Geometer, this week, turns to tensioning and constructing . . . . . .

Chains and sprockets

RESEMBLING single roller chains in main features, double and triple roller types-sometimes "duplex" and "triplex" chains-meet design needs for greater strength and larger bearing surfaces.

At the same time such chains maintain compact drives for the alternative solution, a single roller chain of larger size would involve a longer pitch between the rollers and, consequently, larger sprockets if carrying the same number of teeth. As it is, a double roller chain, A, or a triple roller type, merely needs increased width in which to run.

The alternative to double or triple roller chains for neat compact drives is the " silent " or inverted-tooth chain, ***B,*** which runs on " sprockets " that are virtually gears, C. Such chains are built up in any width required from numbers of plates 1/16 in.-3/32 in. thick, with holes at the required pitch and carrying a pair of teeth on the underside. The plates are assembled on pins, free to pivot, and side plates are pressed on the outside.

Chains of this type were once fairly common for car-engine camshaft and auxiliary drives-as on Packard in recent years and were employed in a few instances for primary drives for motorcycles.

Very strong, a silent chain can nevertheless acquire considerable slackness from the wear of the pins and holes in the plates. On a roller chain pull and wear are always one way across the full length of the pins. On a silent chain the plates pull on opposite sides of the pins, which become nicked or grooved. Thus width for width, a silent chain has about half the wear resistance of a roller chain.

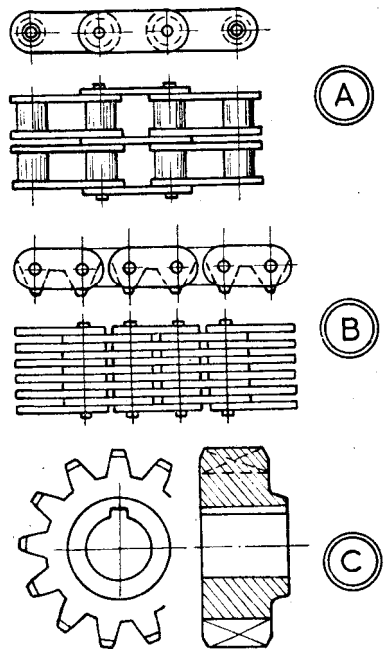
Slackness in chain

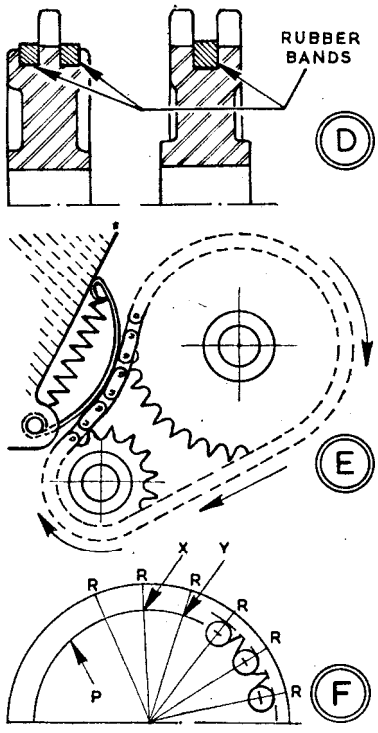
It is, however, perhaps the only chain of transmission type reasonably easy to construct by model makers in true-to-full-size manner. Having drilled, filed and hardened a pair of " master " toothed plates in silver steel about 1/8in. thick, the chain plates could be drilled, placed on pins between the plates and filed several at a time. Casehardened, they could then be assembled with side plates on hardened pins, lightly riveted.

On single and double roller chains employed for camshaft drives, tensioners at the present time consist of rubber bands, ***D,*** sprung into grooves in the camshaft sprockets. The single roller chain requires two bands, one each side of the sprocket teeth, but for the double roller chain a single band is used between the teeth. Deterioration or indentation of these bands permits slackness in the chain-which may be heard as rattle. On occasion, after years of use and hardening, bands disintegrate.

Sprockets from flat plate

A tensioner for either a roller or silent chain may consist of a blade of spring steel, curved and pulled into the slack side of the chain by a tension spring, ***E,*** and a variation of this type, similarly applied, has a hardened slipper on the end of a spring-loaded plunger. Roller chains may also be tensioned with jockey pulleys, fixed or spring-loaded, on the slack sides.





When required, small sprockets for single roller chains can be made from flat plate, the width of the chain, but ensure the plate is about 1/4 in. larger than the finished sprocket.

On a lathe having a dividing head (or using a change wheel and indexing plunger to obtain the number of teeth) no calculations need be made. With a pointed tool at centre height, radial lines as at ***F-R, R,*** etc., are made according to the number of teeth. Then dividers are set to' the pitch of the chain and applied to two of the lines as X-Y, and the tool set so that with a few trial attempts, a pitch circle ***P*** can be scribed on which the points X-Y will be at the intersections of the lines.

These points may then be centre punched, drilled out roller size, and the plate turned off until the holes are just breaking out. The teeth can then be finished with hacksaw and file.

By calculation the following can be the method of finding the diameter of pitch circle on which to drill holes: multiply number of teeth in sprocket by two; divide into 360; from angle thus found in degrees obtain cosecant value in trigonometrical tables; multiply this by pitch of chain.