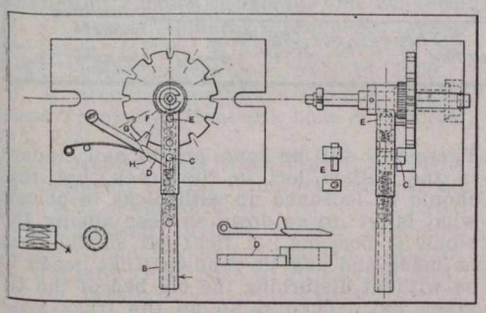
penter's brace. By means of the latter, the spiral is inserted inside the pipe completely, by turning the brace in the direction of the spiral, so as to slightly diminish the diameter of the spiral; on the discontinuance of the turning the spiral springs to the full inside diameter of the pipe. The pipe may then be bent as though it were a lead rod, after which, by reversing the rotation of the brace, the spiral may be withdrawn from the tube. Curves of any degree of complication may thus be made without any flattening at the bends; the only limit of sharpness of curvature is that imposed by the quality of the metal being bent. Curves in all three planes may be made.—Shop Kinks, by R. Grimshaw.

Quick Shifting Indexing Fixture.

The accompanying illustration shows a quick shifting indexing fixture, which is used on a milling machine for milling ratchet teeth of the form shown at A in the illustration. The blank is held on the fixture by means of a screw and slotted washer, the arrangement of which is clearly shown in the side view. The operation is as follows: The handle B is moved in the direction of the arrow, causing the pin C at the end of the oblong slot in the handle to force the pawl D out of its slot in the dial. As soon as the pawl is out of the slot, the V shaped pin E, which is kept engaged with the ratchet F by a spring, will cause the shaft to which the dial is keyed to revolve. When the pin C has reached the point G, it will release the pawl, which is then thrown back into contact with the dial by a spring. As the dial continues to revolve,



Quick Shifting Indexing Fixture.

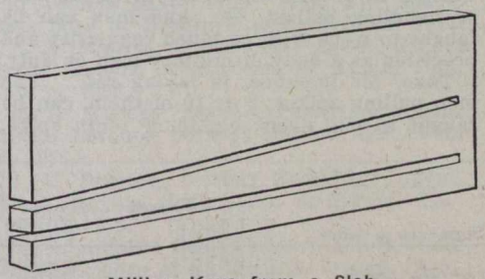
the pawl will drop into the next slot and locate the work for milling the next tooth.

In returning the handle, the pin C will travel on the opposite side of the pawl, and when left in the curve H the spring behind the pin will hold the pawl D securely in the slot in the dial. The spring behind pin E is made just stiff enough to keep the pin from slipping when the pawl is out of a slot in the dial. The teeth in the ratchet F were cut with an ordinary thread cutter. This fixture is used on a hand miller, and the teeth in the blank are cut with an ordinary angular cutter. This system of shifting could easily be applied to a horizontal attachment, and by substituting a centre for the stud and inserting a ball thrust bearing, it could be used instead of an index head where quick shifting is desirable. For those classes of work for which it is adapted, a fixture of this kind enables a very satisfactory rate of production to be attained.—Machinery, New York.

Block Signaling on the Intercolonial Ry.—The block signaling system, which is being installed on the I.R.C., has been completed between Nelson Jct. and Newcastle, N.B., and was placed in operation Jan. 10. The system is already in operation between Halifax and Windsor Jct., St. John and Hampton, and Moncton and Painsec Jct.

Milling Out Keys.

About as cheap a way of making keys in quantity, or even when only a few are needed, is to mill them out of a slab, as shown herewith, by means of a cutter, which is practically a thick saw. This insures that the sides, which are at an angle to each other, and which do the work and hence require to be true and well finished, have a perfect surface and regular taper, the lat-

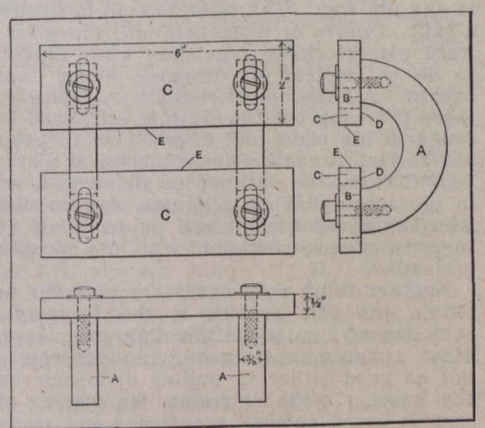


Milling Keys from a Slab.

ter being of whatever degree it is required, which is readily determined by the graduated table of the machine. From one slab, either planed off or milled on the two parallel sides, there may be milled a number of keys, cutting them alternately head and tail, so that the width is properly arranged for, the whole stock may be used up. The accompanying illustration shows a key partially milled out of a slab.—Shop Kinks, by R. Grimshaw.

Accurate Tapered Plug Gauges.

An accurate tapered plug gauge that has been found of value in grinding work especially, is illustrated herewith. It is made quite heavy to withstand the severe usage it would meet with in the hands of the tool boy, etc. The two yokes A were rough turned from machine steel forgings, and the surfaces B were then ground on a surface grinder to insure having them parallel. The pieces C



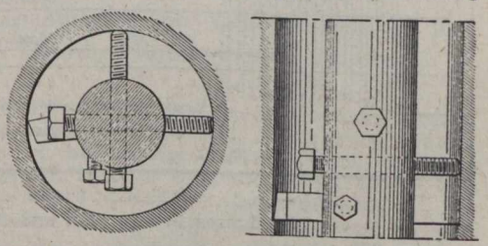
Gauge for Measuring Tapered Work.

were made of tool steel, hardened, with the surfaces D ground, and the surfaces E ground and lapped. The slots were made 1-16 in. larger than the screws, in order to provide for the required amount of adjustment.

This tool was used for gauging the tapered plugs while grinding, the method of setting forth the proper taper in inches per foot being as follows: A block, made of machine steel, with two holes of accurate diameter and spacing between centres, was used. Assuming that a plug is required with a taper of 1¼ in. per ft. and 1 in. diam. at the large end, it would be necessary to use accurate 11-16 and 1-in. plug gauges in connection with this block. As the centre distance of the holes in the block is exactly 3 ins. it will be evident that the difference in diameter of the plugs should be 5-16 in. to correspond to a taper of 1¼ in. per ft. In setting the gauge shown all that is necessary is to insert the standard plugs in the block, and then set the parallels to engage the protruding ends of the plugs. In case other tapers than 1¼ in. per ft. are required, it would be necessary to make extra plugs with shanks to fit the holes in the block, and with the protruding ends of the proper diameters to correspond with the required taper.—Machinery, New York.

Tool for Drilling Long Deep Holes.

For drilling long deep holes that do not go clear through the pieces so as to permit the use of a boring bar, a tool having right back of it a set crew that can be set out so as to bear against the side opposite the cutting

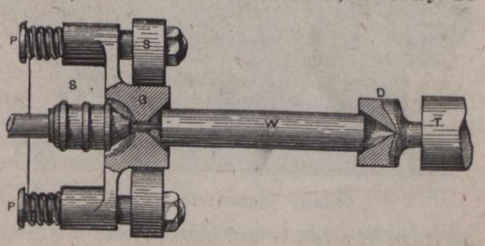


Tool for Drilling Long Deep Holes.

so as to touch the opposite side of the bore, and with a similar set screw midway between the tool and the first mentioned set screw, bearing against the bore hole circumference at a midway point, has been found very effective. Such a tool is shown in the accompanying illustration. One set screw is directly opposite the tool, and the other one midway. The opposite set screw prevents the tool from backing away from the work, and the midway one prevents the tool from springing away from a central position. If the job be such as to permit the hole being bored vertically, there will be no trouble about getting out the borings or having them crowd under either of the set screws, but if the job must be placed horizontally, the tool must be rigged so that one of the screws shall be on top, and the other on the side.—Shop Kinks, by R. Grimshaw.

Centre Drilling Device.

A centre drilling device for small work, and which is of novel design, is shown in the accompanying illustration, which is a plan view. A frame S is bolted to the lathe shears, close to the headstock, directly be-



Centre Drilling Device.

neath the centre drill. This frame carries two pin bolts P, which act as guides for a carriage G, which is normally kept to the right by the coil springs on the pin bolts P. The rear of the carriage G is recessed for drill chuck clearance, with a central hole through which the centre drill passes. The front of the carriage is recessed with a tapered recess, of such a size as to take the largest bars to be centred. The recesses on either side and the drill hole are concentric, and in line with the lathe centres. The