted in operative position located between the spaced arms 40 and 41 of the yoke member Y. The maximum effective external diameter of the spring 55 is such as to permit the spring to be received between the arms of the yoke at their point of minimum spacing which is located at the inner end of the wedge block 51 (see Figs. 1 and 2).

The biasing spring supporting and rollback bearing member 60 is of plate-like form constructed to provide a base portion 61 having a central prong 62 and opposite side prongs 63 spaced from and generally parallel with said central prong and extending from one side edge of the base portion 61. At the opposite side edge of base 61 from the prongs 62 and 63, the member 60 is provided with a semi-circular cut-out which forms a curved or arcuate bearing surface 64 therein and thereacross having a radius of curvature equal to the radius of curvature of the curved bearing surface 35 at the forward side edge of the rollback R. The outer side prongs 63 of member 60 are provided at their outer ends along the outer side thereof with the outwardly extending lugs 65, and each prong 63 at the inner end thereof is formed of reduced width by providing a radius 65*a* cut therein from the inner side thereof to thereby enable the prong to be sprung or pressed inwardly a slight distance for purposes of assembly in case 10.

This support member 60, referring now particularly to Fig. 2, is mounted within the case 10 in assembled position disposed centrally of the case intermediate the rollback R and the latch bolt B with the member being disposed transversely of and across the case in the plane of the rollback R, and being fixed in such position in case 10 by the lugs 65 engaged into suitable rectangular openings 10*b* formed at diametrically opposite locations in

the case side wall. The support member 60 is positioned in the case 10 to lie in the plane of the rollback R and is located longitudinally of the case to position the bearing surface 64 thereof for relatively light bearing engagement with the bearing surface 35 of the rollback R. The length of the member 60 is such that when it is in its mounted position, as aforesaid, and the latch bolt is in its projected latching position, the end of the central prong 62 thereof is spaced from the inner end surface 52 of the wedge block 51, while the ends of the opposite side prongs 63 are spaced inwardly from the latch bolt (see Fig. 2). The spring 55 in mounted assembled position fits over and is guided and constrained in its operative position by the central prong 62 of member 60 with the forward end of the spring being engaged on and against the surface 52 of the wedge block 51. It is to be noted that with the foregoing construction and arrangement, the outer, free end of the central prong 62 of member 60 will be engaged by the wedge block 51 upon retraction of latch bolt B and thus act as a stop limiting retraction for the latch bolt.

A guide member 70 is provided for mounting on the support and bearing member 60 for the purpose of constraining and maintaining the rollback R in its operative position on spindle S against axial movement and displacement from position with its bearing surface 35 aligned with and in bearing engagement with the complementary bearing surface 64 of the member 60. In this specific example the guide member 70 is formed-up from relatively thin sheet material into U-shaped cross-section to provide the spaced parallel guide flanges 71 extending from a closed base portion 72, with the flanges at their opposite ends extending a distance outwardly beyond base portion 72 to provide spaces therebetween for receiving therein and therethrough the opposite side edge prongs 63, respectively, of the member 60. Centrally of the base 72 of member 70 there is provided an extended open end sleeve portion 73 of rectangular cross-section which is adapted to fit over and receive therethrough the central, biasing spring mounting prong 62 of the member 60. In the assembled latch unit of the example embodiment, the guide member 70 is fitted over member 60 with the central prong 62 extending through sleeve 73 and the opposite side prongs 63 extending through the spaced opposite end portions, respectively, of the guide flanges 71. The guide member 70 is positioned inwardly on member 60 to a location thereon at which the guide flanges 71 extend rearwardly a distance across opposite sides of the rollback R to thereby maintain the rollback against axial displacement on the spindle S. Such mounted and assembled position of the guide member 70 is shown in Fig. 2 in particular, and it will be noted that the biasing spring 55 at its inner end fits over and is centered on the sleeve portion 73 of member 70 with the inner end of the spring being engaged against and seated on base 72 around the sleeve member.

With the the foregoing construction, arrangement and assembly of the latch mechanism, it will be clear that the latch bolt may be retracted from its normally projected position to which it is biased by the spring 55, by rotation in either direction of the spindle S through the retraction of the yoke member Y by the rollback R. It will also be clear that the latch bolt B may be depressed from projected position independently of the spindle actuated retracting mechanism constituted by the rollback R and the yoke Y. The arrangement is further such that a maximum length of stroke or range of reciprocation of the latch bolt B is obtained which is an important advantage, particularly in a small dimensioned unit such as a screen door type of latch. Upon the application of depressive forces to the outer end of the latch bolt B, the latch bolt with the yoke Y fixed thereto will be displaced inwardly or rearwardly with the pivot forming closed end sections 44 of yoke member Y being moved freely rearwardly independently of and without interference from rollback R and its retracting lugs 36. Upon depression of latch bolt B and yoke member Y independently of rollback R, the spring arms 40 and 41 of the yoke member will be forced or spread apart outwardly as they ride over the curved edge surface 33.

As the biasing spring 55 which acts directly upon the latch bolt B is preferably a light type of spring, I have found it advisable to supplement and boost the action of that spring, and to this end a feature of the invention resides in the mounting and arrangement of an auxiliary spring mechanism within the inner rose 20 in operative connection with the spindle S. In carrying out this feature the invention provides a circular back plate 80 having an external diameter to substantially fit within the internal diameter at the base 20*a* of the inner rose 20, with this back plate in assembled installed position of a latch unit being fixed by suitable fastening members to the adjacent inner side of a door D or other closure on which the latch is installed. Diametrically opposite, fastening member receiving apertures 80*a* may be provided in the plate 80 for this purpose (see Fig. 7). The plate 80 is, in this example, provided with a plurality of lugs 81 bent-up therefrom and spaced apart therearound for the purpose of maintaining the spacing between and relative positioning of the back plate 80 and the inner rose 20. If desired or found expedient, the outer ends of the lugs 81 may be bent outwardly and inclined inwardly to provide outer surfaces 81*a* complementary to the portions of the rose 20 opposite the lugs.

A spring mounting and actuating disc 90 is mounted on the spindle S within the inner rose 20 for rotation in either direction by and with the spindle. Disc 90 is provided with a square opening 91 centrally therethrough to receive the spindle S for fixing the disc to the spindle for rotation therewith as a unit. The external diameter of the disc 90 is such that it may be received within the spaced lugs 81 which are bent up from the back plate 80, as will be clear by reference to Fig. 4. In this particular example, three (3) lugs or edge flanges are bent up from the body of disc 90 at the periphery thereof in positions spaced apart therearound with two of these lugs, identified as 92, being of greater length than the third lug identified as 93, but with each of the lugs 92 and the lug 93 being curved or arcuate on the radius of the circular disc 90. The lugs 92 are adjacent but spaced apart while the lug 93 is located at the opposite side of the disc spaced across the disc from but located on a diameter intermediate and centrally of the lugs 92. An annular torque spring member 94 in the form of a split ring having its ends bent laterally and outwardly in opposite directions in the plane of the ring to provide the ears 95, is positioned on the outer disc 90 contracted within and around the inner sides of the flanges 92 and 93 with the ends of the spring being crossed and the ears 95 thereof engaged over opposite side edges, respectively, of the lug 93 on the disc 90. The disc 90 with the spring 94 mounted and assembled thereon, as above described, is mounted on the spindle S with the lugs 92 and 93 and the spring 94 at the inner side thereof facing the back plate 80 and with the ears 95 of the spring ends being engaged against the opposite side edges, respectively, of one of the lugs 81 of the back plate 80. In such mounted position the outer arcuate edges of the lugs 92 and 93 have slidable bearing contact on and against the adjacent outer face of the back plate 80. It will thus be clear that rotation of the spindle S in either direction will rotate the disc 90 therewith relative to the fixed back plate 80 and due to the engagement of the spring ears 95 of spring 94 against the opposite edges of the lug 81, the spring will be further contracted and placed under increased torque which, upon release of the rotating forces being manually applied to the spindle S through the handle H or the knob K, will act to return the spindle to its normal position, being the position shown in Figs. 1 and 2. Hence, rotation of the spindle S to retract the latch bolt B from its normal projected position must be effective against the combined forces of the spring 94 on disc 90 and the latch bolt biasing spring 55 to thereby give a bet-

ter action and feel to the latch bolt retracting operation. It follows that it will be the combined action of the springs 55 and 94 which will return the latch bolt B to its normal projected, latching position after retraction thereof by the yoke member Y resulting from manual rotation of the spindle S and release from that spindle of the rotating forces applied thereto.

In order to provide for releasably locking the door latch mechanism in its projected, latching position, I have provided a simple locking member **100** which I mount and combine in operative association with the back plate **80** and the auxiliary spring actuator disc **90**. This lock member **100**, referring now to Figs. 1, 4 and 7, is in the form of a plate having at one end thereof a manual operating lever **101** extending therefrom of reduced width relative to the body of the locking member, with the outer end of this lever being bent laterally to provide the fingerpiece **102** for manual reciprocation of the locking member. The locking member **100** is mounted on the back plate **80** for straight line reciprocation radially of the back plate toward and from spindle S and the spring actuator disc **90**. In the present example the mounting for the locking member **100** is formed by spaced parallel guide flanges **83** which are bent up from back plate **80** in positions intermediate a pair of the adjacent lugs **81** and opposite the third lug **81**, as will be clear by reference to Fig. 4. The spacing of the guide flanges **83** is such as to freely slidably engage the opposite edges of the locking member **100** when that member is mounted in position therebetween on and against the outer face of plate **80**. The arrangement and relative positioning of back plate **80**, actuator disc **90** and locking member **100** is such that when the latch mechanism is in position with the latch bolt B thereof projected, the spring actuator disc **90** is positioned with the space between the adjacent flange members **92** aligned with the space between the guide flanges **83** for the locking member **100** on the back plate **80**.

Thus, by depressing the lever **101** of the locking member **100** from its outwardly retracted position, the inner end portion of the locking member slides into and is engaged between flange members **92** and will thus lock spindle S against rotation in either direction. By withdrawing or retracting the lever **101** from its depressed position the locking member **100** is withdrawn to position clear of the flange members **92** on the actuator disc **90** so that that disc and the spindle S on which it is mounted are then free for rotation to actuate the latch mechanism to retract the latch bolt B from projected position. The inner end of locking member **100** is preferably provided with a suitable arcuate cut-out **103**.

For the purpose of releasably holding the locking member **100** in its withdrawn, non-locking position and in its depressed locking position, I have provided a spring member **104** which is mounted in position extended across the guide flanges **83** over the outer side of locking member **100**, being received in aligned notches **84** provided in such guide flanges. The opposite ends of the spring member **104** are bent inwardly to the back plate **80** and are received and engaged under bent-up lips **85** formed in the back plate. The portion of the spring member **104** which extends between guide flanges **83** is curved or bent inwardly toward the back plate **80** to provide a catch portion **105** engaged against the outer side of the locking member and being adapted to snap into one or the other of a pair of spaced, transverse grooves or recesses **106** formed in the outer side of the lock plate. These grooves **106** are so positioned that the inner one is aligned with and receives the catch portion **105** of spring member **104** when the locking member **100** is in retracted, non-locking position while the outer groove **106** is positioned opposite and receives the catch **105** when the locking member **100** is in its depressed, locking position.

One of the advantages of a latch unit of my invention is found in the ease with which the mechanism may be initially assembled so that manufacturing and assembly costs are substantially reduced. In the assembly of the unit the yoke member Y is first attached to the latch bolt B by the wedge block **51** as referred to hereinbefore. The latch bolt biasing spring **55** is then positioned within the yoke member Y. The guide member **70** is next positioned on the support and rollback bearing member **60** and these members are placed on the spring **55** within the yoke Y. The rollback R is then positioned between the guide flanges **71** of guide member **70**, with the lugs **36** of the rollback engaged within the closed, pivot forming ends **44** of the yoke member, such ends being seated in the bearing recesses **38**, respectively, at the rear sides of the lugs. This entire assembly is then pushed into the case **10** into position with the lugs **65** of the member **60** snapped into recesses **10*b*** in the case. In assembled position in the case it is to be particularly noted that the rollback R will be positioned against displacement transversely of the case by the guide flanges **71** of guide member **70** and by the slot or space formed in the rear wall **12** of the case by the lanced-out portion **12*a***, with the square opening **91** of the rollback being thus positioned and retained in substantial axial alignment with the case openings **18** which are adapted to receive therethrough the spindle S. It will be further noted that the length of the wedge plug **51** is such as to cause it to contact the central prong **62** of member **60** with the result that as this assembly is pushed into the case **10** the plug **51** will push member **60** into position and when the member **60** has the lugs **65** thereof lined up with the holes **10*b*** in the case, these lugs will snap thereinto and complete the mounting of this assembly in the case. In this manner the assembled unit has the rollback R mounted at all times in position so that the square section spindle S may be merely pushed through openings **18** in the case and the square opening **31** of the rollback R to complete the unit.

Due to the foregoing construction, arrangement and assembly, it will be evident that in installing the latch unit in a door, the installer has no difficulty in properly mounting and assembling the spindle S into operative position in and through the latch mechanism. Thus, no special tools or special operations or special skills are required from the installer to easily and quickly install a latch unit in a door or other closure. The necessity for utilizing spindles of special design and construction is eliminated and conventional types of spindles may be used, such for example as the standard type of square section spindle S of the example embodiment of a latch unit of my invention.

In Fig. 1 of the drawings it will be noted that the latch unit of my invention is illustrated in installed position on the door D with the latch bolt B being shown in its projected, latching position engaged in the usual keeper and strike plate **8** in the conventional door frame **7**, a portion only of which is shown.

While the flexible and resilient spring wire yoke member of my invention finds particular utility in the light weight, small dimensioned screen door type of latch unit, it is not so limited, and my invention contemplates and includes the use of such yoke members in any types, classes and sizes of latch and lock mechanisms to which adapted where the advantages thereof, including the rolling bearing connections made possible thereby with the yoke actuator may be found desirable. Similarly, the design and arrangement by which the assembly of the mechanism is made with the latch bolt actuator, such as the rollback R of the example hereof, positioned for ready installation of a standard or conventional spindle, is not limited to embodiment only in the type of latch of the example embodiment.

It will also be evident that various other forms, designs, embodiments, adaptations, additions, eliminations, substitutions, combinations and constructions may be resorted to without departing from the spirit and scope of my invention and, hence, I do not desire or intend to

limit my invention in all respects to the exact and specific design, construction and arrangement of the selected example herein disclosed, except as may be required by specifically intended limitations thereto appearing in the appended claims.

What I claim is:

1. In a door latch mechanism, in combination, a reciprocally mounted latch bolt for projection and retraction; a rotary spindle mounted in position spaced from one end of said latch bolt with its axis approximately perpendicular to the path of reciprocation of said latch bolt; a rollback on said spindle for rotation therewith in either direction; said rollback being formed with a circular peripheral edge portion therearound having at locations thereon at opposite sides of the axis of rotation of said spindle member arcuate bearing surfaces open at their outer sides through and across said peripheral edge portion and with their axes substantially parallel with the axis of said spindle; each of said arcuate bearing surfaces at the side thereof opposite said latch bolt being joined with said circular peripheral edge surface and said rollback at the side of each of said recesses adjacent said latch bolt being formed to provide an abutment surface; a yoke member fixed at one end thereof to said latch bolt and having spaced arms extending from said latch bolt to said rollback; the free ends of said arms opposite said latch bolt being spaced apart and being formed with members of circular cross section disposed transversely thereacross and rotatably engaged in said arcuate bearing recesses, respectively, of said rollback; each of said circular cross section members at the free ends of said arms being displaceable from its said recess into slidable engagement with said peripheral surface of said rollback upon rotation of said rollback in a direction to displace such recess toward such latch bolt; and a biasing spring in operative connection with said latch bolt adapted to act to continuously project the said latch bolt.

2. In a door latch mechanism, in combination, a reciprocally mounted latch bolt for projection and retraction; a rotary spindle mounted in position with its axis of rotation approximately perpendicular to the path of reciprocation of said latch bolt; a rollback mounted on said spindle for rotation therewith and being provided with spaced arcuate bearing surfaces thereon located in positions at opposite sides of the axis of rotation of said rollback with the axes of said arcuate bearing surfaces being substantially parallel with said axis of rotation; said arcuate bearing surfaces being open across the outer sides thereof through said rollback; a spring wire yoke member fixed at one end thereof to said latch bolt and providing spaced spring arms extending from said latch bolt to said rollback; each of said spring arms being comprised of spaced substantially parallel wire lengths connected at their inner ends by a transversely disposed wire length; and said wire lengths at the ends of said spring arms being rotatably engaged in said arcuate bearing surfaces, respectively, of said rollback.

3. In the combination as defined in claim 2, said spring arms of said spring wire yoke member being normally parallel when unstressed and said transverse wire lengths at the ends thereof being spaced apart a distance less than the distance of the spacing between said arcuate bearing surfaces in said rollback.

4. In a door latch mechanism, in combination, a reciprocally mounted latch bolt; a latch bolt actuating member mounted for rotation in either direction about an axis approximately perpendicular to the path of reciprocation of said latch bolt; said latch bolt actuating member being provided with arcuate bearing surfaces therein spaced apart thereon located equal distances at opposite sides of the axis of rotation of said member with their axes substantially parallel with such axis of rotation; a resilient yoke member formed of spring wire to provide spaced substantially parallel spring arms connected at one end thereof by a base portion; each of said spring arms of said yoke member being comprised of spaced substantially parallel lengths of wire connected at their free ends opposite said base portion by a transversely disposed wire length of circular cross-section; the base end of said yoke member being connected to said latch bolt and said spring arms of said yoke member being positioned extending to said actuating member; and the free ends of said spring arms of said yoke member being sprung apart and engaged under spring tension at opposite sides of said actuating member with said wire lengths across said free end portions of said arms being rotatably and yieldingly received in said arcuate bearing surfaces, respectively, of said actuating member.

5. As a new article of manufacture, a resilient yoke member for connecting a latch bolt with a retracting mechanism, said yoke member being formed of spring wire to provide spaced spring arms connected at one end thereof to provide an attaching base; each of said spring arms being formed of spaced substantially parallel lengths of wire connected at the ends thereof opposite said attaching base by a pivot member-forming wire portion extending transversely between and connecting said parallel lengths of wire; and the ends of said spring arms opposite said attaching base providing spaced free ends for said spring arms adapted to be sprung apart to increase the spacing between said pivot member-forming wire portions.

6. As a new article of manufacture, a resilient yoke member for connecting a latch bolt with a retracting mechanism, said yoke member comprising a single piece of spring wire bent-up to form spaced substantially parallel spring arms each consisting of spaced substantially parallel wire lengths; one of the wire lengths of each of said spring arms being connected at adjacent ends thereof by a length of said wire extending transversely therebetween to form therewith an attaching base; a length of said wire extending transversely between and connecting the free ends of the wire lengths of each of said spring arms opposite said attaching base; and said wire lengths at the free ends of said spring arms being adapted to be sprung apart with said spring arms under tension to increase the spacing therebetween.

7. In a latch mechanism, in combination, a tubular case; a wall structure at one end of said case formed with an arcuate recess therein disposed centrally thereof and opening into said case; a support member mounted in said case extending thereacross centrally thereof intermediate the opposite ends of the case; the end of said support member adjacent said wall structure being spaced therefrom and formed with an arcuate bearing surface therein in the plane of said arcuate recess in said wall structure; a rollback rotatably mounted in said case between said recessed wall structure and said support member; said rollback having an arcuate bearing surface complementary with and received in said arcuate bearing surface in the adjacent end of said support member with the opposite side of said rollback being received in said arcuate recess in said wall structure; a guide member mounted on said support member and being formed to provide spaced guide flanges located at opposite sides of said arcuate bearing surface in said support member; a latch bolt reciprocally mounted in said case for projection and retraction; an operating yoke connecting said latch bolt and said rollback; and a biasing spring mounted under compression between said latch bolt and said support member adapted to continuously bias said latch bolt to projected position.

8. In a latch mechanism, in combination, a tubular case having one end thereof open; a wall structure at the end of said casing opposite said open end; the opposite sides of said case adjacent said wall structure being provided with opposite, axially aligned openings transversely therethrough to receive a rotary spindle; a support member mounted in fixed position in said case extending transversely thereacross and centrally thereof intermedi-

ate said wall structure and the opposite open end of the case; the end of said support member adjacent said wall structure being spaced from said wall structure and formed with an arcuate bearing surface therein; said wall structure being formed with an arcuate recess therein disposed centrally thereof in the plane of said arcuate bearing surface in said support member; a rollback rotatably mounted in said case in position between said wall structure and said support member; said rollback being received in said arcuate recess of said wall structure and being formed at the opposite side thereof with an arcuate bearing surface in bearing engagement with said arcuate bearing surface of said support member; said rollback being provided with a spindle receiving opening therethrough for axial alignment with said opposite spindle receiving openings in said case; a latch bolt reciprocally mounted in the open end of said case for projection and retraction; a latch bolt actuating yoke member fixed to said latch bolt and extending inwardly therefrom to and in operative connection with said rollback for effecting retraction of said latch bolt; and a biasing spring between said latch bolt and said support member adapted to act to continuously bias said latch bolt to projected position.

9. In the combination as defined in claim 8, said support member being formed to provide a central prong and opposite side prongs extending forwardly therefrom toward said latch bolt; and said biasing spring being of coil form and at its inner end being mounted and centered on said central prong of said support member.

10. In the combination as defined in claim 8, said support member being formed to provide a central prong and opposite side prongs extending forwardly therefrom toward said latch bolt; the forward ends of said side prongs at the outer sides thereof being formed with outwardly projecting lugs thereon; and said case being formed with openings therein adapted to receive and seat therein said lugs on said prongs to secure said support member in mounted position.

11. In the combination as defined in claim 8, said support member being formed to provide a central prong and opposite side prongs substantially parallel therewith, said prongs extending forwardly therefrom toward said latch bolt; a guide member mounted on said support member over said forwardly extending prongs, said guide member in mounted position being located on said support member at the inner ends of said prongs and providing spaced guide flanges positioned at opposite sides, respectively, of said rollback in said arcuate bearing surface in said support member.

12. In the combination as defined in claim 8, said support member being formed to provide forwardly extending central and opposite side prongs, a guide member mounted on said support member and having openings therethrough for receiving and through which said support member prongs extend, said guide member being located in mounted position at the inner ends of said prongs and being formed to provide spaced guide flanges positioned at opposite sides of and across the opening in said support member formed by said arcuate bearing surface of the said support member, and said biasing spring being of coil type and being mounted at its inner end over and centered by said central prong of said support member.

13. In a latch mechanism, in combination, a tubular case; a plate-like support member mounted in fixed position in said case extending thereacross centrally thereof intermediate the opposite ends of the case; one end edge of said support member formed to provide an arcuate bearing surface therein opening through the opposite sides thereof; a transverse wall member mounted in fixed position in said case spaced from the recessed end edge of said support member; said transverse wall member being formed to provide an arcuate recess therein opposite and in the plane of said arcuate recess in the end edge of said support member; a rollback rotatably mounted in said case between said transverse wall member and said support member in position in the plane of said support member; said rollback having an arcuate bearing surface complementary with and received in said arcuate bearing surface in the adjacent end edge of said support member with the opposite side of said rollback being rotatably received in the recess of said transverse wall member; said rollback having a spindle receiving bore transversely therethrough; said case having spindle receiving openings in opposite sides thereof, respectively, in positions for axial alignment with said opening through said rollback; and a guide member mounted on said support member and being formed to provide spaced guide flanges located at and extending across opposite sides of said arcuate bearing surface in said support member.

14. In a latch mechanism, in combination, a tubular case, a support member mounted in fixed position in said case intermediate the opposite ends thereof; one end of said support member being formed to provide an arcuate bearing surface therein; a wall member mounted in fixed position in said case disposed transversely thereof and spaced from said recessed end of said support member; said wall member having an arcuate recess therein opposite and opening into said case in the plane of said arcuate recess in said support member; a rollback rotatably mounted in said case between said wall member and said support member; said rollback having an arcuate bearing surface complementary with and received in said arcuate bearing surface in the adjacent end of said support member; said rollback having a diameter to extend into said recess in said wall member and being constrained against lateral displacement by said wall member; said rollback having a spindle receiving bore transversely therethrough; and said case having spindle receiving openings in opposite sides thereof, respectively, in positions for axial alignment with said opening through said rollback for mounting a spindle in position extending through said aligned case openings and rollback opening.

15. In a door latch mechanism, in combination, a rotary spindle; a back plate adapted to be mounted in fixed position and being formed with a central opening therethrough for rotatably receiving said spindle; a rose mounted on and over said back plate and having an aperture therethrough for rotatably receiving said spindle; an auxiliary spring actuator disc mounted on and rotatable with said spindle between said rose and said back plate; a torque spring mounted on and rotatable with said actuator disc; and a lug on said back plate for engagement with said torque spring on said actuator disc whereby rotation of said disc by said spindle in either direction increases the torque of said spring on said disc.

16. In the combination as defined in claim 15, said auxiliary spring actuator disc being formed with outwardly turned flanges adjacent the periphery thereof and being spaced apart therearound, said auxiliary torque spring being in the form of a split ring having its opposite ends bent outwardly to provide ear members, and said spring having its ends crossed over each other with said ears being engaged at opposite side edges of said lug on said back plate.

17. In the combination as defined in claim 15, said back plate being formed with a plurality of lugs extending forwardly therefrom toward said rose and spaced apart therearound, said torque spring on said actuator disc being operatively engaged with one of said lugs on said back plate whereby rotation of said disc with said spindle in either direction increases the torque in said spring, and a lock member slidably mounted on said back plate for displacement between a depressed, latching position engaged between adjacent lugs on said back plate and a withdrawn, unlatching position clear of said lugs.

18. In a door latch mechanism, in combination, a reciprocally mounted latch bolt; a rotary spindle; a rollback mounted on and rotatable with said spindle; said rollback having oppositely and radially outwardly extending actuating members thereon at opposite sides of the axis of said

rollback; a yoke member fixed at one end thereof to said latch bolt and reciprocal therewith; said yoke member providing spaced, spring arms extending therefrom having their outer free ends spaced apart; and the spaced free ends of said spring arms of said yoke member being sprung apart and resiliently engaged under spring tension with said rollback at opposite sides of the axis thereof and with said actuating members, respectively, of said rollback for reciprocation of said latch bolt by rotation of said rollback in either direction.

19. In a door latch mechanism, in combination, a reciprocally mounted latch bolt; a rotary spindle; a rollback member on said spindle for rotation therewith; said rollback member providing peripheral edge surface portions thereon at opposite sides of the axis of rotation thereof; a yoke member on said latch bolt for reciprocation therewith comprising spaced spring arms extending therefrom with the outer ends thereof spaced apart and being resiliently displaceable toward and from each other; and said spaced outer ends of said spring arms of said yoke member being resiliently yieldingly engaged under spring tension with said peripheral edge surface portions, respectively, of said rollback at opposite sides of the axis thereof.

20. In a door latch mechanism in combination, a reciprocally mounted latch bolt; a rotary spindle; a rollback mounted on said spindle for rotation therewith; said rollback providing a peripheral edge portion thereon having radially outwardly extending lugs at opposite sides of the axis of rotation of said rollback for swinging in opposite directions by rotation of said spindle; a yoke member fixed to said latch bolt and reciprocal therewith; said yoke member comprising spaced spring arms extending from said latch bolt to said rollback; said rollback being formed with arcuate cross section bearing recesses therein transversely thereacross opening through the outer sides thereof at the inner ends of said lugs at the sides of said lugs opposite said latch bolt; the free ends of said spring arms of said yoke member opposite said latch bolt being spaced apart and provided with transversely disposed portions of circular cross section displaceably engaged in said bearing recesses, respectively, of said rollback in rotary bearing engagement therewith; and each of said circular cross section portions at the free ends of said spring arms being yieldingly displaceable from said bearing recess in which engaged into yielding slidable engagement on said peripheral portion of said rollback at the side of said lug that is opposite said latch bolt by rotation of said rollback in a direction to displace such lug toward said latch bolt and being returnable under spring tension from displaced position to position engaged in its respective recess and engaged by such lug by rotation of said rollback in the opposite direction.

21. In a door latch mechanism in combination, a reciprocally mounted latch bolt; a rotary spindle; a circular rollback mounted on and rotatable with said spindle; said rollback being formed with oppositely and radially outwardly extending lugs thereon at opposite sides of the axis of rotation of said spindle; a yoke member fixed to and reciprocal with said latch bolt and being formed to provide spaced, resilient spring arms extending from said latch bolt to said rollback; the ends of said spaced spring arms opposite said latch bolt being spaced apart and free for independent yielding displacement toward and from each other against the spring action thereof; said free ends of said spring arms being formed with portions disposed transversely thereacross; the free ends of said spring arms with said transverse portions being sprung apart and yieldingly engaged under tension over and against said lugs, respectively, and said rollback at the rear sides of said lugs opposite said latch bolt for effecting reciprocation of said yoke and said latch bolt by rotation in either direction of said rollback.

22. In a door latch mechanism in combination, a reciprocally mounted latch bolt; a rotary spindle; a rollback on said spindle for rotation therewith in either direction; said rollback being formed with a circular peripheral edge surface concentric with the axis of said spindle; said peripheral edge surface of said rollback being provided with transversely disposed arcuate cross section bearing recesses therein and thereacross opening through the outer sides thereof; a yoke member fixed to and reciprocal with said latch bolt and extending therefrom to said rollback; said yoke member at the end thereof opposite said latch bolt being provided with spaced members of circular cross section rotatably engaged in said arcuate recesses, respectively, of said rollback in rotary bearing engagement therein; and each of said circular cross section members of said yoke member being displaceable from said bearing recess in which engaged into sliding engagement on and relative to said peripheral edge surface of said rollback by rotation of the latter in one direction and being returnable from displaced position to position engaged in its said bearing recess by rotation of said rollback in the opposite direction.

23. In a door latch mechanism in combination, a reciprocally mounted latch bolt; a rotary spindle; a rollback on said spindle for rotation therewith in either direction; said rollback being formed with spaced arcuate cross section bearing recesses disposed transversely across and opening through the peripheral portion thereof at opposite sides of the axis of rotation of said spindle; a yoke member fixed to and reciprocal with said latch bolt; said yoke member including spaced spring wire resilient arms extending from said latch bolt to said rollback; said spaced resilient arms of said yoke member terminating at said rollback opposite said latch bolt in spaced free ends resiliently displaceable with said arms toward and from each other; said free ends of said resilient spring wire arms each having a closed end of wire disposed transversely thereacross of circular cross section; said arms with said circular cross section closed free ends thereof being sprung apart and rotatably engaged in said arcuate recesses, respectively, in said rollback in rotary bearing engagement therein; and each of said closed free ends of said arms being displaceable from its said bearing recess into yielding slidable engagement under spring tension on said peripheral portion of said rollback by rotation of the latter in one direction and being returnable under such spring tension from displaced position to position engaged in its said bearing recess by rotation of said rollback in the opposite direction.

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