June 14, 1938. J. E. PURWEET 2,120,528

SPRING ASSEMBLY

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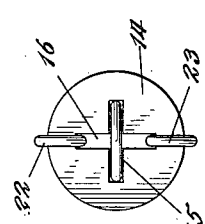


Fig. 3.

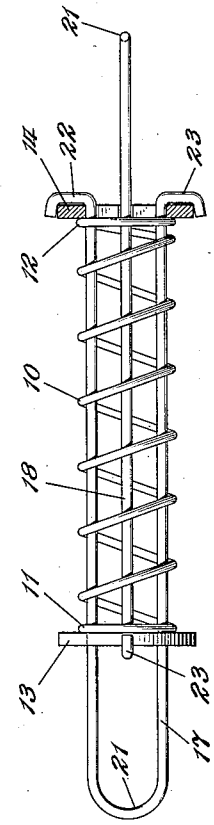


Fig. 1.

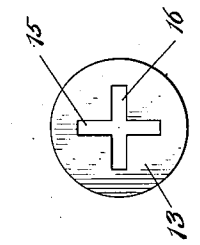


Fig. 2.

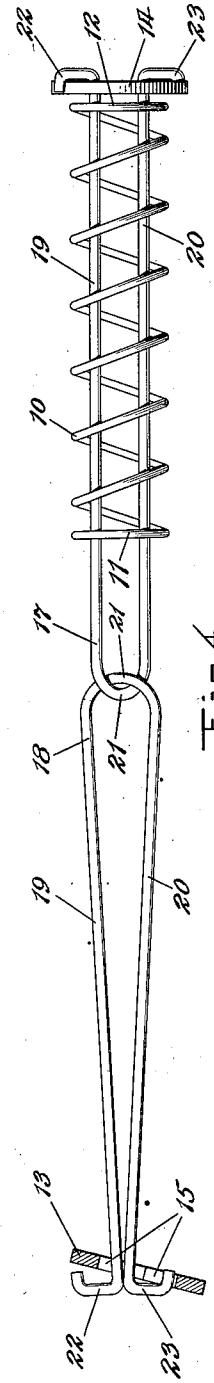


Fig. 4.

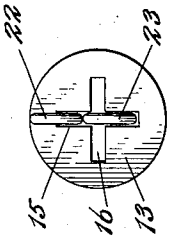


Fig. 5.

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SPRING ASSEMBLY

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3 Claims. (Cl. 267—72)

This invention relates to a spring assembly of the type sometimes called a draft spring and in which a coiled compression spring is located between two abutment washers or discs with U-shaped tension members connected to each disc and extending axially through the spring in relatively reversed direction so that oppositely direct pulls on the tension members will place the interposed spring under compression.

Some forms of spring assemblies as heretofore constructed are expensive to manufacture, among other reasons due to the fact that machine work has to be performed after the component parts have been assembled at least to the extent of binding the tension members to clinch them to the abutment disks and where the tension members are slidably mounted in the abutment disks the relatively movable parts must be machined to fit. Further it is usual to secure the free ends of the tension members permanently one to each of the abutment discs, thus rendering it impossible to replace the spring therebetween should it become damaged or lose its resiliency.

Accordingly, the primary object of the invention is to provide a simplified form of draft spring assembly which will permit the preforming of the component parts as complete articles and which separately formed parts can be fabricated into the desired assembly even by unskilled labor and without necessity of using any tools whatsoever.

Springs of this character are very apt to be subjected when in use to distorting strains with the result that jarring actions and the like thereon are quite apt to disarrange the parts from their initially set relative position. A common complaint against known forms of such spring assemblies is that the tension members which following approved practices are originally set in planes at right angles to each other, tend to rotate relative to each other about the axis of the spring thus tending to disarrange the desired uniform distribution of pressure on the abutment discs and thus on the spring ends. Accordingly, the present disclosure features not only a structure which can be easily fabricated but also a construction which acts to maintain the tension members in their originally prelocated position restrained from the undesired axial rotation. This feature of the invention is attained by forming a pair of intersecting slots in the abutment disks in the form of a Maltese cross and locating the four sides of the two U-shaped tension members in the slots, one side located in each arm of the slots, the portion of material between the arms of the slots acting as stops or spacing means resisting any tendency of the arms to shift rotationally either with reference to each other or with reference to the abutment disks.

Still another object of the invention featuring ease in assembling the component parts is to form the tension members simply as U-shaped bent wires and provide in the proportion of the tension members and associated compression spring a disposition of parts such that the crotch end of the U-shaped tension members forms a smooth end which can be readily threaded axially through the bore of the compression spring without possibility of loose ends catching in the turns of the spring and which tension members when in position will coact with a fairly close fit within the spring to form a fairly rigid internal guide therefore and thus resist lateral distortion of the spring while permitting a freedom of axial compression movement.

Various other objects and advantages of the invention will be in part obvious from an inspection of the accompanying drawing and in part will be more fully set forth in the following particular description of one form of draft spring embodying the invention, and the invention also consists in certain new and novel features of construction and combination of parts hereinafter set forth and claimed.

In the accompanying drawing:

Figure 1 is a view of a draft spring assembly constituting a preferred embodiment of the invention and with the right hand abutment disc shown in vertical section;

Figure 2 is a plan view of one of the abutment discs separated from the assembly;

Figure 3 is a view in end elevation looking at the right hand end of Figure 1, but it is understood that if Figure 3 was rotated 90° it would similarly illustrate the left hand abutment disc;

Figure 4 is a showing of the draft spring of Figure 1, illustrating a step in its construction at the point where the left hand disc is being threaded on to the assembly and before the tension members have been intercollapsed into the position shown in Figure 1; and

Figure 5 is an end view looking at the left hand end of Figure 4.

In the drawing there is shown a coiled compression spring 10 of conventional cylindrical form and having its opposite ends 11 and 12 flat to form abutting ends. It is a feature of this disclosure that the spring is not secured to any part and may be replaced in the assembly readily by another spring of the same or different dimen-

sion. The flat ends 11 and 12 are engaged respectively by abutment discs 13 and 14 of identical construction so that the detailed description of one will be sufficient for the other. Each disc is of a flat washer or coin-like form and is provided centrally thereof with two narrow intersecting slots 15 and 16 centered in the disc and arranged in Maltese cross form. Preferably each disc has a diameter slightly greater than the external diameter of the spring 10 to provide a broad bearing engagement between itself and the spring turn engaging the same, and is centered relative to the axis of the spring by two spring compressing tension members 17 and 18.

These compression members are of identical form so that here again the detailed description of one will be sufficient for the other. Each tension member is simply a length of stiff springy wire bent back upon itself at its midlength to form two parallel long straight rod-like sides 19 and 20 connected by a U-forming crotch 21 which has no greater width than the width of the portion of the member formed by the parallel sides 19 and 20 and thus no greater width than the internal diameter of the spring 10. The free ends of each of the sides 19 and 20 is bent outwardly at right angles to form disc face engaging abutments 21 and 22 and then bent at its extreme end back upon itself to form stops which lap the outer edge of the associated disc. The hooks thus formed are disposed in relatively outwardly projecting position in the plane of the associated sides and crotch to facilitate the threading of the disc on to the hook end as shown at the left end of Figure 4. The slots 15 and 16 are so proportioned that their length is equal to the width of the tension members measured between the parallel sides so that the parallel sides in their normal tendency to spread apart engage in the opposite ends of the slot as illustrated in Figure 3. The hooked ends 21 and 22 are so proportioned that their aggregate length when the free ends of the tension members are pressed together in contact with each other as indicated at the left of Figure 4 will just permit the ends to be passed through their associate slots. The extreme ends of the hooks are so proportioned and located that they overlap the outer periphery of the disc as shown at the right hand side of Figure 1 and thus form a pocket into which the discs fit more or less snugly.

In assembling the parts it will be noted as by reference to Figure 4 that the right hand disc 14 is simply slid on the, at that time free, smooth surfaced crotch end of the member 17 and moved along the sides 19 and 20 until it engages the hook ends. The spring 10 is then slid on the member 17, the smooth crotch end assisting in threading the tension member into the spring. The member 18 is then hooked through the opening at the left end of member 17 so that the crotch end of one extends through the crotch end of the other leaving the entire length of member 18 exposed for manual gripping in the succeeding step of threading the left disc on to the assembly. The free ends of the member 18 are then pitched together and disc 13 threaded thereon. This is attained by looping the upper end of disc 13 over the upper hook 21, lowering the disc to engage the side 19 which action lowers the slot 15 sufficient to permit the lower hook 22 to pass therethrough after which the sides 19 and 20 are permitted to spring apart thus locating the sides 19 and 20 at opposite ends of the slot 15. The members 17 or 18 are then telescoped axially one into the other, the crotch end of the member 18 being passed through slot 16 of disc 14 and the crotch end of member 17 being passed through the slot 15 of disc 13 to complete the assembly as shown in Figure 1.

In operation it is understood that outwardly directed axial pull on the crotches 21 of the two tension members will cause the discs 13 and 14 to tend to approach each other and thus place the interposed spring 10 under compression as is usual with such forms of draft springs.

Should it be desired to dismantle the parts in order to replace the spring, the operation is simply reversed. By pulling the hooked ends of the members relatively away from each other the tension members are restored to the position shown in Figure 4, and the parts are simply separated from each other.

By means of a device of this character, it is possible to quickly assemble the components parts solely by manual operation and without the necessity of the usual practice of welding or bending the parts into position. The hooked ends offer no difficulty either in assembling or dismantling the parts for it is the smooth crotch ends which are used to receive the spring and left disc. The Maltese cross arrangement of slots is of particular importance in that it maintains the members 17 and 18 in their prefixed relation in planes at right angles to each other and thus free of relative rotationed movement. Further the structure forms a skeleton frame of two pairs of rod-like sides which are held fixed in equidistantly spaced circumferential relation to form a rugged internal guide which tends to maintain the spring in its preformed cylindrical form. In general there is obtained a particularly rugged compact assembly which tends to resist displacement of the parts under vibratory or other conditions which would otherwise tend to disarrange the parts while in use.

The present disclosure particularly features a construction in which all of the component parts may be manufactured as stock parts with a few standard sizes and from which a large number of different size assemblies may be formed at will simply by selecting the desired length of spring and tension members to meet the peculiarities of any one situation and it is obviously within the scope of the disclosure to utilize more than one spring in place of the single spring 20 with separating washers therebetween and by a judicious selection of springs of different tensions and strengths variable compressive resistances may be obtained and variable resistances at different stages of the compressive action.

I claim:

1. A spring assembly comprising two similar completely preformed wire tension members fixedly disposed in planes extending at right angles to each other, each tension member being of U-form having parallel sides connected at a crotch end, with the free ends bent relatively outward from each other to form a pair of disc-face engaging abutments and their extreme ends bent back at right angles to the face engaging abutments to form disc-edge-lapping stops, a coiled compression spring of less length than the tension members, having the inner sides of its turns engaging and guided by the four parallel sides of the tension members, a pair of spring abutment discs at opposite ends of the spring, each disc provided with a pair of narrow, intersecting slots extending at right angles to each other in the form of a Maltese cross and each slot con-

taining at its outer end one of the four sides of the two tension members in spring pressed engagement with the disc at said outer end, whereby each side is held from outward movement at two points along its length, the inner faces of the discs being engaged by opposite ends of the spring in the region thereof external to the slots, the outer face of each disc engaging its associated abutment and diametrically opposite points of its peripheral edge engaged by the stops at the adjacent ends of the tension member whereby each disc is held to its seat provided by the abutment and stops by the spring, the crotch end of each tension member having a width less than the length of the slot which parallels it in the adjacent disc whereby in assembling and in demounting the spring assembly the crotch end of each tension member may be withdrawn through the disc which is adjacent thereto thus releasing the same from the spring and each slot having a length greater than the width of the bent end of each tension member plus the diameter of the wire forming the tension member whereby each disc may be either hooked on to or unhooked from the disc adjacent its free end when free of the spring without necessity of bending or otherwise modifying the preformed forms of the tension members.

2. A spring assembly comprising five preformed elements adapted to be assembled and demounted manually without changing the preformed configuration of the elements, said elements comprising two similar completely preformed wire tension members, each being of U-form having substantially parallel and spaced apart sides connected at a crotch end with the free ends bent relatively outward from each other, a coiled compression spring encircling the midportion of the tension members, a pair of spring abutment discs at opposite ends of the spring, each disc provided with a pair of long narrow intersecting slots, each slot containing at its outer end one of the four sides of the two tension members in spring pressed engagement with the disc at said outer end and said slots acting to maintain the sides of the tension members in circumferentially spaced apart relation, the inner faces of the discs being engaged by opposite ends of the spring, the crotch end of each tension member having a width less than the length of the slots to permit the crotch end of either tension member to pass freely therethrough and each slot having a length to permit the passing therethrough of the free ends of either tension member.

3. A spring assembly comprising five preformed elements, said elements consisting of a compression spring, a pair of U-shaped tension members having substantially parallel sides engaging the inner turns of the spring to form a core for the same and having outturned ends, a pair of discs at opposite ends of the spring and through which the adjacent parts of the tension members are passed and said spring acting through the discs to maintain the same in engagement with the outturned ends, and said discs and tension members provided with coacting means for securing the sides of the tension members in their circumferentially spaced apart relation engaging the spring.

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