

BOOT AND SHOE APPARATUS.

(See page 144.)

The illustrations, selected from Knight's "Mechanical Dictionary,"* given herewith, represent apparatus used in the manufacture of boots and shoes. The engraving, Fig. 1, represents

LASTING TOOLS,

which are employed to grip the upper leather of a boot or shoe and draw it over the last. In the tool on the left, the two jaws act simultaneously upon the leather through the motion of the nut, C, upon the screw. The same movement brings the jaws toward each other and stretches the leather around the last. The two pairs of jaws in the second tool engage the sides of the leather, and are then drawn thereupon and also inwardly by the action of the cam lever. Lasts are usually made upon the ordinary type of lathe employed for turning irregular forms. For this purpose, however, special machinery has been devised, to which class belongs the

LAST LATHE,

represented in Fig. 2. In this machine, the block, L5, from which the last is to be cut, is, by a train of gearing, made to present a face to the cutters precisely corresponding to the face of the model against the guides, P P4. By moving links on these rods, up or down on their graduated scales, the last may be enlarged or reduced in its relative proportions to the model. A similar variation of the bar, N", on the sector at the end of the machine, will vary the work in relation to its length as compared with that of the model.

In Fig. 3 is a

BOOT SHANK MACHINE,

used for drawing the leather of the upper or boot leg over the last into the hollow of the shank. The leather being placed over the last is inserted between the jaws, which are pivoted to the plate. The screw connecting the jaws by arms is thus turned, causing the jaws to be brought together, and thus stretching the leather. The same figure also shows a boot stretcher, for stretching the uppers. The last is divided into an upper and an under section which are connected by a lever. The fore end of the upper section is pivoted to the fore end of the lever, and the middle end of the lever has its fulcrum at the mid-length of the lower section. The screws operate to raise the rear end of the upper section directly, and its fore end through the medium of the lever. The upper surface of the last has changeable knobs to stretch the leather in particular places.

Fig. 4 represents a

BOOT HOLDER

or jack, for holding the boot during the process of manufacture. The base piece is attached to the bench and has a stationary prong. The movable prong containing the foot piece is attached to the other, and is held at its adjustment by a rack and pawl. The operation may be clearly understood from the engraving. A similar device is sometimes used to stretch the boot while blacking or varnishing it.

Fig. 5 shows a boot sole with steel calks attached, for the use of pedestrians in winter weather or when scaling the snowy tops of mountains or crossing glaciers. These calks are readily arranged to screw into plates fastened to the sole and heel of the boot, and are then removable at will. In walking over ice, these or similar appliances are indispensable; and many bruises, and sometimes limbs and even lives, have been saved by their use.

IMPROVED DRILLING AND SLOTTING MACHINE.

(See page 145.)

In the accompanying engraving we illustrate a drilling machine made by Messrs. Lowry, of Cross-street Works, Salford, which embodies certain improvements introduced recently into this type of drill. These may be briefly described as consisting principally in carrying down the framing at the back of the jib post to the bed plate, so that it can be properly secured, and every trace of vibration is removed. The machine has also been so modified that it constitutes a very satisfactory key-way slotting machine. Our engraving will explain itself without further description.—*Iron.*

A FRUITFUL source of malaria is found in the earth adjoining ponds which are dammed for manufacturing or other purposes. The soil in the vicinity, through the water being raised above its previous level, becomes soaked, and hence damp and very dangerous to health.

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PATENTS IN AMERICA.

It appears from the annual report of the United States Commissioner of Patents, which has just reached us, that there were 21,638 applications during the year 1875. Of this number 14,837 (including reissues and designs) were granted. These figures show a slight increase over those for the previous year, and are the highest ever known. The number of trade marks and labels registered was 1138 and 313 respectively. The total receipts of the office were 743,453 dols., which is made up as follows: Amount received on applications for patents, reissues, designs, extensions, caveats, disclaimers, appeals, and trade marks, 670,180 dols.; copies of specifications, drawings, and other papers, 45,380 dols.; recording assignments, 18,012; subscription to the *Official Gazette*, 6646 dols.; registration of labels, \$2334. The expenditure reached \$721,657, thus leaving a surplus of \$21,795. This added to the surplus accruing in former years gives, \$886,909, as "the balance in the Treasury of the Patent Fund." This, however, is, like the patent surplus in this country, nothing but a "phantom fund," as it has been called. The principal items of expenditure are: salaries, \$430,218; photo-lithographing drawing, \$114,309; illustrations for the *Official Gazette*, \$49,428; tracing drawings, \$34,972; stationery, \$16,600; cases in model rooms, furniture, &c., \$20,000; pay of temporary clerks, \$29,512; and miscellaneous disbursements, \$11,765. Following the example of former years the Commissioner gives a table showing the number of patents granted to residents of the different States, territories and foreign countries during the year. It is interesting to notice the wide differences which exist. For instance, in Idaho Territory only one patent was granted, the population being 14,999. Against this we may put the State of New York, where 3771 patents were issued, being in the proportion of one patent per 1163 inhabitants.

The density of the patent-taking population is greatest of all in the District of Columbia, where 1 person out of every 615 appears to be a patentee. This, however, can hardly represent the inventive activity of the district, and the high proportion is probably due to the fact that many inventors acquire a temporary domicile in Washington for the purpose of prosecuting their application. The absolute number of patents taken out is small, reaching only 214. New Mexico Territory contributes the smallest proportion of patents, there being only one to every 37,101 inhabitants. The agricultural States do not, as might have been expected, make much show. Only 31 patents (1 to every 32,161) came from Alabama. North Carolina contributes 37, or 1 to every 28,906, and South Carolina sends 46, or 1 to each 17,513 persons. To the statistician the table is full of interest. The staff of the office consists of 96 examiners of various grades, and the Commissioner recommends the appointment of 12 more, or he "must view with dismay" the arrears of work which will accumulate. One of the good features of the *Official Gazette* alluded to in the report is the publication of the decisions of the Commissioner of Patents and of the United States courts in patent and trade-mark causes. The publication of the back issues of patents proceeds gradually, but the Commissioner urges upon Congress the absolute necessity of making larger grants for this purpose. The letter-press is printed as far back as November, 1866. The office is rapidly outgrowing the accommodation which the building affords, especially in the model-rooms. About 10,000 rejected models were removed in consequence "to an open space under the roof of the west wing of the Patent Office building. The floor of this attic and the model-shelves are composed of rough boards, and the place itself is very difficult of access. The trouble increases yearly, and if no provision can be made for relief in this regard, it will be necessary to do away entirely with models."

The report concludes with some very interesting particulars of the intended contribution of the Patent Office to the Centennial Exhibition. A space of 10,000 ft. has been assigned for the exhibition of models of American inventions, illustrating the more important and useful industries. The task of selection will be a difficult one, for it appears, for instance, that no less than 2295 patents have been granted for sewing machines and their attachments between 1790 and 1873. There are 2451 patents for ploughs, 2244 for harvesters, 1391 for churns, 1483 for lamps, and even 645 for beehives. The report under notice is carefully drawn up, but we observe one or two glaring inconsistencies, the number of patents issued being put at 14,837 in one place, whilst on the next page it is said to be 16,288. It would appear also that whilst 38 patents were extended, there were only 2 applications for extension. The issues of patents to subjects of Great Britain, France, and other foreign countries, are also variously stated.