

which is determined by their distance from the outer edge of the chuck, or from any one of the concentric rings with which the face of the chuck is finished. These rings are for the purpose of centering the jaws whenever necessary, and they should always be made use of when putting work into the chuck. Of course if the chuck be a universal one, the centering business can be dispensed with and it is only necessary to put the work in place and screw up the chuck. Even then the work should be tested to see if it be centered truly, for sometimes there are lumps or projections on the surface which prevent the work from centering itself exactly.

When such is found to be the case, it is necessary to pack under one or more of the chuck jaws, using thin metal strips or thick paper, until a bit of chalk held against the work while it is revolving will make a mark entirely around the surface. In chucking the collar above mentioned there were one or two rough places in its surface where a hammer had been used some time or other, and one of these places coming under the jaw of a universal chuck, threw the work out of round a trifle. It was not very much, but enough to spoil the accuracy of the work when a good job was necessary.

By holding a bit of chalk against the surface of the work the high places can be easily detected and the chuck shifted accordingly.

ACCURATE CENTERING.

It is not possible to center as accurately as sometimes is necessary by using the chalk method, hence for extra nice work an "indicator" should be used which will magnify the excentricity of the work. Such an indicator of the "home-made" variety is shown by Fig. 39. It is a very simple device and is easily made. Its principal parts are: A bar or shank, D, which fits into the tool-post the same as a tool would be placed, and the bar is made with a split end, hollowed out as shown by detail E, to receive the ball which is formed upon pointer C at B. The enlargement B is placed in the hollow cavity in bar D, and the two act as a ball and socket joint in permitting free though limited motion of the pointer C, which, when in use, is placed with its lower end against the object to be centered, as shown at A. When this is done the revolution of the work, should there be any inequali-

ties in the surface thereof, causes the short arm to vibrate with the inequalities, and the motion being greatly magnified by the

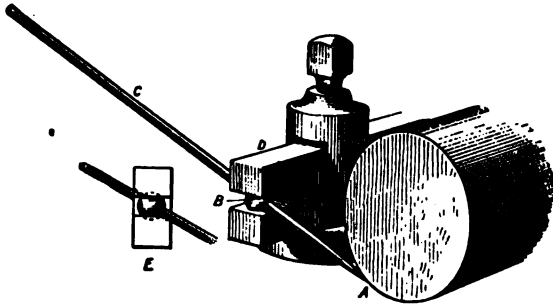


Fig. 39—Centering Indicator.

long arm C, is rendered visible in a marked degree by the vibrations.

The piece to be chucked being put in as close as the eye can determine, the pointer is placed in position and the lathe started on a very slow speed. If the work be the least out of truth, the long arm C will rise and fall with every revolution of the work and the workman has only to note the position of the arm and move one of the jaws of the chuck accordingly. A very little practice with one of these indicators will enable a man to quickly chuck a round piece of material with an accuracy which could never be even approached by the best lathesman in the country working without the indicator.

The indicator may be easily made by any blacksmith and its cost will be but a trifle, while its value is great. The device can be applied to inside as well as outside surfaces. In that case it would be made to work in the top of the hole, while for exterior work it works as shown, against the bottom of the object.

To true up work when an independent chuck is used—and by independent is meant that the three or four jaws of a clutch all work independent of each other, each being controlled by a separate screw which is set up, as required, by means of a wrench which fits all the screws. The universal clutch, on the contrary, has as many screws as it has jaws, of course, but these screws are all connected by means of a large connecting gear so that turning up any one of the screws causes all of them to advance an equal distance.

Some chucks, however, do not have any screws. Instead the

jaws are advanced by a sort of spiral which is placed just inside the face of the chuck and which may be rotated from either one of several places in the chuck. Other universal chucks have a shell which screws over the front end of the chuck and carries with it the jaws which hold the work in place. Both the independent and the universal chucks have their good points, and both should be provided as soon as possible by the smith-machinist who desires to do good work and lots of it at a low price.

The large face-plate may be and should be made into a chuck by means of four movable jaws which may be bolted at will to the face of the chuck, forming a large independent chuck which is very useful in holding pulleys and similar work which will barely swing above the lathe bed. Bear in mind that the jaws of all good chucks should be made to reverse so as to hold a ring or pulley from the inside of the rim as well as from the outside thereof. Many good chucks are designed with this end in view. In selecting chucks pick out one of this kind, also see that it is adjustable for wear and that it is strong and well constructed.

SETTING THE STEADY REST FOR BORING.

Place the work in the chuck as directed above, supporting it entirely by that means, provided the work is not so long as to pull out of the grip of the chuck by its own weight. Having made the far end of the work (the end farthest from the chuck) run as true as possible, proceed to put the steady rest in position as close to the end of the work as possible, and make sure that the bearers of the rest lie fair against the work before they are tightened into place.

The surface of the work must be clean and smooth where the steady rest is to bear, otherwise good work is impossible under any condition. It is not possible to true up work in the steady rest by means of the center indicator, for this tool will not work unless the work be held in the lathe entirely by the spindle and its attachments (face-plates, chuck, etc.). Keep the bearers of the steady rest well oiled at all times when the lathe is running. The least stick, chatter or jumping between the work and the steady rest and good-bye to the possibility of decent work.

When an object too long to be first supported and trued up

THE
SCREW-CUTTING LATHE

HOW TO SELECT, SET UP, ADJUST
AND OPERATE

BY JAMES F. HOBART, M.E.

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