PRACTICAL MECHANISM.

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NEW SERIES—No. XXIV.

PATTERN MAKING.—BENCH WORK.

Round columns are either plain, fluted, or of a mixed design to agree with the square columns in the same building. Fig. 180 represents a plain round column; but it must be remembered that, even though the shaft be plain, the design of the base and cap may be modified according to taste. In the case of so simple a one as we have illustrated, it would probably be cast solid as represented; though if of very large size, as those in the crypts of churches, perhaps 18 inches in diameter, a great deal of metal would be saved by simply casting a plain round shaft with the mouldings, N and O, upon it, and of a length measured from the lower part of the base to the top of the cap. This casting takes the weight of the building. The base, B, with its moulding, B M, and the cap, C, with its moulding, C M, are thin castings fixed to

Fig. 180.

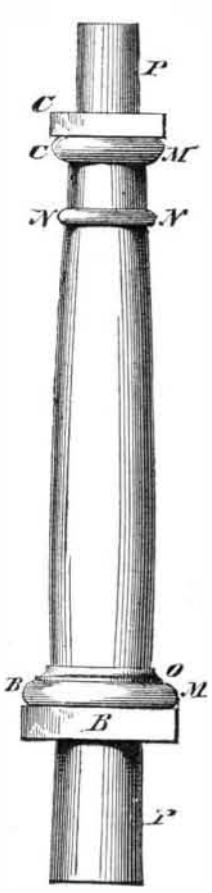


Fig. 182.

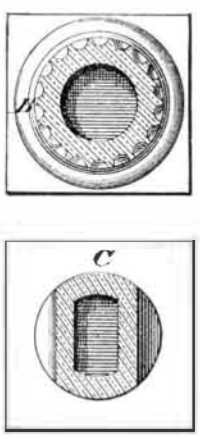
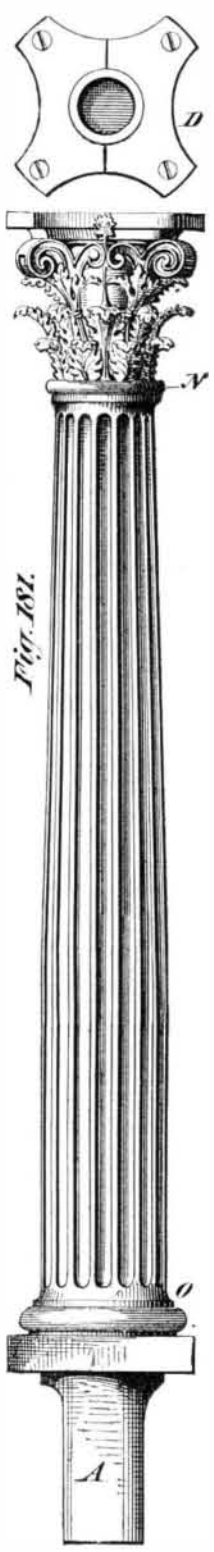


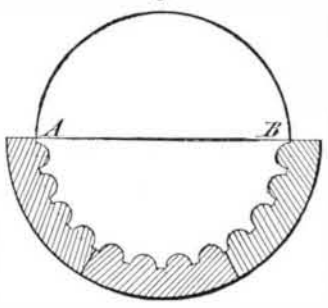
Fig. 181.



the column by screws. P P are the core prints. Little need be said as to the method of preparing a pattern of this description. If small, it will be turned from the solid wood; and if large, it will be lagged or staved up, as we have described on page 101 of our current volume. In any case, the pattern must be made in halves. Some foundries require a half-core box; while in others, the core is struck up in the manner described on page 229, volume XXXV. We may now pass to the consideration of the fluted column shown in Fig. 181. D is a plan of the peculiar cap required for this kind of column; it is neither square nor round, but of a shape which harmonizes beautifully with the carved work below, all of which, including the cap, is added afterwards, the column being cast a plain round above the member marked N, and also below that marked O. The extension, A, is the part which passes between the joists of the flooring; it is often flattened to admit of this, as shown at C, Fig. 182. B is a section of the column through the fluted part. It is not thought necessary to show the prints, as they would be similar to those shown in Fig. 180, the lower one being flattened if the extension, A, were required.

We have now arrived at the most important part of this branch of our subject, and that is, how to make the fluted pattern column so that it may be extracted with facility from the mould; for, by referring to Fig. 181, it will be seen that the rammed sand, by entering the flutes, would lock the pattern down unless this difficulty were provided for. To overcome this difficulty, we refer the reader to Figs. 183, 184, 185. Fig. 183 is a sectional view of a column, turned extra large at the part intended to be fluted so as to form a plain core print all around the column. A convenient number, divisible by 3 or 4, of flutes must be taken; we have taken 12 flutes in the half column. A suitable core box must be constructed with, say, four flutes; these cores, when packed around the mould, will core out the flutes in the column. This method is only given because there may be special cases where it would be most suitable; but it is not that generally adopted.

Fig. 183.



In Fig. 184, each half of the column is formed of three pieces, which are held together by taper dovetails; in this case the middle piece is first drawn from the mould and then the side pieces. This method will accommodate any even number of flutes, and is quite practicable; the objection to it, however, is that the dovetails are liable to stick, and also that, when the middle piece is drawn out, the side pieces sometimes fall into the mould, to its irretrievable injury.

Fig. 184.

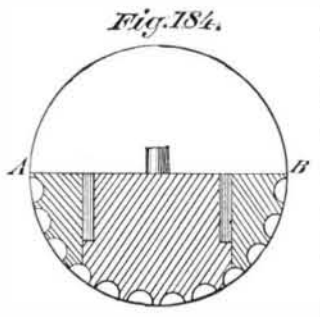
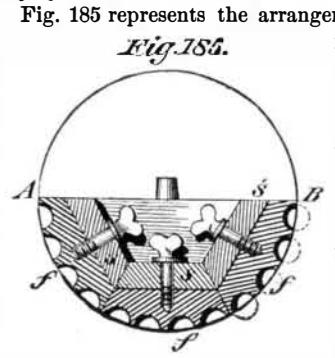


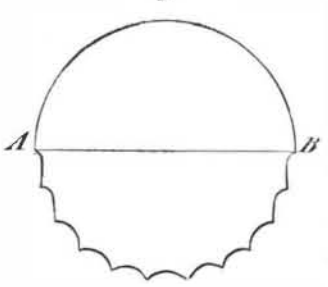
Fig. 185 represents the arrangement in most general use; it is not nearly so expensive as that shown in Fig. 183, nor is it open to the objections mentioned in connection with Fig. 184. The three pieces marked S are the main staves of the column pattern, but the number is not arbitrary. We may take four or any other number, depending on the size of the column; it is advisable, however, to have as few pieces as possible. What we have to do is to notice the direction taken by the pieces as they are drawn out, and if it appears that the flutes do not escape properly, then a larger number of divisions must be made. The pieces marked *f* are the supplementary staves in which the flutes are cut; they are attached to the inner staves by screws, which are removed by the moulder, who is then able to extract the pattern. The side pieces, *f f*, are then drawn out, and lastly the lower pieces, the process being, it will be noticed, the reverse of that shown in Fig. 183. In each case, the line, A B, is the parting line of the pattern, which must always occur in the middle of a ridge and not in a flute. The flutes should be cut out to a half circle, and eased off slightly towards the ridges with sand paper. They must not be in the least undercut, because of the draft in the mould. The pattern should be made as smooth as possible by alternately sand-papering and varnishing, using well worn sand paper to insure smoothness.

Fig. 185.



In Fig. 186 are shown what are called bastard flutes. Their use gives a cheap but not beautiful style, and they are sometimes employed on lamp posts and columns in the cheaper class of tenement houses. The flutes, it will be noted, are made shallow and of a shape to permit the whole half pattern to be removed from the sand. The flutes are cut out of the solid, the front ones being the deepest and the side ones so shallow that many of them are scarcely distinguishable.

Fig. 186.



In columns whose designs are of a mixed character, the methods illustrated for fluting are equally suitable for cableing, as shown in Fig. 185, where the cableing is shown in dotted lines; while rosettes, rope mouldings, and the like, are either attached by wires, as shown in the illustration of square columns, or they must be cast separately and afterwards affixed by screws, as are many other ornaments whose shapes preclude their being moulded solid with the columns.

Diamond Cutting by Girls.

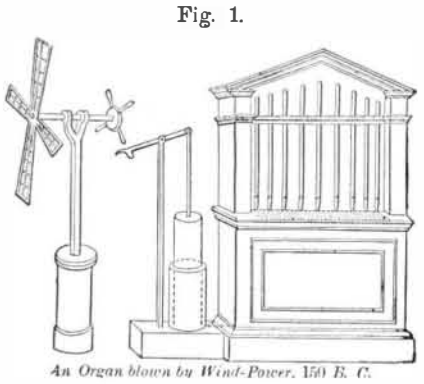
Messrs. H. Cohenno & Co., of New York city and Boston, Mass., write to say that the Dutch Israelites have never refused to instruct American boys, but have consented to do so if paid a proper remuneration, such as they themselves had to incur to learn the business; and further, Mr. Morse's men were not discharged, but left voluntarily. They also say that they are not able to discover where Mr. Morse's girls are at work.

ORGANS, OLD AND NEW.

In the organ the notes are produced by pipes of different lengths, shapes, and materials, supplied with air by bellows and operated by keys which admit or cut off the supply.

The dimension of the instrument is designated by the number of feet of length that its largest pipe measures, forming the lowest note of the key board. Thus we speak of an organ of 32, 16, or 8 feet. An instrument which possesses open flutes of 32, 16, 8, and 4 feet, and a principal an octave above the latter, has a compass of 8 octaves. Large organs sometimes have five key boards, one above another. The first, nearest to the organist, is that of the choir organ. The second, that of the great organ. The third, the swell key board. The fourth, the recitative key board. The fifth, the echo key board. Below these is the pedal key board, played by the feet. The music of the organ is sometimes written on three lines, the two upper ones for the hands and the under one for the pedal key board.

Fig. 1.



An Organ blown by Wind-Power, 150 B. C.

In the "Spiritalia" of Hero of Alexandria, who flourished 150 B.C., we find a description of an organ blown by the agency of a windmill which works the piston of the air pump. Its invention is, perhaps, to be credited to Ctesibus of Alexandria, though it is likely that it was the result of the gradual improvement by various parties through the centuries. The reconstruction of it, given in Fig. 1, is taken, with other engravings presented, from Knight's "New Mechanical Dictionary."* The descriptions of it by Athenæus, Vitruvius, and Claudian render it certain that the pipes were musical, and blown by the force of water, instead of expansible air bellows.

Fig. 2.

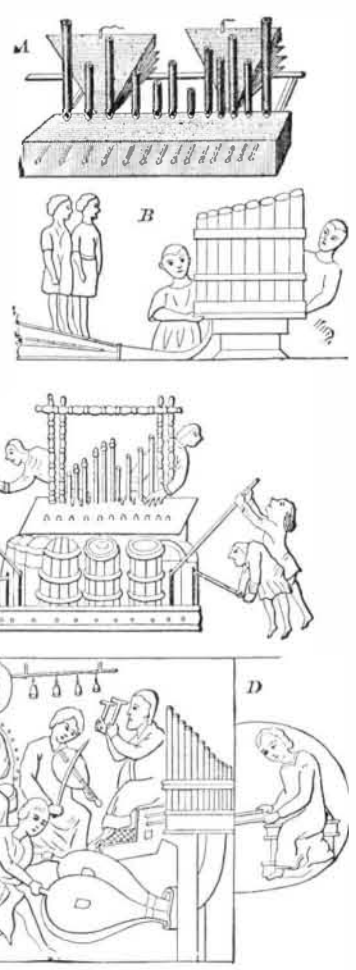


Fig. 2 shows several old methods adopted for supplying wind to the organ; the arrangement of the keys and the manner of manipulating them are also illustrated.

A is a representation by Father Kircher of a very primitive form of Hebrew organ, the "Macraphe d'Aruchin." In this, as in other of the earlier organs, a leathern bag served the purpose of the wind chest.

B is copied from the sculptures on an obelisk at Constantinople, erected by Theodosius, who died A.D. 395.

C is a pneumatic organ of the tenth century; it is taken from an ancient psalter in the library of Trinity College, Cambridge.

* Published in numbers by Messrs. Hurd & Houghton, New York city.

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