prepared on tracing cloth, if "standard," or, on thin tracing paper if "special," a blue print off same is to be made as illustrated on changed form No. 96, marked at top "cut No. 1;" which is made by inserting a blank strip of red paper between the tracing and the blue print paper, held by a paper clip at each end. The blank space on cut No. 1 is then ruled and headed by the Engineer in charge of the job, for the convenience of the Cost Department No. 4. A full set of these prints—as many as are required for the full complement of the parts of the machine—are to be placed between two sheets of 100 lbs. jute tag manilla paper, fastened on the upper end by wire staples, so that the forms can not be easily removed therefrom and lost.

The Cost Department No. 4, being supplied with a full set of part lists (form No. 96) has no excuse if the cost of the whole job is not complete.

Two additional sets of blue prints, form No. 96, one of which is to be placed in the hands of the Inspectors on the assembling floor of the shops, on which should be marked or indicated everything which has not been made in accordance with the approved drawings and specifications.

After the machine or article has been shipped off the works, the Inspectors' part lists are to be returned to the Engineering Department No. 3, where they must be carefully filed by the index clerk in envelope form No. 90, under the particular job number, and this rule should be rigidly enforced, that no part or piece required for this job, can be ordered until the Inspectors' part lists on file have been examined.

The remaining set of blue print forms No. 96, are to be forwarded to Department No. 4, where the date, and time of receiving same, should be stamped on back of each sheet. Department No. 4 will transfer these part lists to the Stores Department to be checked; and the stores official check-mark registered under the word "Inspector" next any of the specified articles, which they have in stock, whether in the rough or finished, and a number of articles so marked, entered straightway on Stores Record Card form No. 34 and No. 35; care being taken, that the job number and quantity required (the date and workmen's check number to be filled in only after the respective articles are delivered). If the balance of articles in stock is less than the minimum required, (which is determined by the Engineer in charge of the job), then Requisition form No. 26 or No. 27, (depending upon the character of the article), must be made out by Stores Department without delay. (Continued.)

MOULDING A LARGE GEAR WHEEL.

BY THE EDITOR.

In no branch of the art of founding is there demanded of the moulder more skill, patience, resource, and intelligent perception of the laws of cause and effect than in the moulding of a 12 ft. double helical split gear, weighing some 12 tons, in which the pitch diameter and depth of face must not appreciably vary, the teeth be equidistant, and so clean that neither file, hammer nor chisel must be used on the flanks of any of them; and yet with properly designed machines and experienced artisans it is possible to approximate to this degree of perfection.

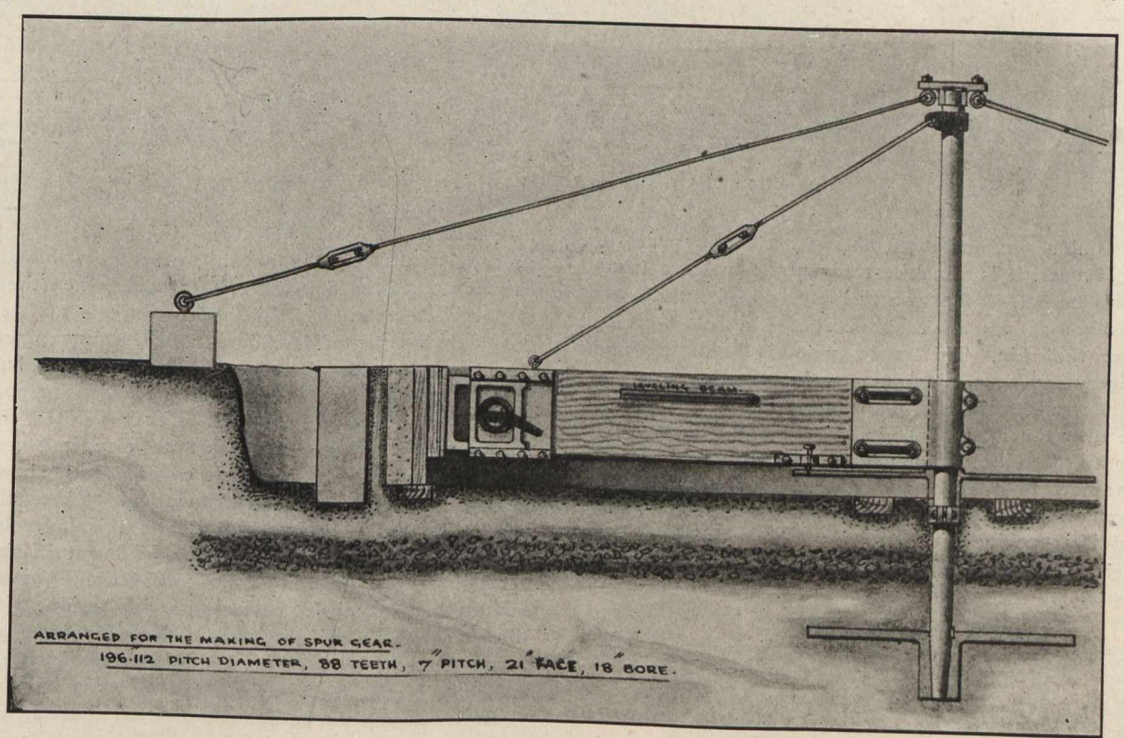

Fig. 1.—Groves' Portable Gear Moulding Machine.

Notwithstanding the manifest advantages of machine moulding it is astonishing to find how tenaciously some people cling to the antiquated. Sometime ago we visited the foundry of a large engineering concern and to our amazement saw them moulding a gear wheel about 6 ft. in diameter from a full pattern. The foundry floor was used for the drag, and just as we were passing, four men—each with one hand on the sling chain, shaking, and the other with a bar vigorously rapping the top of a spike driven into the water-soaked pattern—were trying to hoist the pattern out of the sand with the aid of a crane. When it was finally lifted out, a sorry plight the mould presented, for in several parts, the sand forming teeth spaces had been carried away with the pattern, and these defects in the mould had to be made up again by patching. One has only to witness this antedeluvian method of moulding to realize how it is that large gears made from costly full patterns are almost invariably irregular in form, defective in pitch, and when in gear touch only on one side of the face. In view of the increasing perfection and refinement in modern machinery, it is not surprising that the cut gear has almost entirely displaced the old uncouth cast gear with uncut teeth. But just as an axe is better than a razor to cut down a tree, so, in the fitness of things there are innumerable cases where the moulded-tooth gear is preferable to the gear with cut teeth. In machinery where the shaft centres seldom vary, the cut gear, with its deadly accuracy of pitch is manifestly the best; for as long as the gear centres remain intact the wear on the teeth will be practically nil, since in accordance with the laws of mechanics the teeth will roll on the pitch circles and not grind. On the other hand, in machinery subject to intense stress and violent shock—rolling mill, stamp press machines, etc.—the bearings wear away rapidly, the gears loose their centres, the teeth begin to grind instead of