

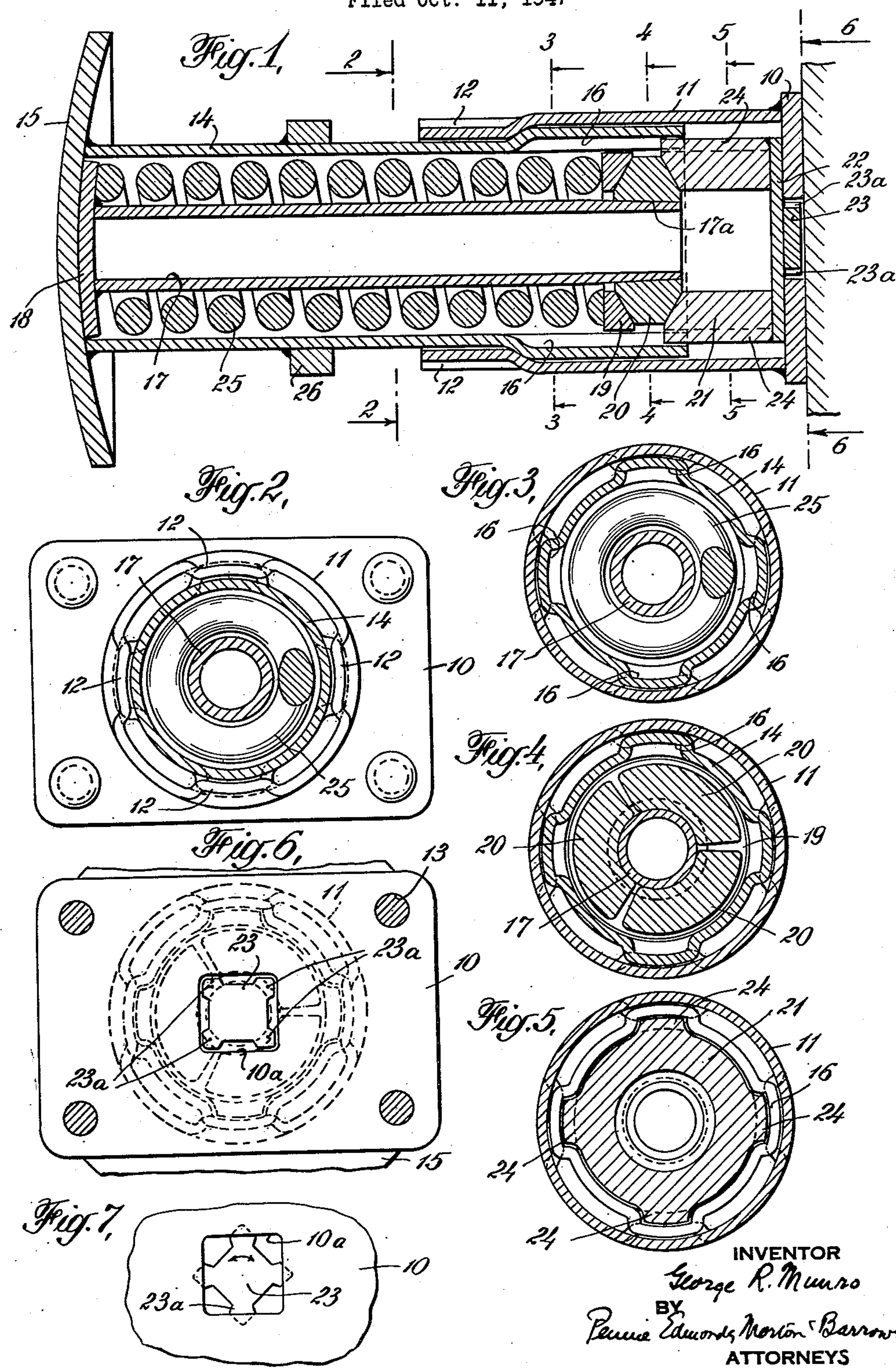
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BUFFER

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## UNITED STATES PATENT OFFICE

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## BUFFER

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This invention relates to buffers for use on railway rolling stock and is concerned more particularly with a novel buffer, the elements of which are held in assembled relation by inter-engaging parts and without the use of bolts or other fastening devices. The new buffer is, accordingly, of simplified construction and assembly and it has the form of a self-contained unit. The buffer includes spring means and also friction elements, so that it is of relatively large capacity and adapted for heavy duty.

The construction of the buffer of the invention may be understood from consideration of the accompanying drawing, in which

Fig. 1 is a longitudinal sectional view through one form of the new buffer;

Figs. 2 to 6, inclusive, are sectional views on the lines 2-2, 3-3, 4-4, 5-5, and 6-6, respectively, of Fig. 1; and

Fig. 7 is a fragmentary rear end view of the buffer showing a locking means in inoperative position.

The buffer in the form illustrated in the accompanying drawing includes a housing of generally tubular form having one end closed. The housing may be of unitary construction but preferably consists of a base plate 10 and a tubular section 11 secured to the base plate by welding. At its open end, the tubular section of the housing is formed with circumferentially spaced inward projections, which may be conveniently formed by indenting the metal of the section at spaced places, as indicated at 12. The base plate projects outwardly beyond the end of the tubular section and may be of oblong form and provided with openings 13, through which bolts or other means for attaching the buffer to the car structure may be passed.

The buffer includes a main plunger which, in the form illustrated, comprises a length of tubing 14 closed at one end by a head 15 of dished form welded to the end of the tubing. At its open end, the tubing is provided with circumferentially spaced outward projections 16, which may be conveniently formed by expanding the end of the tubing at spaced places by appropriate means. The formation of the projections on the tubing in this manner produces circumferentially spaced recesses in the inner surface of the tubing, each recess being defined at its ends by substantially radial shoulders. The outer diameter of tubing 14 inward from projections 16 is slightly less than the internal diameter of the housing across the inward projections 12 thereon, and the dimensions and spacing of the in-

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ward projections 12 on the housing and the outward projections 16 on the plunger are such that, when the plunger and housing are in proper angular relation, the open end of the plunger may be inserted into the housing, with the plunger projections passing between the housing projections. Thereafter, the plunger may be rotated through a small angle to bring its projections behind those on the housing, after which the engagement of the projections on the housing and plunger limits the movement of the plunger out of the housing.

An inner plunger is mounted loosely within the main plunger and preferably comprises a tube 17 closed at one end by a dished head 18 welded to the tube. The curvature of the inner plunger head is similar to that of the head 15 of the main plunger, so that the head of the inner plunger may seat against the head of the main plunger and make extended contact therewith. The head 18 of the inner plunger is of substantially greater diameter than the tube 17 and, at its inner end, the tube is formed with a section 17a of diminishing outer diameter toward the open end of the tube.

The movement of the main and inner plunger into the housing is resisted by friction means, which may take various forms, but, in the construction disclosed, include a ring 19 loosely encircling the tube 17 of the inner plunger adjacent its tapered end. One face of the ring is flat and the other end is inclined to the axis of the plunger. The inclined face of the ring bears against similarly inclined faces of a group of friction shoes 20, which encircle tube 17 and contact on their inner surfaces with the tapered surface of the tube 17. In the construction illustrated, there are three shoes 20 and, at their ends adjacent the end of tube 17, the shoes have inclined surfaces which bear against a similarly inclined surface on one end of a cylindrical block 21. The block 21 is closed at its opposite end by a plate 22, which has a projection 23 extending outwardly therefrom. The projection is of non-circular outline and, in the construction shown, has corner extensions 23a, so that the overall shape of projection 23 is approximately that of a square. The base plate 10 has a central opening 10a, into which projection 23 on plate 22 may be inserted and, when the projection lies within opening 10a, block 21 is held against rotational movement relative to the base 10.

The block 21 extends into the open end of tubing 14 of the main plunger and has longi-



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tudinal projections 24, which enter the grooves formed by expansion of the end of the tubing to provide the outward projections 16. The lateral edges of the grooves form stops, with which the projections 24 on block 21 may engage, and the interengaging parts prevent relative rotational movement of the main plunger and block, while permitting free longitudinal movement of the plunger. When the projection 23 is seated in opening 10a, the projections 24 on block 21 hold the main plunger with its projections 16 aligned with and behind the inward projections 12 on the housing.

Spring means are disposed within the main plunger and housing to bear at one end against the head 18 of the inner plunger and hold that plunger against the head 15 of the main plunger. At the other end, the spring means bear against ring 19 and maintain the elements of the friction means in contact. The pressure of the spring means against ring 19 is transmitted through the inclined surfaces of the ring and the shoes 23 to hold the shoes in tight contact with the outer surface of tube 17. In the construction disclosed, the spring means take the form of a heavy coil spring 25 and, when force is applied to the buffer to move the plunger into the housing, such movement is limited by means of a collar 26 encircling the tube 14 of the main plunger outside the housing and at such a distance from the end of the housing that the collar strikes the end of the housing and arrests the movement of the main plunger into the housing before the coils of spring 25 make contact with one another.

In the assembly of the buffer, the block 21 is placed within the housing with its projection 23 angularly misaligned with opening 10a through the base plate 10 and bearing against the inner face of the base plate adjacent the opening. The shoes 23 are then placed in contact with the inclined surface of block 21, ring 19 placed on the shoes, and spring 25 is placed upon ring 19. The inner plunger is then inserted through the spring with its tapering end passing through the group of shoes. The main plunger is next oriented to align its outward projections 16 with the spaces between inward projections 12 on the housing and then telescoped over the spring and inner plunger. Force is now applied to the main plunger to move its open end into the housing against the resistance of spring 25. When the main plunger has been moved into the housing until its projections 16 lie inward from the inner ends of projections 12 on the housing, the end of tubing 14 of the main plunger will have telescoped over the end of block 21 and the projections 24 on the block will lie between the stops formed by the sides of the expanded portions of tubing 14, which form projections 16. The main plunger is then turned angularly through a small arc, until the projection 23 slips into the opening 10a. In that relation of the parts, the outward projections 16 on the main plunger lie behind the inward projections 12 on the housing and, when the plunger is released, it will be forced outwardly from the housing by spring 25, until the engagement of projections 12 and 16 prevents further movement. The buffer is now in condition for use and the plunger is free to be moved longitudinally relative to the housing by forces applied to the main plunger head.

Angular movement of the main plunger relative to the housing during use of the buffer is prevented by the interengagement of block 21 of

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the friction means with the stops on the inside of the inner end of the plunger and by the interengagement of projection 23 with the walls of opening 10 on the base plate of the housing. Whenever it is desired to disassemble the buffer, a tool is applied through opening 10a against projection 23 and block 21 is moved inwardly into the housing, until the projection is clear of the opening. With the parts in this condition, the main plunger may be rotated until its projections 16 are in alignment with the spaces between the inward projections 12 on the housing. Thereupon, the main plunger may be withdrawn from the housing by longitudinal movement.

I claim:

1. A buffer comprising a housing open at one end and closed at the other and having circumferentially-spaced inward projections at its open end, a hollow main plunger extending through the open end of the housing, the plunger having a closed outer end and circumferentially-spaced outward projections and circumferentially-spaced internal shoulders within the housing, the plunger projections normally being engageable behind the inward projections of the housing to limit the outward movement of the plunger from the housing when the plunger and housing are in one angular relation, but being movable longitudinally of the housing between the housing projections when the plunger and housing are in a different angular relation, an inner plunger within the main plunger bearing against the closed outer end thereof, friction means within the housing engaging the inner plunger and including a friction member seated against the closed end of the housing and lying partly within the inner end of the main plunger, spring means within the main plunger and housing exerting its force at one end against the closed end of the main plunger and at its other end against a part of the friction means, means on that portion of said friction member which lies within the inner end of the main plunger engageable with the internal shoulders on the main plunger to connect the main plunger and said friction member for rotational movement in unison, while permitting their relative longitudinal movement, and interengaging means on said friction member and housing normally preventing relative rotational movement of the friction member and housing.

2. A buffer comprising a housing open at one end and closed at the other end and having circumferentially-spaced inward projections at its open end, a hollow main plunger extending through the open end of the housing, the plunger having a closed outer end and circumferentially-spaced outward projections and circumferentially-spaced internal shoulders within the housing, the plunger projections normally being engageable behind the inward projections of the housing to limit the outward movement of the plunger from the housing when the plunger and housing are in one angular relation but being movable longitudinally of the housing between the housing projections when the plunger and housing are in a different angular relation, an inner plunger loosely mounted within the main plunger, said inner plunger having its outer end closed by a head which bears against the closed outer end of the main plunger and extends laterally beyond the inner plunger at opposite sides thereof, friction means within the housing engaging the inner plunger and including a friction member seated against the closed end of



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the housing and lying partly within the inner end of the main plunger, spring means within the main plunger and housing bearing at one end against the inner side of the laterally-extending portions of the head which closes the outer end of the inner plunger and at its other end against a part of the friction means, means on that portion of said friction member which lies within the inner end of the main plunger to connect the main plunger and said frictional member for rotational movement in unison, while permitting their relative longitudinal movement, and inter-engaging means on said friction member and housing normally preventing relative rotational movement of the friction member and housing.

3. A buffer comprising a housing open at one end and closed at the other and having circumferentially-spaced inward projections at its open end, a hollow main plunger extending through the open end of the housing, the plunger having a closed outer end and circumferentially-spaced outward projections and circumferentially-spaced internal shoulders within the housing, the plunger projections normally being engageable behind the inward projections of the housing to limit the outward movement of the plunger from the housing when the plunger and housing are in one angular relation, but being movable longitudinally of the housing between the housing projections when the plunger and housing are in a different angular relation, an inner plunger within the main plunger bearing against the closed outer end thereof, friction means within the housing engaging the inner plunger and including a friction member seated against the closed end of the housing, the end of said friction member remote from the closed end of the housing having an inclined face lying at least in part within the inner end of the main plunger, a ring surrounding the inner plunger and having an inclined surface opposite the inclined surface of said friction member, and friction shoes arranged about the inner plunger and interposed

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between said friction member and said ring and having inclined faces bearing respectively against the inclined faces of said friction member and said ring, spring means within the main plunger and housing exerting its force at one end against the closed end of the main plunger and at its other end against said ring, ribs on the outer periphery of said friction member extending in a direction longitudinally of the main plunger and at least in part within the inner end of the main plunger, said ribs being engageable with the internal shoulders on the main plunger to connect the main plunger and said friction member for rotational movement in unison, while permitting their relative longitudinal movement, and inter-engaging means on the friction member and housing normally preventing relative rotational movement of the friction member and housing.

4. A buffer as set forth in claim 1 in which the means on said friction member which connects said friction member and the main plunger for rotational movement in unison are ribs on the outer surface of said friction member which extend in a direction longitudinally of the main plunger.

5. A buffer as set forth in claim 1 having a stop on the main plunger engageable by the open end of the housing to limit the movement of the main plunger into the housing.

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