



Fig. 15. Standard Work Place for "Ribboning" Handkerchiefs. Note the "Spring Chair" developed by Frank B. Gilbreth. The legs rest on springs in the extensions to eliminate floor vibration and any consequent discomfort or fatigue.

soon found out after starting this that the sheets came out of the machine badly curled, so much so that it was almost impossible to pile them, to say nothing of the trouble that might be occasioned at the scoring machines later on. Rather than discard the idea of running these sheets this way and returning to the old way, we raised the canvas coming off the last drier about 2', running it over a 4½" roll instead of a 7" roll, and placing two iron rolls on the top of this one, thereby bending the board over a small diameter roll in the opposite direction from what the board is curled, coming from the large drier. This attachment is running at the present time, and the board is coming from the machine straighter than it did under the old system of running the sheets in the machine the old way; but it was found that in bringing the sheets down to the man breaking at the end of the machine vertical instead of coming out to him horizontally, it inconvenienced the breaker so that it has been decided to put an automatic cut-off on to this machine, most of the apparatus for which is on hand in the plant at the present time.

Another adjustment which was found necessary in connection with the operation of this machine was one which would raise the paper off from the paste roll when the machine would be stopped to reload the elevator. The previous custom was to break the paper off by hand after the load which was on the elevator had been run and then re-thread the machine. This appliance is now on the machine, and shows a saving of one-half the time.

The conclusions to be drawn from this report are as follows:

The second track to go on the ceiling has arrived but has not been put in place. The inside gauge is being made at the Chapel Machine Shops. New tongs for lifting the paper rolls are forged up and in the machine shop. New reel rods are made and are in use. The elevator has been lowered even with the floor to receive the Cowan truck load of board. A new canvas is running on the machine at the present time.

As soon as the rest of the alterations are made on this machine and the new sizes of lining paper have arrived, there is no reason why the task and bonus cannot be immediately applied.

Any one of the examples cited above would in itself furnish the substance for a paper.

Machine shop practice affords a rich field for machine standardization and in this field Mr. Barth's work is preeminent.

Two machine tools of the same size and presumably of the same capacity built by different makers will be found to vary greatly in the range of speeds and feeds provided and in pulling power. It is highly desirable—more obviously so under scientific management—that they should be the same, or as nearly so as possible, in order that jobs may be routed to either one indiscriminately and done as efficiently in one as the other, the same instruction cards and the same tool lists serving either one. By judicious and inexpensive changes in pulleys, belts and gears, Mr. Barth not only brings this about, but what is of greater importance, provides a range of speeds, of feeds and of pulling power suited to the predominating product, taking into account size, material and kind of work, in place of the combination provided by the maker which aimed to provide for *everything* within the machine's capacity, from the largest to the smallest. For example in a 24" engine lathe one may turn a piece 24" in diameter or ½" in diameter but it is not good practice to do either, therefore, why try to provide speeds suitable for these extremes at the expense of speeds for the range of diameters that should properly and will as a rule be handled in a machine of that size?

Bolt slots for clamping work on the tables of drill presses, milling machines and boring mills and on the face plates of lathes seem to have been a detail considered of little importance by machine designers. Two different machines built by the same maker will be found to take bolts of the same diameter but with heads of a different size; two machines of the same kind and size built by different makers will be found to call for bolts different in diameter as well as in the dimensions of the heads. I have even seen a drill press with slots provided to take bolts ¾" in diameter,



Fig. 16. Truck Station.

but a different size head in the table from that provided for in the base plate.

From what I have said about bolts under the head of standard tools, I think you will appreciate the difficulties, the loss of time and of production which such an unstandardized condition entails. Even supposing that a supply of ordinary bolts for each machine were kept in the tool room, resulting in a much larger stock and more work in the tool room, that they were kept in first-class condition and issued to the machines as required in advance for each job, we would nevertheless find that owing to the poor proportions of the head they would frequently break or damage the slots on the table.

On this account it is the practice as one of the preliminary steps in installing the Taylor System in a machine shop to plane out the slots in all machines to take the strong standard bolt developed by Mr. Barth.

Still another excellent and simple illustration of machine standardization in a machine shop is in the tool posts of small and medium size engine lathes. Until quite recently and still in many instances, the tool post with its concave or cupped washer and sliding shoe, furnished with the machine was intended to be used with a tool simply cut off from the bar of steel, the end trimmed roughly to shape and ground. Now the Taylor standard tool, as will be seen by referring back to Figure 7, has a nose turned up considerably above the top surface of the bar, facilitating grinding and affording an increased number of grindings before the tool must be dressed, with, as a consequence, less waste of tool steel. In all cases where necessary the tool post and in some cases the slide rest are altered to permit the use of standard tools; usually this results in reducing the number of sizes of tool steel that have to be used. A more direct gain is obtained, however,