Oct. 13, 1925. 1,557,099

W. H. SCHULZE

SHAFT AND DETACHABLE GEAR

Filed Nov. 21, 1924

Fig 1

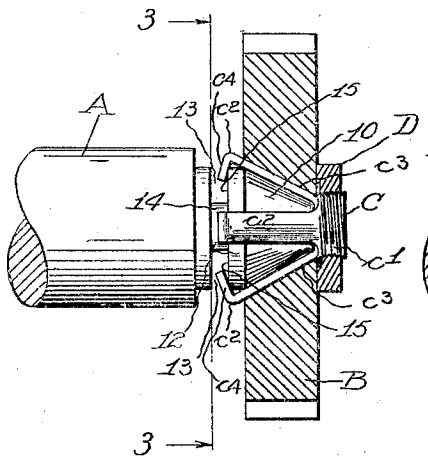


Fig 2.

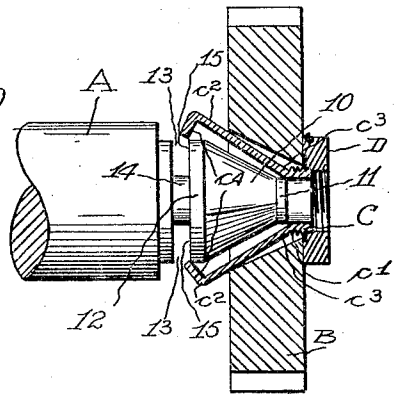


Fig 7

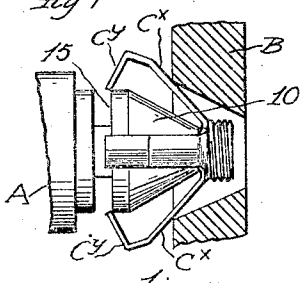


Fig 5

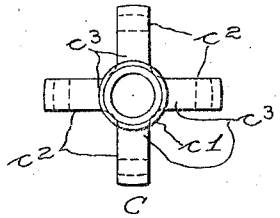


Fig 3

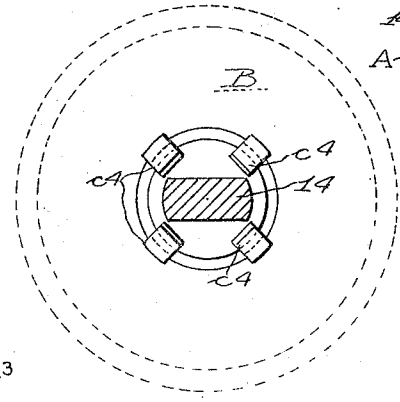


Fig 6

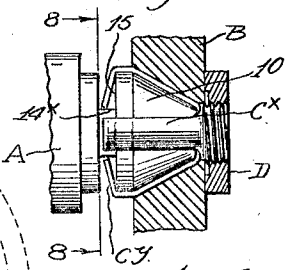


Fig 4

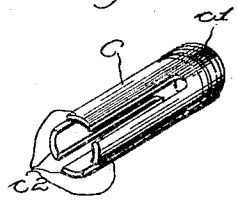
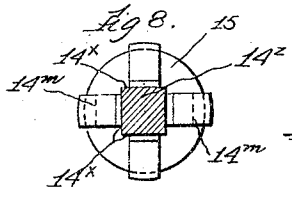


Fig 8.



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William H. Schulze.
by Burton & Burton
his Attorneys.

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UNITED STATES PATENT OFFICE.

WILLIAM H. SCHULZE, OF CHICAGO, ILLINOIS, ASSIGNOR TO STEWART-WARNER SPEEDOMETER CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF VIRGINIA.

SHAFT AND DETACHABLE GEAR.

Application filed November 21, 1924. Serial No. 751,300.

To all whom it may concern:

Be it known that I, WILLIAM H. SCHULZE, a citizen of the United States, residing in the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Shafts and Detachable Gears, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved construction of a shaft and detachable gear with means for attaching the shaft to the gear, adapted to facilitate disengagement of the gear for replacement or for substituting a different gear. It consists in the elements and features of construction shown and described, as indicated in the claims.

In the drawings:

Figure 1 is a section axial with respect to the shaft, of a shaft and detachable gear embodying this invention in one of its forms, the gear being shown in secured position on the shaft.

Figure 2 is a view similar to Figure 1 showing the gear in the process of applying and making it fast on the shaft.

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

Figure 4 is a perspective view of the securing device at one stage of its construction, that is, showing a sleeve or cylindrical blank from which the securing device is formed.

Figure 5 is a front end elevation of the securing device in its completed form ready to be applied.

Figures 6, 7 and 8 are views corresponding to Figures 1, 2 and 3, respectively, showing a slight modification from the form shown in the preceding figures.

In the construction shown in the drawings the shaft, A, has a gear-centering terminal comprising a mechanically tapered part, 10, a cylindrical end portion, 11, corresponding in diameter to the least diameter of said tapering part and the cylindrical part, 12, back of the tapering part and having a diameter equal to the greatest diameter of said tapering or conical part, 10. Back of the terminal portion of the shaft it has two opposite parallel cross slots or grooves, 13, 13, reducing the shaft in cross section to a neck portion, 14, and forming rearwardly facing shoulders, 15, the neck being cut away at its opposite ends to the extent of the full width of the neck so that there is formed a continuous annular shoulder merging the two shoulders, 15, 15, which would otherwise be separated by the neck.

The gear, B, has an axial aperture of conical or tapering form extending from side to side, the taper agreeing as to angle with that of the tapered portion, 10, of the shaft, but the diameter being somewhat greater. The attaching device consists of a member which in the course of its preparation is a sleeve, as seen in Fig. 4, made of spring steel externally threaded at one end, as seen at c^1, hereinafter referred to as the hub. This sleeve is longitudinally slotted from the opposite end to the hub to form a plurality of fingers, c^2, each comprising a sector of the original cylindrical sleeve and each of these sector fingers is bent outwardly from the axis of the sleeve at c^3, so as to extend normally at a considerable angle somewhat greater than the angle of slope of the tapered part, 10, of the shaft and of the central aperture of the gear; and the terminal portion of each of the fingers, c^2, is bent at substantially right angles to form a hook end, c^4, for engaging the shoulder, 15, of the shaft. This attaching member, C, is dimensioned in diameter and length and the spread of its spring fingers so that being introduced onto the shaft terminal and pressed back, the spring fingers will snap their hook ends into engagement with the shoulder, 15; and the gear being then introduced over the attaching member as seen in Fig. 2, the threaded hub, c^1, will protrude from the forward face of the gear sufficiently for engagement with it of a nut, D, which is suitably diametered to lap the margin of the gear aperture at the face; and the nut being screwed home into the hub crowds the gear back against the diverging spring fingers, c^2, until said fingers are forced into contact with the tapered portion, 10, of the shaft, and the nut being further tightened, these fingers are clamped between the tapered portion of the shaft and the wall of the tapered bore of the gear, and thereby the gear is accurately centered on the shaft and made rigid therewith against relative displacement either axially or rotatively.

In the form shown in Figures 6, 7 and 8, the clasping prongs, C^x, have their hook ends, C^y, of such length that when the prongs are clamped between the gear and the tapered seat, 10, the ends of the hooks are seated squarely on the other key seats, 14^x, which result from cutting down the shaft by the cross slots to form the shoulder, 15. In this form, if it is desired to retain all four prongs, the shaft will be cross slotted to reduce it to a square neck, 14^z, as seen in Figure 8, providing four key seats, 14^x, as shown, and the four prongs will seat at said four key seats respectively. But if preferred, to avoid reducing the shaft on all four sides, the form may be as seen in Figure 3, and in that case either two of the prongs may be omitted or their hook ends may be shortened as indicated by dotted lines, 14^m, on Figure 8.

I claim:—

1. In combination, a shaft, a detachable gear and an attaching device, the shaft having a tapered gear centering terminal seat for the gear and having back of said terminal a rearwardly facing shoulder, the gear having a conical central aperture whose taper corresponds to the tapered centering terminal of the shaft, the securing device comprising a plural pronged spring clip being adapted to be snapped over the tapered terminal of the shaft and engaged by the hooked ends of its prongs behind said rearwardly facing shoulder, said clip having a threaded hub and a nut adapted to engage the threaded hub and seat against the outer face of the gear for crowding the gear onto the tapered seat and clamping the prongs between said seat and the gear.

2. In the construction defined in claim 1, foregoing, the shaft having back of the rearwardly-facing shoulder, a non-circular part providing key seats, and the prongs having their hook ends of suitable length for engaging said key seats at the position at which the prongs are clamped between the tapered seat and the gear.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 19 day of November, 1924.

WILLIAM H. SCHULZE.