Dec. 26, 1922. 1,440,320.

W. E. SYMONS.

SHOCK ABSORBING MECHANISM.

FILED DEC. 15, 1921. 2 SHEETS—SHEET 1.

Fig. 1.

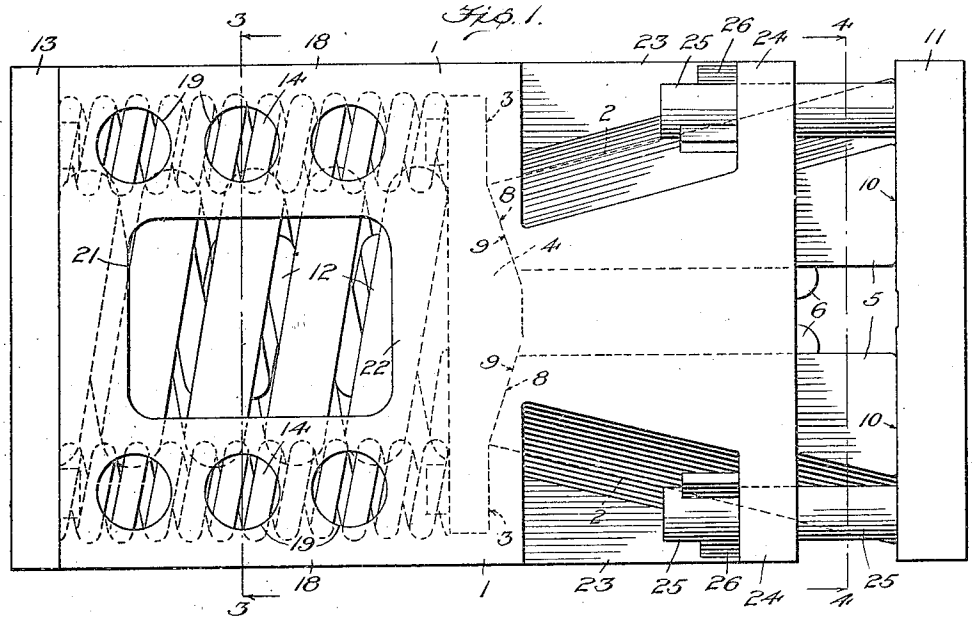
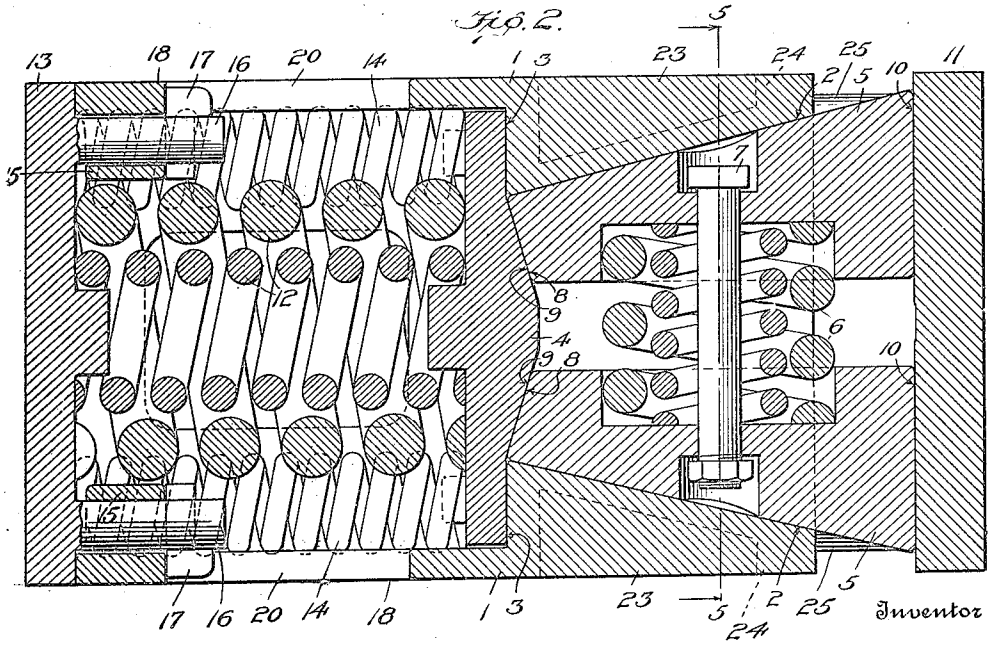


Fig. 2.



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Fig. 3

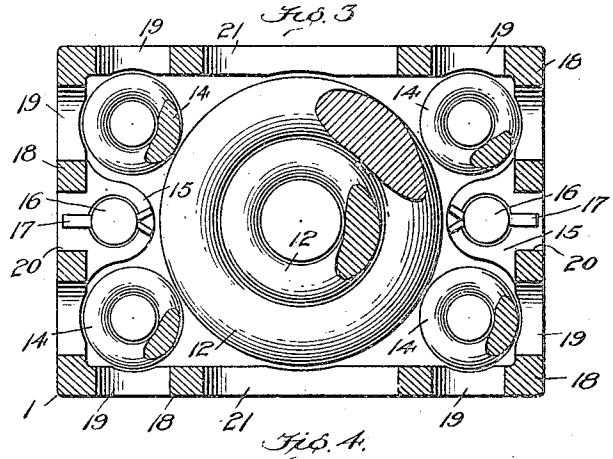


Fig. 4.

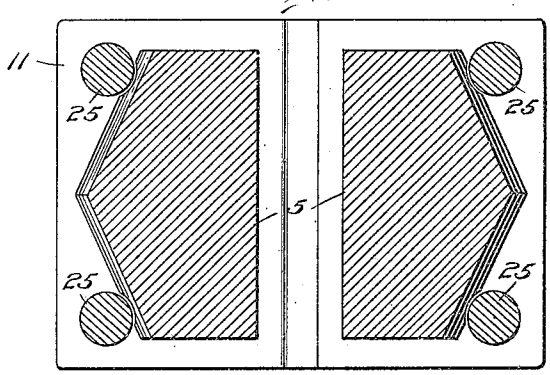
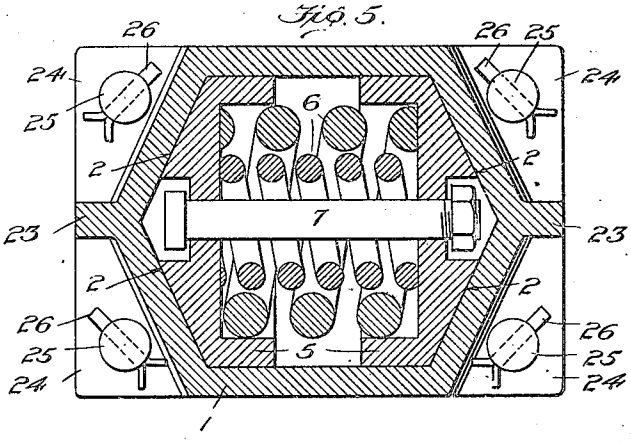


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILSON E. SYMONS, OF NEW YORK, N. Y.

SHOCK-ABSORBING MECHANISM.

Application filed December 15, 1921. Serial No. 522,502.

To all whom it may concern:

Be it known that I, WILSON E. SYMONS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Shock-Absorbing Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to shock absorbing mechanism primarily intended to be employed as the cushioning unit of draft rigging appliances for railway cars and locomotives, and is an improvement upon the apparatus which is the subject of my Patent No. 1,396,896, granted November 15, 1921. The purpose of the present invention is to simplify the construction, reduce the cost, decrease the expense of maintenance and increase the strength and shock absorbing capacity of the mechanism disclosed in my patent referred to.

Generally stated, the principal features of the invention whereby the before noted objects are accomplished are the following: The casing end cap forming a seat for the springs is secured to the casing in such manner that the number and arrangement of springs employed give greatly increased spring capacity and correspondingly augment the frictional resistance of the mechanism; a skeleton form of casing is employed having a plurality of columnar portions supporting each of the stop shoulders formed on the interior of the casing for cooperating with the follower interposed between the slidable friction wedges and the springs within the casing which are compressed by said follower; and the exterior of the casing on opposite sides of the convergent faces with which the slidable wedges contact is provided with webs extending from the stop shoulders of the casing toward the outer ends of said convergent faces, and the follower which engages the outer ends of the wedges is movably connected to the casing by means of a plurality of posts which extend toward said stop shoulders along the exterior of the casing on opposite sides of the said webs.

Other features of my invention enabling the several parts of the shock absorbing mechanism to be coordinated in a manner producing advantageous and improved results will hereinafter appear.

In the drawings illustrating the invention, the scope whereof is pointed out in the claims,—

Figure 1 is a plan view of a shock absorbing mechanism embodying the invention, the parts being in normal position.

Figure 2 is a horizontal central section of the construction shown in Fig. 1.

Figure 3 is a transverse section on the line 3—3, Fig. 1.

Figure 4 is a section on the line 4—4, Fig. 1.

Figure 5 is a section on the line 5—5, Fig. 2.

In the drawings, 1 is a casing which is adapted to receive spring means and friction elements. The casing is open at opposite ends and is formed interiorly on opposite sides with inclined faces 2 which converge inwardly from the outer end of the casing. A plurality of inclined faces 2 is preferably formed on each side of the casing, their disposition being such as to form a wedge shaped channel between them. Adjacent the inner ends of the convergent faces 2 the casing is provided with oppositely disposed stop shoulders 3 forming seats for a follower 4.

Slidably mounted in the casing 1 and conforming to the convergent inclined faces 2 is a pair of friction wedges 5 which bear against the follower 3 and normally project outwardly beyond the neighboring end of the casing. These wedges, which are adapted to have relative movement toward and from each other, bear upon the opposite ends of a transversely disposed spring 6 interposed between said wedges for the purpose of constantly maintaining them in contact with the respectively corresponding inclined faces 2 of the casing. The spring means employed for forcing the wedges apart is, as shown, preferably a double coil spring. A bolt 7 extending through said spring and through suitable apertures in the wedges 5 is preferably employed for limiting the separation of said wedges, such a construction being advantageous in that it facilitates the assembly of the wedges and interposed spring with the other parts of the shock absorbing mechanism. The inner ends 8 of the fric-

tion wedges and the faces 9 of the follower 4 with which the wedges respectively engage, preferably extend obliquely to the direction of travel of said follower 4. The outer ends 10 of the wedges, which engage the outer follower 11, may if desired lie in the same transverse plane.

Seated centrally upon the follower 4 so that its axis is directed between the friction wedges 5, is a double coil major spring 12 whose opposite end bears upon an end cap or cover plate 13 secured to the end of the casing 1 which is remote from the wedges. In addition to the major spring 12 a plurality of minor coil springs 14 are interposed between the follower 4 and the end cap 13 externally of said spring 12, the axes of said springs 14 being in alinement with the stop shoulders 3 on the interior of the casing and the adjacent springs 14 being spaced from each other to permit the intervention of perforated lugs 15 with which the casing 1 is provided on opposite sides adjacent the end cap 13.

The end cap 13 is integrally provided with a plurality of posts 16 which extend through the corresponding apertured lugs 15 and are slotted at their inner ends for the reception of keys 17. These keys which are strong and rugged and which, as shown, preferably have their ends split and bent outwardly so as to retain them in assembled position, bear against the respective lugs 15 and thus restrain outward movement of the end cap 13 with respect to the casing 1.

The portion of the casing 1 which is between the stop shoulders 3 and the end cap 13 is of skeleton form having at each side a plurality of columnar portions 18 extending in the direction of compression of the coil springs 12 and 14 in alinement with the respective stop shoulders 3. Each of these columnar portions is preferably provided with a series of spaced openings 19 adjacent the external springs 14 through which the condition of the latter may be ascertained by inspection, while the lateral openings 20 between the adjacent columnar portions permit the insertion and removal of the keys 17 and also allow the major spring 12 to be viewed. The walls of the casing are also preferably formed with oppositely disposed openings 21 which are spaced rearwardly from the interior stop shoulders 3 of the casing to provide flanges 22 tying said stop shoulders together, and thus enabling the casing efficiently to resist the bursting strains imposed thereon when the friction wedges 5 are forced inwardly.

The exterior of the casing 1 on opposite sides of the convergent inclined faces 2 is preferably provided with longitudinal webs 23 of tapering form which extend from the stop shoulders 3 toward the outer ends of said inclined faces. On opposite sides of these webs 23 the casing is provided with apertured lugs 24 which are respectively adapted to receive posts 25 integrally united to the outer follower 11. These posts are slotted to receive strong keys 26 the inner ends of which are preferably split and bent to retain them in place.

In assembling the mechanism the follower 4 is first placed in position within the casing and the large double coil spring 12 and the smaller coil springs 14 are then properly seated upon said follower. The posts 16 of the end cap 13 are then inserted in the apertured lugs 15 of the casing and the keys 17 are driven into place so as to secure said cap to the casing. It is preferred that the assembly of the end cap 15 with the casing shall cause a slight compression of the springs 12 and 14. The friction wedges 5 and their interposed springs 6 after having been connected by the bolt 7 are brought into assembled relation with the convergent inclined faces 2 of the casing, the posts 25 of the outer follower 11 are passed through the corresponding lugs 24 and the keys 26 are then driven through the slots at the inner ends of said posts, thus completing the assembly of the mechanism. It is preferred that the application of the outer follower 11 shall set the friction wedges 5 in place with moderate pressure sufficient to remove all slack in the mechanism.

The operation of the device will be readily understood from my Patent No. 1,396,896, already mentioned.

It will be seen that my present invention simplifies and reduces the number of parts of the mechanism, makes it easier of assembly, increases its strength and shock absorbing capacity, and reduces its cost.

I claim:—

1. In a shock absorbing mechanism, the combination with a casing which is open at opposite ends and is formed interiorly with inwardly convergent faces and with stop shoulders adjacent the inner ends of said faces, of a plurality of simultaneously and relatively movable wedges slidably engaging said convergent faces and normally projecting outwardly beyond one end of said casing, spring means interposed between said wedges, a follower normally seated upon said stop shoulders and engaging said wedges and adapted to be displaced from said shoulders by said wedges, a major spring seated upon said follower and having its axis extending between said wedges, a plurality of minor springs seated upon said follower, an end cap secured to said casing and upon which said major and minor springs bear, a follower engaging the outer ends of said wedges, and means projecting between adjacent ones of said minor springs for securing said end cap to said casing, said fol-

lower being provided with means for limiting its outward movement with respect to said casing.

2. In a shock absorbing mechanism, the combination with a casing which is open at opposite ends and is formed interiorly with inwardly convergent faces and with stop shoulders adjacent the inner ends of said faces, of a plurality of simultaneously and relatively movable wedges slidably engaging said convergent faces and normally projecting outwardly beyond one end of said casing, a spring interposed between said wedges, a follower normally seated upon said stop shoulders and engaging the inner ends of said wedges, a double coil spring seated upon said follower with its axis directed between said wedges, a plurality of coil springs seated upon said follower with their axes external to said double coil spring, an end cap secured to said casing and upon which the several coil springs bear, said end cap being provided with a plurality of posts and said casing being provided with perforated lugs projecting between adjacent ones of said external springs and respectively adapted to receive said posts, and means engaging said posts for restraining outward movement of said cap with respect to said casing.

3. In a shock absorbing mechanism, the combination with a casing which is open at opposite ends and is formed interiorly with inwardly convergent faces and with stop shoulders adjacent the inner ends of said faces, of a plurality of simultaneously and relatively movable wedges slidably engaging said convergent faces and normally projecting outwardly beyond one end of said casing, spring means interposed between said wedges, a follower normally seated upon said shoulders and engaging the inner ends of said wedges, a centrally disposed coil spring seated upon said follower, a plurality of coil springs seated upon said follower externally of said centrally disposed spring, an end cap secured to said casing and upon which the several coil springs bear, said cap being provided with a plurality of slotted posts, and keys entering the slots in said posts and engaging said casing for restraining outward movement of said cap with respect to said casing, said casing being provided with perforated lugs projecting between adjacent ones of said external springs and adapted to receive said posts, and said casing also being formed with openings communicating with the interior of said casing through which said keys may be associated with said slotted posts.

4. In a shock absorbing mechanism, the combination with a casing which is open at opposite ends and is formed interiorly with inwardly convergent faces and with stop shoulders adjacent the inner ends of said faces, of a plurality of simultaneously and relatively movable wedges slidably engaging said convergent faces and normally projecting outwardly beyond one end of said casing, spring means interposed between said wedges, a follower normally seated upon said shoulders and engaging the inner ends of said wedges, a plurality of springs seated upon said follower, and an end cap secured to said casing and upon which said springs bear, the walls of said casing between said stop shoulders and end cap having openings communicating with the interior of said casing, said openings being spaced rearwardly from said stop shoulders to provide flanges extending between and tying said shoulders together.

5. In a shock absorbing mechanism, the combination with a casing which is open at opposite ends and is formed interiorly with inwardly convergent faces and with stop shoulders adjacent the inner ends of said faces, of a plurality of simultaneously and relatively movable wedges slidably engaging said convergent faces and normally projecting outwardly beyond one end of said casing, spring means interposed between said wedges, a follower normally seated upon said shoulders and engaging the inner ends of said wedges, a plurality of springs seated upon said follower, and an end cap secured to said casing and upon which said springs bear, said casing between said stop shoulders and end cap being of skeleton form and provided with columnar portions extending in the direction of compression of said coil springs, each of said stop shoulders being supported by a plurality of said columnar portions.

6. In a shock absorbing mechanism, the combination, with a casing which is open at opposite ends and is formed interiorly with inwardly convergent faces and with stop shoulders adjacent the inner ends of said faces, of a plurality of simultaneously and relatively movable wedges slidably engaging said convergent faces and normally projecting outwardly beyond one end of said casing, spring means interposed between said wedges, a follower normally seated upon said shoulders and engaging the inner ends of said wedges, a double coil spring seated upon said follower with its axis directed between said wedges, a plurality of coil springs seated on said follower externally of said double coil spring, and an end cap secured to said casing and upon which said several coil springs bear, said casing between said stop shoulders and end cap being of skeleton form and provided with columnar portions having openings adjacent said external springs communicating with the interior of said casing, each of said stop shoulders being supported by a plurality of said columnar portions.

7. In a shock absorbing mechanism, the combination with a casing which is open at

opposite ends and is formed interiorly with inwardly convergent faces and with stop shoulders adjacent the inner ends of said faces, of a plurality of simultaneously and relatively movable wedges slidably engaging said convergent faces and normally projecting outwardly beyond one end of said casing, spring means interposed between said wedges, a follower normally seated upon said stop shoulders and engaging said wedges, a plurality of springs seated upon said follower, an end cap secured to said casing and upon which said springs bear, and a follower engaging the outer ends of said wedges, the exterior of said casing on opposite sides of said convergent faces being provided with longitudinal webs extending from said stop shoulders toward the outer ends of said faces and also being provided with a plurality of apertured lugs lying on opposite sides of said webs, and said last named follower being provided with a plurality of posts corresponding to said apertured lugs and extending therethrough.

8. In a shock absorbing mechanism, the combination with a casing which is open at opposite ends and is formed interiorly with inwardly convergent faces and with stop shoulders adjacent the inner ends of said faces, of a plurality of simultaneously and relatively movable wedges slidably engaging said convergent faces and normally projecting outwardly beyond one end of said casing, spring means interposed between said wedges, a follower normally seated upon said shoulders and engaging said wedges, a plurality of springs seated upon said follower, an end cap secured to said casing and forming a seat for said springs, and a follower engaging the outer ends of said wedges and movably connected to said casing, said casing being provided with a plurality of apertured lugs, and said last named follower being provided with a plurality of posts respectively projecting through said lugs and extending toward said stop shoulders along the exterior of said casing.

In testimony whereof I affix my signature.

WILSON E. SYMONS.