FIG. 17. General view of Folding Department.

by doing away with the cupped washer and sliding shoe and substituting therefore a flat washer with flat pucking pieces to be placed under the tool.

To make this clear it is necessary that I explain that the cutting edge of a tool used on cylindrical work be set approximately on, or slightly above, the horizontal radial axis of the work and that the front of the tool clear slightly a tangential line drawn from the point at which the edge of the tool touches the work. The front of a Taylor standard tool is ground to an angle of six degrees from a perpendicular to the base, just enough so that the front of the tool will bear on the work only on the cutting edge; consequently it should be set with the cutting edge just on the horizontal axis of the work—"on the center," as a machinist would say. If a tool is ground with a greater angle of clearance—as is almost inevitable with a tool ground by hand on an emery wheel of relatively small diameter (and it is not unusual to see such tools ground with from 15° to 20° clearance)—one of two things must be done. Either it must be set with the cutting edge above the center or horizontal axis of the job so that the circumferential arc of the work will neutralize the excessive clearance, or it must be tilted, the base being on an angle to the horizontal, which accomplishes the same effect. The cupped washer and sliding shoe accomplishes both at once, tilting the tool and raising the edge. It is in fact quite an ingenious device. However there is one very serious objection to it; the proper setting of the tool is a matter of judgment and of cut and try, calling for more skill and better judgment than is possessed by many workmen and very liable to be a source of delay, or at least uncertainty in the time of an important element.

All of this uncertainty is eliminated by the flat washer and packing pieces replacing the cupped washer and sliding shoe, and by the provision of a measuring device which quickly indicates the number and

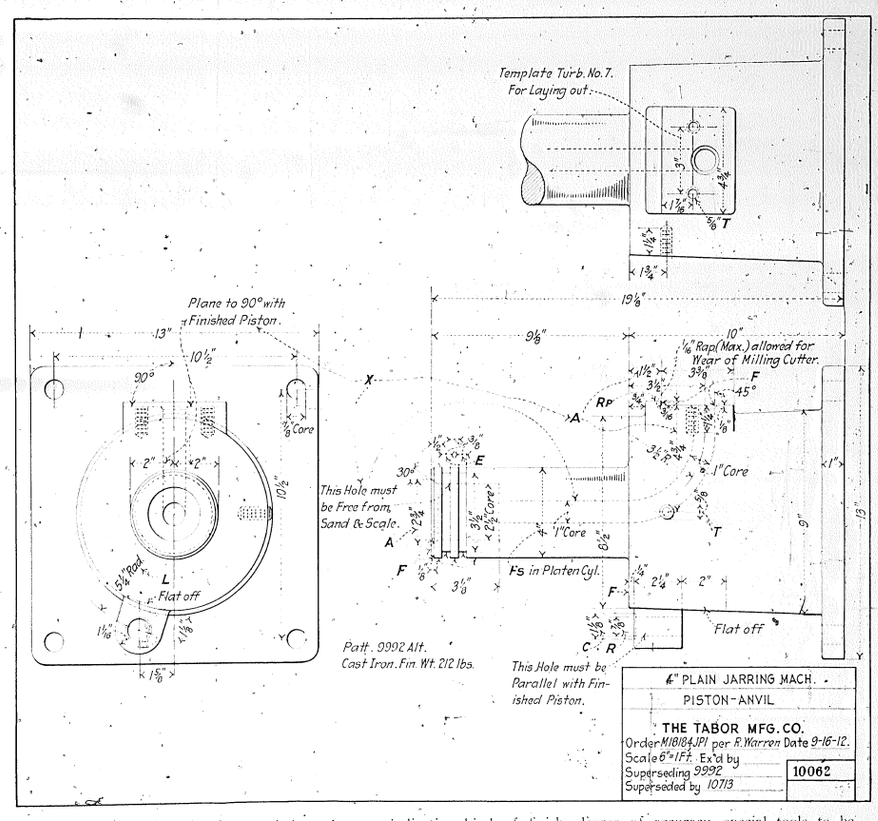

FIG. 18. Drawing showing symbols and notes indicating kind of finish, degree of accuracy, special tools to be used, etc.—nothing left to chance.

thickness of packing pieces that must be placed under the tool, to compensate for variation in height from base to cutting edge due to grinding, and to bring the cutting edge in contact with the work at the right point. This is another standard for which we are chiefly indebted to Mr. Barth.

Under the unstandardized conditions described it is impossible to make a definite allowance for this elementary operation, which on the average must be performed several times during each job. Under the standardized conditions it not only may be depended upon to take the same time each time it is done, but it may be done in less time. A description of this device, of which there are several forms all essentially the same, is, I think, worth while, as it may suggest something similar in other directions. The measuring device with hooks, holding packing pieces, shown by Figure 12, is mounted on the tool stand supplied for the lathe. The tool is picked up from the stand and placed on its base with the cutting edge against the scale. The graduation indicates by direct reading the packing pieces or pieces required, which are picked off their hooks and placed with the tool in the tool post. If the cutting edge comes to the top graduation—