

April 10, 1951

K. WILLIAMS
BUFFING MECHANISM

2,548,088

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3 Sheets-Sheet 1

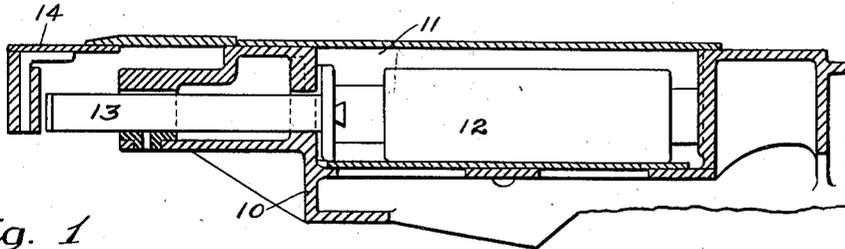


Fig. 1

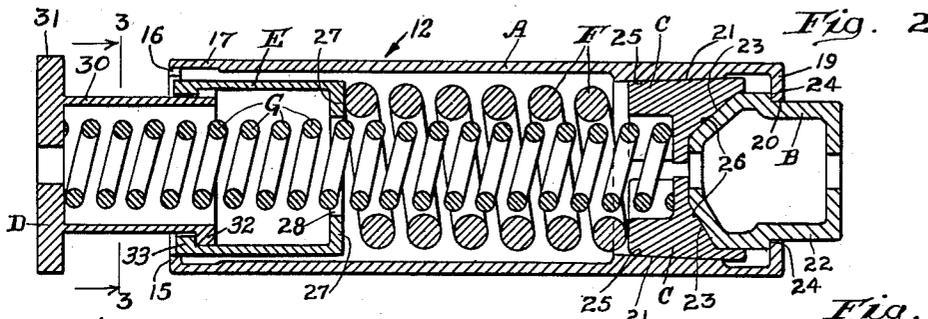


Fig. 2

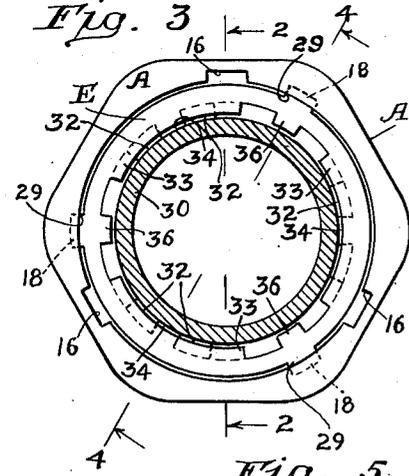


Fig. 3

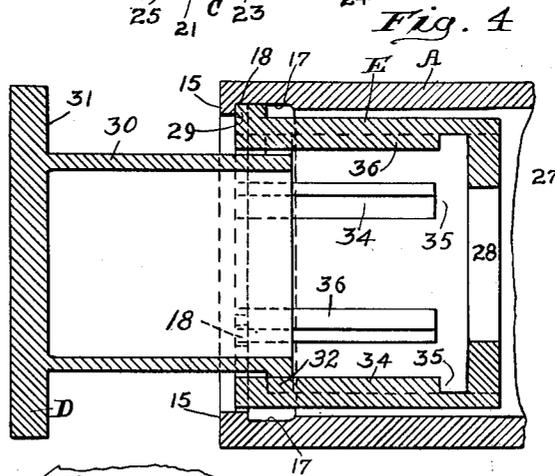


Fig. 4

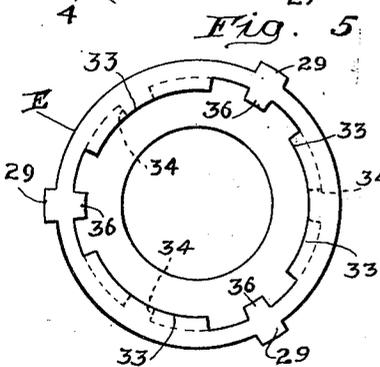


Fig. 5

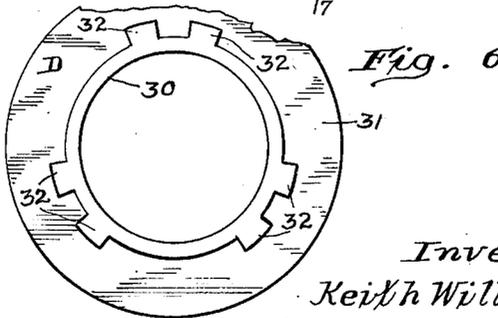


Fig. 6

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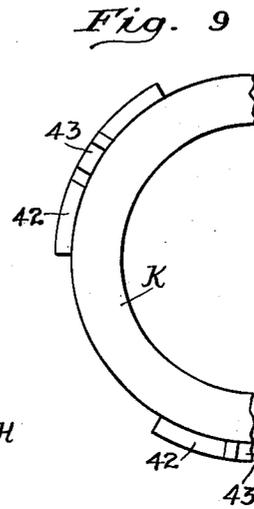
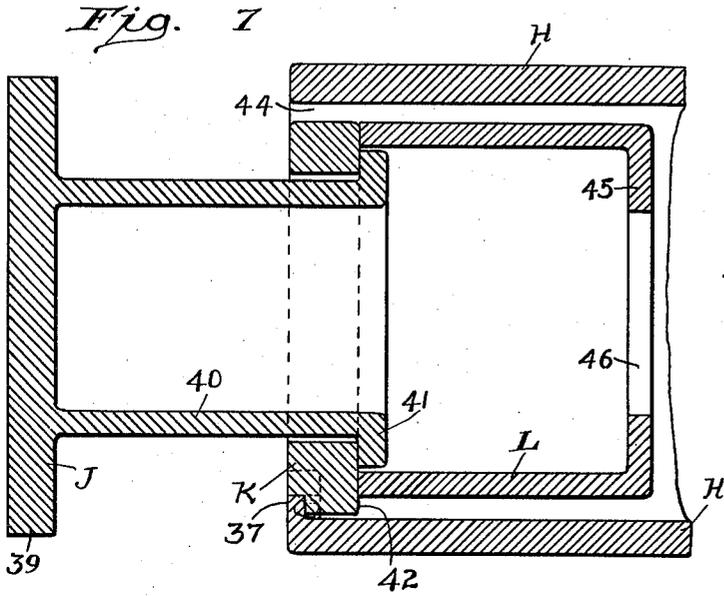
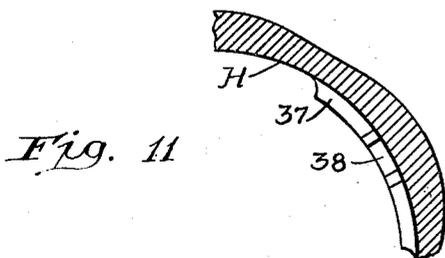
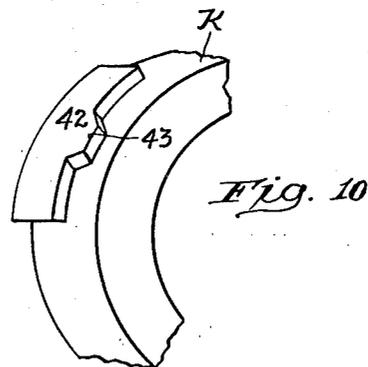
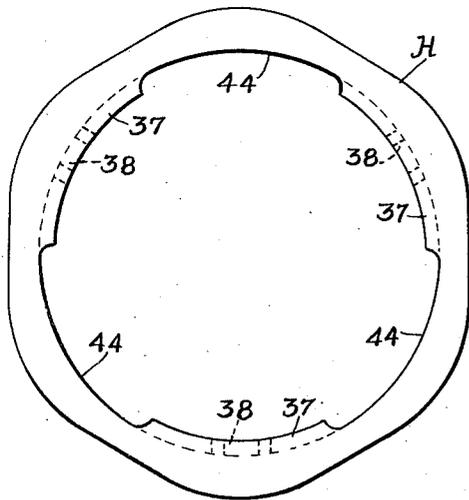


Fig. 8



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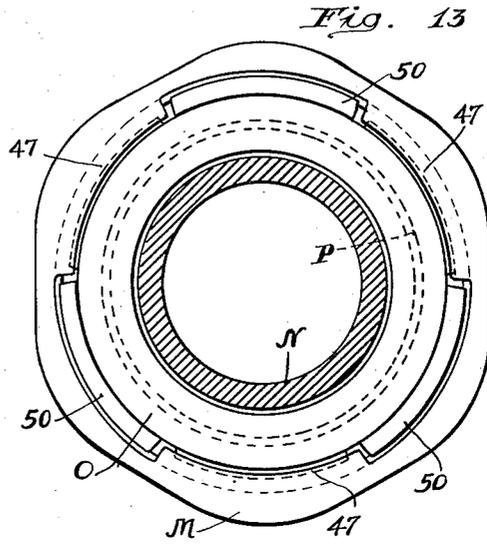
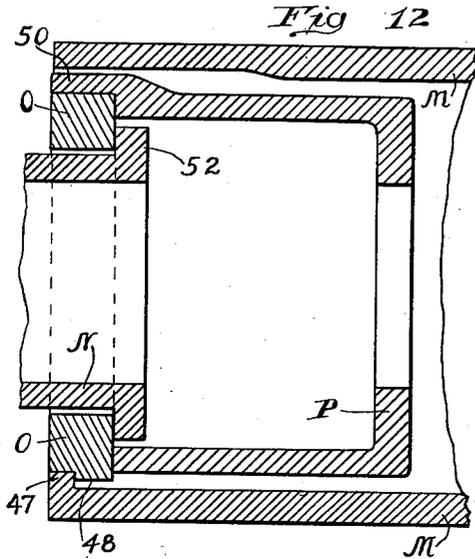


Fig. 14

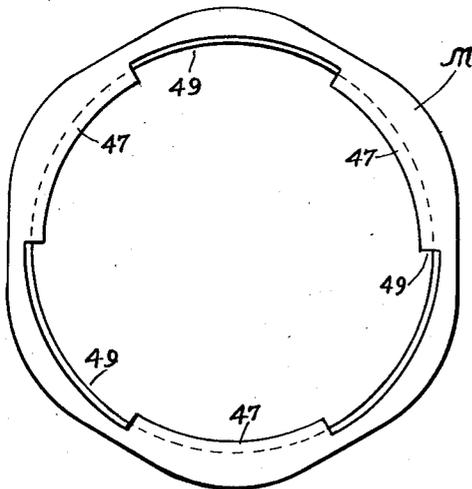
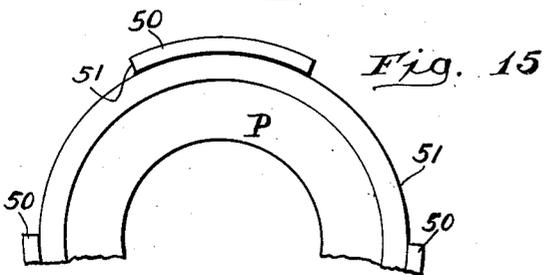
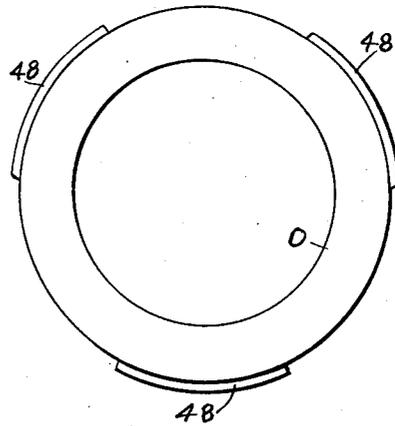


Fig. 16



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UNITED STATES PATENT OFFICE

2,548,088

BUFFING MECHANISM

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Application May 15, 1946, Serial No. 669,953

12 Claims. (Cl. 213—24)

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This invention relates to improvements in buffing mechanisms for railway cars.

One object of the invention is to provide in a buffing mechanism of the character indicated, comprising a housing and a spring-resisted buffing cap slidingly telescoped within the housing, simple and efficient means for anchoring the cap to the housing and effectively locking the same against accidental removal, the locking means being designed to permit the cap to be readily assembled with or removed from the housing.

A more specific object of the invention is to provide in a buffing mechanism comprising a housing, a buffing cap slidingly telescoped within one end of the housing, a friction clutch slidingly telescoped within the other end of the housing, and spring means within the housing composed of a plurality of spring elements opposing movement of the buffing cap inwardly of the housing and cooperating with the friction clutch to set up frictional resistance between the clutch and housing, simple and efficient means for anchoring the cap to the housing, including a locking thimble having shouldered engagement with the housing and buffing cap to limit outward movement of the latter with respect to the housing, wherein the thimble is maintained in its locking position by one of the spring elements of said spring means.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawings, forming a part of this specification,

Fig. 1 is a fragmentary, vertical longitudinal sectional view of the end platform of a railway car, illustrating my improvement in buffing mechanisms in connection therewith;

Fig. 2 is a longitudinal sectional view, on an enlarged scale, through the improved buffing mechanism shown in Fig. 1, corresponding substantially to the line 2—2 of Fig. 3;

Fig. 3 is a transverse vertical sectional view, corresponding substantially to the line 3—3 of Fig. 2, Fig. 3 being on a still further enlarged scale;

Fig. 4 is a longitudinal sectional view corresponding substantially to the line 4—4 of Fig. 3, said view being partly broken away;

Fig. 5 is an end elevational view of the locking thimble shown in Fig. 4, looking from left to right;

Fig. 6 is an end elevational view of the buffing cap shown in Fig. 4, looking from right to left in said figure;

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Fig. 7 is a view similar to Fig. 4, illustrating another embodiment of the invention;

Fig. 8 is an end elevational view of the housing shown in Fig. 7, looking from left to right in said figure;

Fig. 9 is a broken end elevational view of the locking ring shown in Fig. 7, looking from left to right in said figure;

Fig. 10 is a broken perspective view of the locking ring shown in Figs. 7 and 9;

Fig. 11 is a fragmentary, transverse sectional view of the end of the housing;

Fig. 12 is a view similar to Fig. 7, illustrating still another embodiment of the invention;

Fig. 13 is an elevational view of Fig. 12, looking from left to right in said figure and showing the buffing cap in vertical section;

Fig. 14 is a view similar to Fig. 13, showing the housing only;

Fig. 15 is a broken end elevational view of the thimble shown in Figs. 12 and 13, looking from left to right in Fig. 12; and

Fig. 16 is an end elevational view of the locking ring shown in Fig. 12, looking from left to right in said figure.

In said drawings, referring more particularly to Fig. 1 thereof, 10 indicates a portion of the underframing of a passenger car end platform, having a pocket 11 adapted to receive the buffing mechanism, which is indicated by 12. The buffing mechanism 12 is actuated by the usual longitudinally slidable center stem 13, which is guided in suitable openings of the underframe structure and cooperates with the usual movable platform member 14. As will be understood by those skilled in this art, the end platform member 14 is moved inwardly upon receiving buffing shocks, thereby forcing the stem 13 inwardly also and compressing the buffing mechanism 12 against the rear wall of the pocket 11.

Referring first to the embodiment of the invention illustrated in Figs. 1 to 6 inclusive, my improved buffing mechanism, which is indicated by 12 in Fig. 1, comprises broadly a housing or friction casing A; a wedge B; three friction shoes C—C—C; a pressure-transmitting member or buffing cap D; a spring abutment thimble E; a heavy outer coil spring F; and a lighter inner coil spring G.

The casing A is in the form of a cylinder of substantially hexagonal cross-section, as shown in Fig. 3. At the front or left-hand end of the casing, as viewed in Fig. 2, an inturned annular stop flange 15 is provided, which is notched as indicated at 16. As shown, three notches

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16—16—16 are preferably provided, which are equally spaced circumferentially of said flange. Inwardly of the flange 15, the side walls of the casing are cut away or circumferentially grooved, as indicated at 17, to provide clearance for certain locking lugs on the thimble E, as hereinafter pointed out. The notches 16 in the flange 15 are preferably of such a depth that the inner end walls of the same coincide with the back wall of the groove 17. On the inner side, the flange 15 is formed with three circumferentially spaced, inwardly opening seats 18—18—18. Each seat 18 is slightly offset circumferentially with respect to the adjacent notch 16, as clearly shown in Fig. 3. The opposite or rear end of the casing A has a laterally inwardly projecting annular flange which forms a rear wall 19 having a central opening 20. Inwardly of the wall 19, the casing has a plurality of interior friction surfaces 21, which extend lengthwise thereof and converge inwardly toward each other. These friction surfaces are preferably three in number and are arranged symmetrically about the axis of the mechanism.

The wedge B is in the form of a hollow block having a reduced stem portion 22, which extends through the opening 20 of the rear wall 19 of the casing A and projects beyond the end of the casing. The wedge block B is provided with three wedge faces 23—23—23, which cooperate with the shoes C—C—C. The outer end of the stem 22 of the wedge is adapted to bear on the vertical rear wall of the pocket 11 of the underframe 10 of the car. The reduced stem 22 provides a stop shoulder 24 at the inner end thereof, which is substantially continuous around the wedge and adapted to engage the rear wall 19 of the casing to limit movement of the wedge block outwardly with respect to the casing.

The friction shoes C correspond in number to the friction surfaces of the casing. Each shoe has a friction surface 25 on the outer side engaging the corresponding friction surface 21 of the casing, and a wedge face 26 on the inner side engaging one of the wedge faces 23 of the wedge block B.

The thimble E, which forms an abutment for the outer end of the outer coil spring G of the spring resistance means, is in the form of a tubular sleeve, having a transverse inner end wall 27 provided with a central opening 28, which extends therethrough and is adapted to accommodate the spring F. The thimble E is telescoped within the housing A and has three radially outwardly projecting lugs 29—29—29 at its outer or left-hand end, as seen in Fig. 4, which overhang the flange 15 of the casing at the inner side and are normally engaged in the seats 18—18—18 of said flange. The thimble is thus locked against rotation by the lugs 29 in their seated condition, and is positively held against outward movement by shouldered engagement of said lugs with the flange 15 of the casing. These lugs 29 of the thimble E are of such a size that they will pass freely through the openings or notches 16 of the flange 15 of the casing when aligned with said notches, thereby permitting telescoping of the thimble within the casing in the operation of assembling the mechanism. After the thimble has been pushed into the casing, the lugs 29 may be engaged with the seats 18 by giving the thimble the required partial turn.

The buffing cap D comprises a tubular sleeve-like section 30 closed at its outer end by a transverse wall which extends outwardly beyond the

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sleevelike section and forms a platelike follower 31. The sleeve section 30 of the cap is slidably telescoped within the thimble E and has its movement inwardly of the housing limited by engagement of the follower 31 with the end of said housing. At the inner end thereof, that is, the right-hand end as viewed in Figs. 2 and 4, the sleeve section 30 of the buffing cap D is provided with three pairs of exterior, radially projecting lugs 32—32, 32—32, and 32—32, Figs. 3 and 6, which overhang and engage in back of inturned arc-shaped flanges 33—33—33 at the outer or left-hand end of the thimble E to restrict outward movement of the cap with respect to the thimble. The flanges 33—33—33 are circumferentially spaced apart and each flange is of such a length that it overlaps both of a corresponding pair of lugs 32—32. To maintain the lugs 32—32 of the respective pairs of the buffing cap in alignment with the corresponding flange 33 of the thimble during sliding movement of the cap inwardly and outwardly lengthwise of the thimble, the latter is provided with three lengthwise extending, interior guide ribs 34—34—34, Figs. 3, 4, and 5, one for each flange 33 extending from the center of said flange and being embraced between a corresponding pair of lugs 32—32 of the buffing cap D. Each rib 34 terminates short of the inner end of the thimble E to provide sufficient clearance between the inner end of the rib and the rear wall 19 of the thimble, as indicated at 35, to allow lateral passage of the lugs 32—32 so that the same may be disengaged from the ribs 34 when the cap has been pushed inwardly to its innermost position with respect to the thimble with the follower 31 abutting the outer end of the thimble. Disengagement of the cap cannot be effected in any other position of the lugs 32—32 inasmuch as the lugs will clear the ends of the ribs only when the follower 31 abuts the end of the thimble. The three flanges 33—33—33 of the thimble are so spaced circumferentially as to freely permit the respective pairs of lugs 32—32 to pass therebetween when the cap is pushed into the thimble E in assembling the same therewith. To assist in guiding the cap while being assembled with the thimble, additional lengthwise extending ribs 36—36—36 are provided interiorly of the thimble which are alternated with the ribs 34—34—34 and disposed midway between the ends of adjacent flanges 33—33 of the thimble. The ribs 36 are of the same length as the ribs 34, terminating short of the end wall 27 to provide clearance for the lugs 32—32 when the cap is turned with respect to the thimble. In the application of the cap to the thimble as it is being pushed into the same, each pair of the lugs 32—32 embrace a corresponding rib 36 on opposite sides, thus guiding the cap in a straight path. As will be evident, although the ribs 36 guide the cap so as to prevent turning of the same while being pushed into the thimble, thereby facilitating assembling of the parts, these ribs are not absolutely essential and may be omitted inasmuch as the turning of the cap while being applied will not materially interfere with the operation of assembling the device and, if it is found desirable, the cap may be manually held against turning.

The spring resistance, comprising the outer and inner springs F' and G, is disposed within the casing A, the inner spring extending through the opening 28 of the end wall 27 of the thimble E and having its opposite ends bearing respectively on the friction shoes C—C—C and the follower member 31 of the buffing cap D. The outer

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spring F surrounds the spring G and has its opposite ends bearing respectively on the shoes C—C—C and the end wall 27 of the thimble E. The springs F and G are preferably under initial compression, and the spring F at all times holds the thimble E seated against the stop flanges 15 of the casing 17 with the lugs 29 engaged in the seats 18, thereby locking the thimble against rotation. When the mechanism is in the normal, full release position shown in Fig. 2, the spring G yieldingly holds the cap D in its outermost position with the lugs 32 thereof seated on the inner sides of the flanges 33 of the thimble E and with each pair of the lugs 32—32 embracing a corresponding rib 34. The lugs 29 of the thimble E and the lugs 32 of the cap D are thus maintained in abutment with the stop flanges 15 and 33 of the casing and thimble respectively. Further, since the thimble E in its seated position is offset inwardly from the front end of the casing A, as shown in Figs. 2 and 4, and is maintained in that position at all times, and since the buffing cap D is limited in its inward movement by engagement of the follower member 31 thereof with the front end of the casing A, the lugs 32—32, 32—32, and 32—32 of the cap cannot pass beyond the ends of the ribs 34—34—34. This is because these ribs are of such a length, as hereinbefore pointed out, that the lugs will clear the ends of the same only when the cap is moved inwardly of the thimble to its limit with the follower 31 engaging the end of the thimble. Thus, the cap is detached from the thimble only when the thimble has been removed from the casing A.

In assembling the mechanism, the friction shoes C—C—C, the wedge B, and the springs F and G are first placed within the casing A. The cap D is then applied to the thimble E by pushing the cap inwardly of the thimble entering the lugs 32—32, 32—32, and 32—32 of the cap through the spaces between the flanges 33—33—33 of the thimble. After the cap has been pushed inwardly to an extent to engage the follower 31 thereof with the end of the thimble, the same is given a partial turn to bring each pair of the lugs 32—32 in longitudinal alignment with a corresponding flange 33 and in position at opposite sides of a corresponding rib 34. The cap D is then pulled outwardly, thereby engaging the lugs with the ribs and locking the cap and thimble against relative rotation. With the cap thus attached to the thimble and projecting therefrom, the thimble is brought to a position with the lugs 29 thereof aligned with the notches 16 of the casing and pushed into the latter against the resistance of the spring F until the lugs 29 clear the flange 15. The thimble E and the attached cap D are then given a partial turn to align the lugs 29 with the seats 18, whereupon the pressure exerted by the spring F forces the lugs into the seats locking the thimble against rotation with respect to the casing A.

The operation of my improved buffing mechanism, as shown in Figs. 1 to 6 inclusive, is as follows: Upon inward movement of the buffing stem 13, the pressure-transmitting member or cap D is forced inwardly of the casing A while the wedge B is held against rearward movement by engagement with the inner end wall of the pocket of the underframe structure. Thus the spring G only is compressed until the follower 31 of the buffing cap engages the front end of the casing A, thereby providing relatively light resistance. Upon further compression of the

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mechanism, the casing A is forced rearwardly by the follower 31. During this last named stage of the compression, relative sliding movement is produced between the casing A and the friction shoes C—C—C and the springs F and G are both compressed, thereby producing relatively high frictional resistance to take care of heavier shocks.

Referring next to the embodiment of the invention illustrated in Figs. 7 to 11 inclusive, the construction of my improved buffing mechanism is substantially identical with that shown in Figs. 1 to 6 inclusive, with the exception that the buffing cap is anchored to the casing by means of a locking ring which is held in locked position by the thimble. The casing, buffing cap, locking ring, and thimble are indicated respectively by H, J, K, and L, in Figs. 7 to 11 inclusive.

The casing H has three circumferentially spaced inturned stop flanges 37 at its front end, each flange having a radially disposed seat 38 on its inner side midway between the ends thereof.

The buffing cap J, which is slidable within the casing H, has a follower section 39 at its outer end and a cylindrical sleeve portion 40 extending inwardly from the follower section. The ring K may be formed by casting the same about the sleeve 40 of the cap so as to be freely movable thereon. The sleeve 40, which is thus engaged through the ring K, has an outwardly projecting annular stop flange 41 at its inner end engaged in back of the ring K.

The ring K, which surrounds the sleeve 40 of the buffing cap, is provided with three circumferentially spaced stop lugs 42, which bear on the inner sides of the flanges 37 of the casing and have central locking projections 43 engaged within the seats 38 of said flanges. The ring K is thus locked against rotation and held against outward movement with respect to the casing H. The lugs 42 of the ring are of such a size as to pass freely through the openings 44 between adjacent flanges of the casing while the ring is being assembled with the same.

The locking ring K is held seated by the thimble L, which bears on the ring and is urged against the ring by the outer coil spring of the buffing mechanism. The inner end wall of the thimble, which is indicated by 45, has a central opening 46 through which the inner spring of the mechanism extends.

In assembling the mechanism, the thimble L is pushed inwardly of the casing H against the resistance of the outer spring of the buffing mechanism and positioned to provide ample clearance for passage of the lugs 42 of the ring between the front of the thimble and the flanges 37 of the casing H. The buffing cap J with the ring thereon is then passed into the end of the casing with the lugs 42 of the ring aligned with the openings 44 between the flanges 37 of the casing. After the ring has been brought to a position with the lugs thereof inwardly of the flanges 37 of the casing, it is given a partial turn to register the respective lugs with the flanges 37. The restraining pressure on the thimble L is then removed, permitting the outer coil spring of the buffing mechanism to project the thimble outwardly, thus forcing the ring outwardly also and seating the lugs 42 thereof on the flanges of the casing with the projections 43 of said lugs engaged in the seats 38. The buffing cap J is thus effectively locked against removal, the ring being held seated at all times by the spring-pressed thimble L.

Referring next to the embodiment of the inven-

tion illustrated in Figs. 12 to 16 inclusive, the construction is identical with that shown in Figs. 7 to 11 inclusive, with the exception that the locking ring is locked against rotation with respect to the casing by projecting fingers on the thimble, which engage between lugs on the ring and flanges on the casing.

In said Figs. 12 to 16 inclusive, the casing, buffing cap, locking ring, and thimble are indicated respectively by M, N, O, and P.

The casing M is provided with three inturned circumferentially spaced flanges 47—47—47 at its front end, in back of which are engaged three circumferentially spaced, arc-shaped lugs 48—48—48 on the ring O, which register with said flanges. The lugs 48 are of such a size that they will pass freely through the openings 49 of the casing M when aligned with said openings, thereby facilitating insertion of the ring within the casing in assembling the mechanism. The ring O is held seated by the thimble P, which bears on the ring and is pressed against the same by the outer coil spring of the buffing mechanism.

To lock the ring O against rotation, the thimble P is provided with three circumferentially spaced, lengthwise extending locking fingers 50—50—50 of arc-shaped transverse section, which are outwardly offset with respect to the ring O to overhang the same. These fingers are engaged in the spaces between the flanges 47—47—47 of the casing and between the lugs 48—48—48 of the ring to lock the ring against rotation with respect to the casing and maintain the lugs 48 thereof in registration with the flanges 47. In other words, the fingers 50 are engaged in the openings 51 between the lugs 48 and in the openings 49 between the flanges 47 of the casing. The fingers 50 act in the manner of keys which substantially fit these openings, locking the thimble to the casing and the ring in turn to the thimble.

The buffing cap N is identical with the cap J hereinbefore described in connection with Figs. 7 to 11 inclusive and has an annular stop flange 52 at its inner end which shoulders against the inner side of the ring O.

In assembling the mechanism, the thimble P is forced into the casing M against the resistance of the outer spring of the buffing mechanism to a position wherein the outer ends of the fingers 50 clear the inner sides of the flanges 47 by a sufficient margin to permit edgewise passage of the lugs 48 of the ring between the ends of said fingers and the inner sides of the flanges. While the thimble is held in this position, the buffing cap with the ring O thereon is pushed into the casing, the lugs 48 of the ring being aligned with the openings 49 between the flanges 47 of the casing so as to pass therethrough. In pushing the buffing cap into the casing, the force is applied to the ring O and the latter, due to its shouldered engagement with the cap, carries the same inwardly therewith. After the ring has been brought to a position with the lugs 48 thereof disposed inwardly of the flanges 47 of the casing, the ring is given a partial turn to register the lugs 48 with the flanges 47. The holding force is then withdrawn from the thimble, permitting the same to be projected by the outer spring of the buffing mechanism, thereby bringing the fingers 50 in locking position between the flanges 47 of the casing and the lugs 48 of the ring.

I claim:

1. In a shock absorber of the character described, the combination with a casing; of a

cap slidably telescoped within the casing; a spring within the casing yieldingly opposing inward movement of the cap; means for anchoring the cap to the casing including an annular locking element having shouldered engagement with the cap for limiting outward movement of the latter, said element and casing having interengaging, laterally spaced stop projections which normally register to hold said cap against outward movement with respect to the casing, the stop projections of said element being of a size to pass between the projections of the casing when said element and casing are turned with respect to each other to register the stop projections of said element with the spaces between the stop projections of the casing; means for preventing the rotation of said annular locking element; and a second spring within the casing yieldingly holding said element with the projections thereof seated against the projections of the casing.

2. In a shock absorber of the character described, the combination with a friction casing having interior, circumferentially spaced flanges at one end; of a friction clutch slidably telescoped within the other end of the casing; a buffing cap slidably telescoped within said first-named end of the casing, said cap having a follower member at the outer end thereof engageable with said first-named end of the casing to limit inward movement of said cap and effect movement of the casing lengthwise with respect to the friction clutch; a spring interposed and reacting between the cap and friction clutch to oppose relative approach thereof; an annular locking element having radially projecting spaced lugs in shouldered engagement with the flanges of the casing to hold said element against outward movement, said lugs being of a size to pass freely through the spaces between the flanges of the casing when the element is turned to register said lugs with said spaces to permit application of said element to the casing, said lugs, by turning said element, being brought to registering position with respect to the flanges of the casing to engage in back of the latter, said cap having shouldered engagement with said locking element to limit outward movement of the cap; means for preventing the rotation of said annular locking element; and a second spring reacting between the clutch and the locking element to forcibly hold said locking element in its outermost position with the lugs thereof pressed against the flanges of the casing.

3. In a shock absorber of the character described, the combination with a casing; of a cap slidably telescoped within the casing; a spring within the casing yieldingly opposing inward movement of the cap; an annular locking element having shouldered engagement with the cap to limit outward movement of the latter, said casing and element having laterally spaced, registering locking projections, said registering projections having interengaging locking ribs and seats to hold said element and casing against relative rotation, the stop projections of said element passing freely between the projections of said casing when said element and casing are turned to stagger the projections of one with respect to those of the other; and a second spring yieldingly holding said element projected with the locking projections in engagement with the locking projections of the casing and the ribs engaged within said seats.

4. In a shock absorber of the character de-

scribed, the combination with a casing having interior, circumferentially spaced stop ledges at one end thereof; of a cap slidingly telescoped within the casing; a spring within the casing yieldingly opposing inward movement of the cap; an annular locking element having shouldered engagement with the cap to limit outward movement of the latter, said element having radially, outwardly projecting stop lugs engageable in back of the ledges of the casing, said lugs being of a size to pass freely between adjacent stop ledges when the cap is turned to register said lugs with the spaces between said ledges; means for preventing the rotation of said annular locking element; and a second spring within said casing bearing on said element and pressing the same outwardly with the lugs thereof in abutment with said ledges.

5. In a shock absorber of the character described, the combination with a casing having interior, circumferentially spaced stop ledges at one end thereof; of a cap slidingly telescoped within the casing; a spring within the casing yieldingly opposing inward movement of the cap; an annular locking element having shouldered engagement with the cap to limit outward movement of the latter, said element having radially, outwardly projecting stop lugs engageable in back of the ledges of the casing, said lugs being of a size to pass freely between adjacent stop ledges when the cap is turned to register said lugs with the spaces between said ledges, said ledges having inwardly opening locking seats; and a second spring within said casing bearing on said element and pressing the same outwardly with the locking lugs engaged in said seats to hold said element against rotation with respect to the casing.

6. In a shock absorber of the character described, the combination with a casing having an annular inturned flange at one end notched at intervals to provide circumferentially spaced supporting ledges, said ledges having inwardly opening locking seats; of a cap slidingly telescoped within said casing, said cap having radially projecting lugs thereon; a spring within the casing yieldingly opposing inward movement of the cap; an annular locking element having circumferentially spaced internal lugs in back of which the lugs of the cap are engaged, said element having radially projecting exterior lugs engaged in back of the ledges of the casing and seated in said seats, said exterior lugs of said element being of a size to pass freely through said notches of the flange of the casing when the cap is turned to register the lugs with said notches; and a second spring in said casing pressing against said element to hold the external lugs of the latter seated in said seats.

7. In a shock absorber of the character described, the combination with a casing having inturned stop ledges at one end, said ledges being circumferentially spaced to provide notches therebetween, each of said ledges having an inwardly facing locking seat; of a cap slidingly telescoped within the casing; a spring within the casing normally holding said cap projected and yieldingly opposing inward movement of the same; an annular locking element having radially projecting exterior lugs engaged in the seats of said ledges to hold said element against outward movement and lock the same against rotation, said exterior lugs being of a size to pass freely through said notches when said element is turned to align the lugs with the notches; inter-

engaging guide means on said element and cap for restricting the latter to movement lengthwise with respect to said element; stops on said element at the outer end of the guide means thereof for limiting outward movement of the cap with respect to said element; and an additional spring yieldingly holding said element with the exterior lugs thereof shouldered against the ledges and seated within said seats.

8. In a shock absorber of the character described, the combination with a casing having inturned stop ledges at one end thereof, said ledges being circumferentially spaced to provide openings therebetween, each of said ledges having an inwardly facing locking seat; of a cap slidingly telescoped within the casing; a locking sleeve within the casing into which said cap extends, said sleeve having exterior, radially extending stop lugs thereon seated in said seats to lock the sleeve against rotation with respect to the casing and hold the same against outward movement with respect to the casing and in position offset inwardly from said end of the casing, said lugs being of a size to pass freely through said notches when said element is turned to align the lugs with the notches; external stop lugs on said cap cooperating with circumferentially spaced stop shoulders on said sleeve for restricting outward movement of the cap with respect to the sleeve, said lugs of the cap being of a size to pass freely between the shoulders of the sleeve when said cap is turned with respect to the sleeve to align the stop lugs of the former with the spaces between the stop shoulders; cooperating guide means on said lugs of the cap and on said sleeve for holding the cap against rotation with respect to the sleeve with the lugs of the former aligned with the shoulders of the latter, said guide means being of interengaging tongue and groove formation, the guide means of said sleeve terminating short of the inner end thereof to provide clearance for disengagement of the lugs of the cap therefrom in lateral direction when said cap is forced into the sleeve to a predetermined extent; stop means on said cap engageable with the end of the casing for limiting movement of the cap inwardly of the sleeve and maintain the lugs of the cap engaged with the guide means of the sleeve; and inner and outer springs within the casing, the inner spring extending through said sleeve and opposing inward movement of the cap, and the outer spring bearing on said sleeve and maintaining the exterior lugs thereof seated in the seats of the ledges.

9. In a shock absorber of the character described, the combination with a casing having circumferentially spaced stop ledges at one end thereof; of inwardly facing locking seats on said ledges; a locking thimble having exterior, radially projecting lugs buttressed against said ledges and seated in the seats thereof, said lugs holding the thimble offset inwardly from said end of the casing; a spring within the casing yieldingly holding said thimble pressed outwardly against said ledges; lengthwise extending, interior guide ribs on the thimble having stop shoulders at the outer ends thereof and terminating short of the inner end of the thimble; a cap slidable within said thimble, said cap having stop projections thereon, each stop projection comprising a pair of laterally spaced lugs embracing the corresponding rib of the thimble to guide said cap and hold the same against rotation; stop means on the cap engageable with the casing for limiting movement of the cap inwardly of the casing,

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said stop projections of the cap being spaced inwardly from the stop means a distance greater than the distance from the outer end of said thimble to the inner ends of the ribs thereof whereby said stop projections clear the inner ends of said ribs when the cap is forced inwardly of the thimble to its full extent, thereby permitting disengagement of said cap by turning the same with respect to the thimble, said stop projections of the cap being of a size to pass freely through the spaces between the stop shoulders of the thimble; and an inner spring within said first-named spring extending through the thimble and yieldingly opposing inward movement of the cap.

10. In a shock absorber of the character described, the combination with a casing; of a spacing sleeve within the casing at one end thereof, said spacing sleeve and casing having a bayonet connection for locking said sleeve to the casing; a cap slidingly telescoped within said sleeve, said cap and sleeve having a sliding bayonet connection with each other; a spring within the casing bearing on the sleeve and yieldingly opposing unlocking of the bayonet connection thereof with the casing; a second spring yieldingly opposing inward movement of said cap; and a stop on said cap engageable with said end of the casing limiting inward movement of the cap with respect to the sleeve to an extent to maintain the sliding bayonet connection thereof engaged, said cap being movable inwardly of the sleeve before being arrested by the stop thereof to permit unlocking of the bayonet connection and disengagement of the cap from the sleeve when said sleeve is detached from the casing.

11. In a shock absorber of the character described, the combination with a casing having circumferentially spaced, interior supporting ledges at one end provided with inwardly facing seats; of a locking ring having radially projecting lugs seated on said ledges, said lugs being of a size to pass freely through the spaces and overhang said ledges when the ring is turned to register the lugs with the ledges, said ring and ledges having interlocking seats and projections

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to lock said ring against rotation; a spacing thimble abutting said ring; a cap extending through said ring and telescoped within the casing for sliding movement; an outer spring within the casing yieldingly holding said thimble seated on the ring to maintain said ring seated on the ledges with the seats and projections interlocked; and a second spring extending through said thimble and yieldingly opposing inward movement of the cap.

12. In a shock absorber of the character described, the combination with a casing having circumferentially spaced, interior supporting ledges at one end; of a cap slidingly telescoped within the casing; a locking ring surrounding said cap and having shouldered engagement therewith to limit outward movement thereof; radially extending locking lugs on said ring seated on the inner sides of said ledges, said lugs being of a size to pass freely through the spaces between said ledges when aligned therewith and overhang said ledges when the ring is turned to register the lugs with the ledges; a spacing thimble bearing on said ring and having outwardly projecting fingers engaged between adjacent lugs of the ring and between adjacent ledges of the casing to lock said ring against rotation with respect to the casing; and inner and outer springs within the casing, said outer spring bearing on the thimble and holding the fingers engaged between said ledges of the casing and lugs of the ring, and said inner spring yieldingly opposing inward movement of the cap.

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