Beginner's Workshop

Testing and fitting SPRINGS

Following his general article on springs, GEOMETER gives some workshop hints

WHEN SPRINGS are standardised and made to a specification, the user is often supplied with basic data to test when deterioration occurs-because springs which are weakened or shortened cannot function as designed.

In the case of coil springs; A, the free length " X " is given in inches and fractions, and the compressed length "Y " when the spring is supporting the specified load in pounds. Both lengths can be measured with a rule or calipers, the compressed length being taken when the spring is weighted as shown. Alternatively, the weight can be suspended from below, as it would be in the case of an extension or tension spring.

Testing compression springs

To test coil compression springs, A, by suspending a weight from below, a hole should be provided in a piece of board or metal bar; this is held in the vice, a free-sliding rod with a hook at the bottom and a thread for a nut at the top pushed through the hole, the spring threaded on, a plate placed on top, finally the nut is fitted. Weights are then hung on the rod.

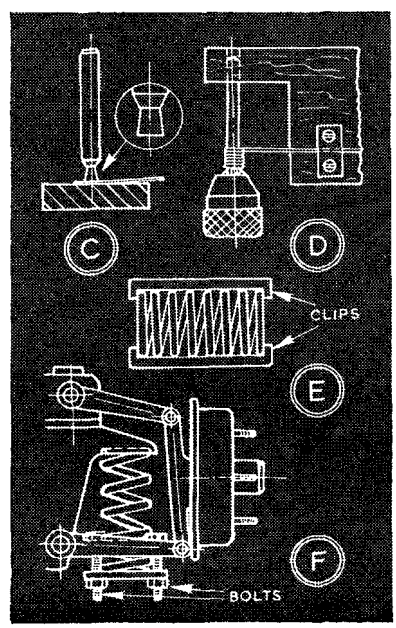
A common method of testing a set of used springs is to employ a new standard spring, compressing each one of the set with this and comparing the lengths. A long threaded rod can be used, with a nut and washer each end and a centre washer between the springs. The nuts are screwed up until the new spring is at specified length; when an old spring is in good condition the length will be the same, but a weak spring will be shorter.

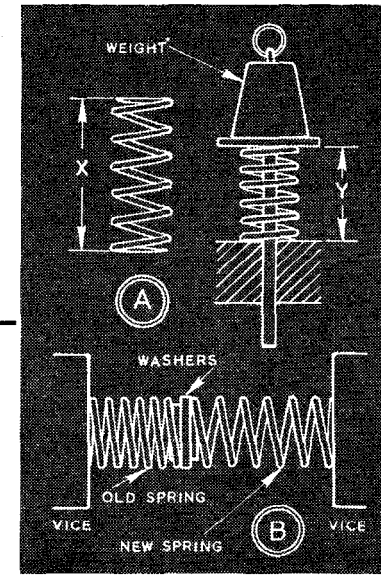
Generally, it is quicker to use the vice for this test (B) locating the springs together on three washers held with a short bolt or screw and nut. The centre washer should be large enough for the springs to bear against, and on each side there should be one small enough to fit in the coil of the spring and act as a spigot. Springs which are weak or short must be discarded.

Small springs for experimental work can often be made by using pieces of old clock spring for leaf springs and spring wire for coil springs.

Utilising pieces of clock spring calls for holes in the ends and, as these cannot be drilled successfully, they have to be punched as at C. The type of punch shown is turned, hardened and tempered from silver steel rod, having a reverse taper and a flat end the diameter of the required holes. The piece of spring is laid on a block of lead and the punch driven through.

To wind small coil springs, a rod can be used in the hand drill, with the end of the wire gripped by a chuck





jaw. A simple arrangement, D, is with the rod in a hole in the cut-away end of a board (held in the vice), with a simple clamp fixed by two screws putting tension on the wire. As the spring opens after winding, allowance must be made by using a rod of appropriate diameter-after a few experiments. Closely-wound coils can be opened, carefully pulling the ends of the spring.

Using a lathe, springs can be wound on a rod in the chuck. Feed for the wire is through a tension clamp on the sliderest, which is driven by the leading screw at a rate to provide suitable spacing (pitch) for the coils.

Fitting and releasing springs

To overcome resistance of springs, means of compressing are often necessary, and for valve springs there are various types of compressors. On occasion (motorcycle crankshaft drives), heavy springs can be pre-compressed in the vice, placing blocks each end, so clips can be fitted, E. The compressed length o the spring is measured for clips to be made from rectangular bar,
the ends in the vice; they are levered off when the spring is in place.

To fit a heavy clock-type spring (gramophone motor), the outer end is clipped into the casing, then the spring wound and pressed into the casing by hand, working towards the centre, until this can be forced in.

Heavy springs of car suspensions are released and fitted with a pair of long bolts in opposite sides of the bottom plate, F; two of the holding bolts having been taken out for these to be fitted. ❑