July 12, 1927. 1,635,929

E. C. DEAN

UNIVERSAL FLEXIBLE SHAFT

Original Filed April 8, 1925

Fig. 1.

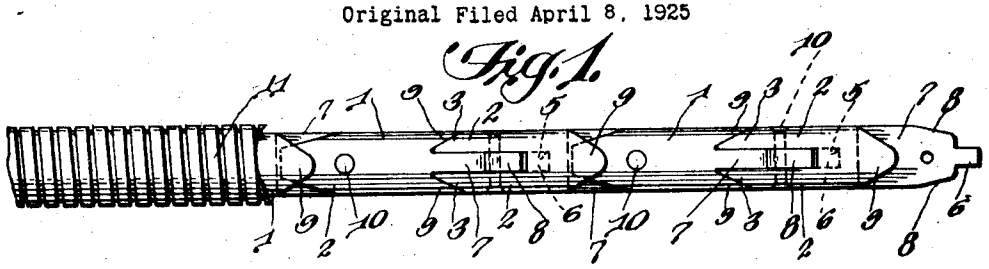


Fig. 2.

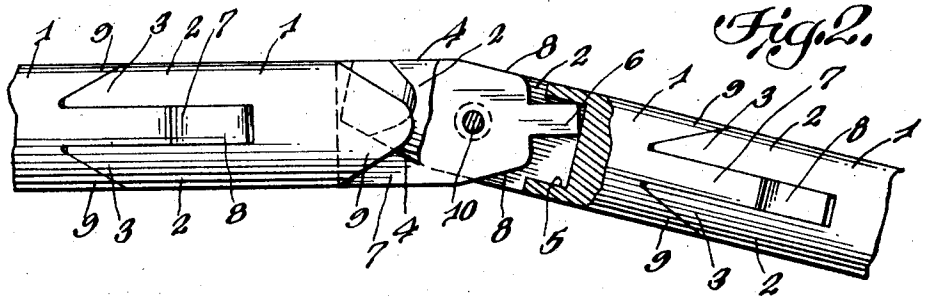


Fig. 3.

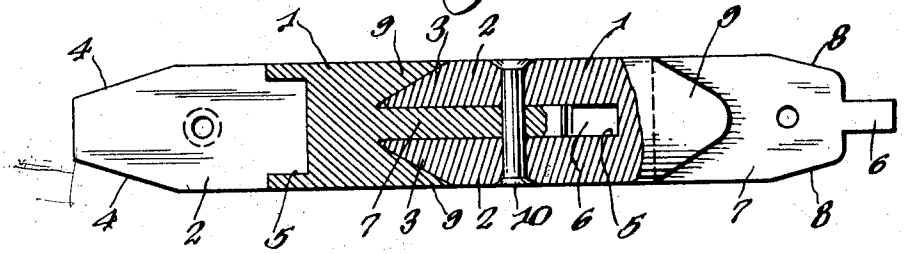
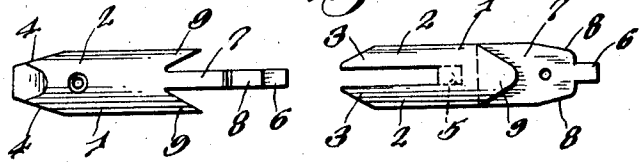


Fig. 4.



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UNITED STATES PATENT OFFICE.

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UNIVERSAL FLEXIBLE SHAFT.

Application filed April 8, 1925, Serial No. 21,622. Renewed June 3, 1927.

This invention relates to new and useful improvements in flexible shafts. The main object of my invention is the provision of a flexible shaft which is formed of a plurality of pivotally connected sections so disposed relative to each other as to limit the pivotal movement of said sections in one direction and prevent lateral movement of the sections in a direction at right angles to the pivotal connection.

Another object of my invention is the provision of a flexible shaft formed of a plurality of pivotally connected sections wherein all of the sections are identical in construction so as to lessen the cost of manufacture of a device of this character and whereby to reduce the cost of replacing broken sections.

With the above and other objects in view my invention consists in the novel features of construction and arrangement and combination of parts to be hereinafter more fully described, pointed out in the accompanying drawings and shown in the claims, in which:

Fig. 1 is a side elevation of the flexible shaft constructed in accordance with my invention.

Fig. 2 is a similar view enlarged and parts broken away and illustrated in cross section.

Fig. 3 is a detailed longitudinal section taken at right angles to the view in Fig. 2.

Fig. 4 is an elevation of two adjacent parts disconnected.

Referring more particularly to the drawings, the numeral 1 indicates the body of the section and formed at one end of the body are the spaced ears 2, the outer ends of which are tapered as shown at 3. The tapering ends 3 extend longitudinally relative to the body and the sides of the tapering portions are cut in an angle as shown at 4. The shoulder between spaced ears 2 is formed with the recesses 5 to receive the reduced ends 6 on the outer end of a tongue 7 on the adjacent section as shown at Fig. 2.

The tongues 7 are formed upon the opposite end of the body 1 from the tongues 2 and have their longitudinal edges tapered as shown at 8 and arranged upon opposite sides of the tongue 7 at its inner end are the tapered ears 9 which cooperate with the tapered ends 3 of the tongues 2 upon an adjacent section to permit pivotal movement of the two sections upon the pivot pin 10. The pivot pin 10 extends transversely through the tongues 2 and 7 for pivotally connecting the section.

It will be noted in Fig. 2 that the reduced end portions 6 move in recesses 5 and limit the pivotal movement of the sections in one direction. At this point I wish to call attention to the fact that the tongues 7 upon one end of the body 1 are disposed at right angles to the tongues 2 upon the other end of the body, thus when various adjacent sections are connected as shown at Figure 1, the adjacent sections may be movable at right angles relative to each other so as to provide the universal movement of the shaft.

Attention is directed to the fact that by having the tapering portions 8 on the tongues 7 and the tapering portions 4 on the outer ends of the tongues 2 these tapering portions will be disposed flush with the outer periphery of the body 1 when moved the limit of its pivotal movement as shown in Figure 2 so as to not apply any unnecessary strain on the housing 11 which encloses the shaft.

It will be apparent from the foregoing that the shaft constructed in accordance with the above will have incorporated therein means whereby the shaft may be moved at various angles due to the fact that the pivotal movement of the sections are such that each end of any individual section will have its pivotal movement at right angles to the opposite section, thus providing for substantially individual movement thruout the length of the shaft. The device is extremely simple in construction and due to the fact that all of the sections are identical in construction, the cost of a shaft of the present nature is considerably reduced.

While I have shown and described the preferred form of my invention it will be obvious that various changes in the details of construction and the proportions may be resorted to for successfully carrying my invention into practice without sacrificing any of the novel features or departing from the scope of the appended claims.

Having thus described my invention what I claim is:—

1. A flexible shaft including a plurality of pivotally connected sections, each section including a body having spaced ears at one end and a recess between the ears, a centrally disposed tongue at the other end of the body having reduced outer ends and a tapered ear upon each side of said tongue.

2. A flexible shaft including a plurality of pivotally connected sections, each section including a body, spaced ears at one end of the body having opposite outer ends, a recess in the body between said ears, a centrally disposed tongue at the other end of the body arranged at right angles to the plane of the ears said tongue having reduced outer end adapted to be disposed in the recess of the adjacent section and tapered ears disposed upon opposite sides of the tongue and cooperating with the tapered ends of the ears on an adjacent section.

In testimony whereof I affix my signature.

ELMER C. DEAN.