

but to have been used as the powder chamber. The iron bullet was found in direct contact with the powder, and in front of it were the remains of a wad of rough fiber, apparently manila oakum. The bore of the gun is one and five-eighths inches. A round hole at the end was for ramming and cleaning out the gun between the shots. This gun, therefore, takes its place among the earliest known breech-loading guns. The bronze of which it has been made was not affected by the water.

The broken blade of a sword, a pistol, and a hook and tackle, thickly incrust with limestone, are also on view, as well as a piece of the woodwork of the ship in a fossilized condition.

The tradition is that the "Florenca" had fifty-six guns on board, and thirty millions of money. The latter has never been recovered, where it still reposes beneath the sand of the bay, making its recovery very difficult.

A SECTIONAL BOOKCASE.

An improved form of sectional bookcase has been invented by Mr. O. O. Buice, of 400 Dexter Street, Montgomery, Ala., which offers the particular advantages of secure interlocking of the units and convenient manipulation of the door, the latter when in open position being completely out of the way of the user of the case. The case is made up in the ordinary way of a base unit and a top unit, between which are held any desired number of case units. The case units comprise the usual sides, bottom shelf, and door. The bottom shelf is indicated at A in our sectional view, and is provided at each end with a transverse rail, B. The bottom shelves are fastened to the side walls of the case by screws threaded in the walls and passing through a horizontal rib on each rail. The lower vertical flange of the rail is adapted to fit in a groove in the base unit, or in the case unit just below, as the case may be. The door of the case is provided with rollers, C, at its upper end, which are adapted to travel in guideways, D, within the case at each side. When the door is closed, these rollers serve as hangers to support the weight of the door. To open the door, it is swung on these rollers as pivots to horizontal position, and then pushed back into the case with its lower face resting on rollers, F. Friction rollers, K,

are also set in the side edges of the door to prevent it from jamming.

To Turn Glass in the Lathe.

BY JOHN M. BLAKE.

The most practical way to turn glass appears to be with steel tools. A diamond scrapes, and works more slowly. The steel tool can be forced, and it will support a more acute angle, say 50 deg. or 60 deg. at the edge. The lubricant that is the most convenient and effective is water applied continuously with a sponge held against the work. An essential point is to have slow speed—say sixty turns or less per minute for a disk one inch in diameter. No extreme pressure is to be used; only the firm, steady hand which turners acquire by practice.

A convenient tool can be made from one-quarter inch square steel, ground off obliquely from corner to corner. This is a form of tool often used on other work, and such a one will answer for a trial. It is well to have six or more tools of this kind, having the center drilled out, and the steel left hard as dipped in water. Grinding tools is quite an item, as would be expected.

These tools, when sharpened, will accomplish more or less, according to the way they are handled. Truing may dull more steel for the proportion of glass removed, than would be the case at a later stage after the surface has been made true, and more pressure

could be applied. At this first stage, keenness of edge is not so essential, and the same tools will bear more continuous use without regrinding. When finishing, or scraping, keen tools are best. At this stage of the process, the glass acts more like a grindstone to dull the edge, therefore we must take a fresh-ground tool as required.

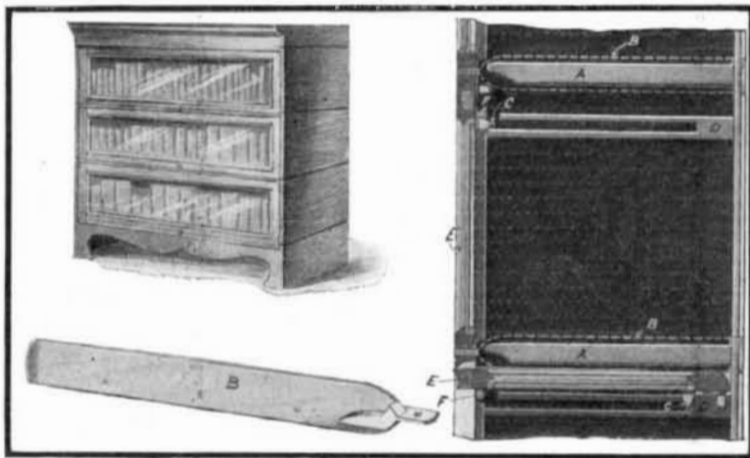
A large portion of the turning has to be done by careful scraping upon critical parts of the work. A good tool for that operation is made of flat steel, thin at the end, and ground to a square edge. The outline of the edge may be either straight or curved. These tools have the advantage that they may be ground quickly.

Most plate glass is hard lime glass, and does not cut so readily as many varieties of optical glass. Nearly all varieties, however, the writer has made to yield to the turning tool. This turning has been applied to shaping lenses to convex and concave lenses. They were mostly an inch or less in diameter. In a few instances, a diameter of three inches was turned to shape.

The field for this kind of work lies more in experimental optics. As a manufacturing process, the method would hardly replace that in which a stream of sand and water is made to fall constantly upon the roughing tool. The rapidity of turning glass by this method does not compare favorably with that of any ordinary material; but the saving of time over the slower way of emery grinding is great.

The purpose of this article is to draw attention to the fact that it is possible to turn glass with steel tools. The quantity of material that can be safely and rapidly removed, when conditions of body of material and an adequate support for the same favor a forcing of the tool, would come as a surprise.

A wagon gearing with two fifth-wheels is the invention of Theodore Sandstrom, of Connorsville, Ind., the object being to permit very short turns of the vehicle, and to prevent it from being overturned in case of a runaway or accident. One of these is in the usual place on the front axle, and the other is on the rear axle with a cog connection, so that when the front wheels are turned, the rear ones will be inclined in the opposite direction.



IMPROVED SECTIONAL BOOK-CASE.

RECENTLY PATENTED INVENTIONS.

Electrical Devices.

TROLLEY.—J. H. WALKER, Lexington, Ky. In the practical use of this invention the thrust-plates and carrier-blocks may be made of copper, brass, or other material of high conductivity, and the current will be carried by practically a copper conductor from the wheel to the motor. The inventor arranges for avoiding frictional wear upon a bolt which extends from side to side of the trolley. This bolt or shaft has a head at one end and a suitable nut at the other, said bolt and nut being housed in the sockets of their respective carrier-blocks and covered by the cap-nuts. Mr. Walker has invented another improvement in trolley mechanism which seeks to provide a novel construction whereby to secure a practically continuous copper conductor from the trolley-wheel to the motor and to provide improvements in the connections between the harp, the branches of the conductor wire, and the trolley-wheel. Mr. Walker has secured a patent on still another trolley, which has for an object, among others, to provide a contact supplemental to the wheel in order to provide for taking off more current than can be ordinarily effected by the use of the wheel alone.

TROLLEY MECHANISM.—J. H. WALKER, Lexington, Ky. In this patent the invention is an improvement in trolley mechanism, and particularly in the means for securing a practically perfect conductor connection between the conductor-wire carried by the trolley and the cable leading from the trolley-base to the motor.

ELECTRIC FIRE AND BURGLAR ALARM.—W. C. BARGER, Mammoth, W. Va. In this case the invention is in the nature of an improved electric fire and burglar alarm. It belongs to that class of alarms in which a cord maintained under tension holds an alarm-bell mechanism in an inoperative condition: but when the cord burns or is slackened the alarm mechanism operates and rings a bell.

TROLLEY-PROTECTOR.—J. H. BEST, JR., Sandusky, Ohio. Novel means in this instance serve to prevent jumping action of the trolley from the conductor-wire, which means has the further advantage in being constructed adapted for allowing free passage of the trolley along the conductor-wire without liability to damage from engagement with projections thereon—such as switches, hangers, and other devices—likely to engage with trolley protectors as they have been heretofore constructed.

SWITCH FOR ELECTRIC LAMPS.—C. WAGNER, New York, N. Y. Mr. Wagner's invention relates to means for turning the current on and off at will, and more particularly

to such means as can be used with electric lamps. His special object is to provide an improved switch for service with incandescent lamps and to insure good electrical contact, while at the same time giving the lamp a comparatively neat appearance.

Heating and Lighting.

VENTILATING, HEATING, AND COOLING APPARATUS.—C. CLUTHE, New York, N. Y. Mr. Cluthe's object in this invention is to provide an improved system and apparatus for the convenient and economical heating or cooling and ventilating of rooms in a building. A step-by-step arrangement of internal coils or radiators placed in an inclined position in the case of the apparatus facilitates the circulation of the air in the case where the device is employed as a heater, since hot air rises, and when used for cooling purposes the arrangement affords means for forming a cooling-chamber or refrigerator beneath the case by inclosing the space below the same.

Machines and Mechanical Devices.

BUTTON-MAKING MACHINE.—E. ROSENWALD, 5 Rue du Ponceau, Paris, France. The new method of manufacture secured by this invention consists in subjecting the pieces or blanks of corozo or other material to the successive action of various tools coating to form the button in such manner that at every step made by the table of the machine the various operations required for the manufacture of the button will be simultaneously performed, the result being that at each step made by the table a finished button will be delivered from the machine, while there will be always a number of buttons simultaneously in course of manufacture corresponding to the number of stages in the operation.

Of General Interest.

MIRROR.—M. T. GOLDSMITH, New York, N. Y. In this patent the invention has reference to hand-mirrors; and Mr. Goldsmith's object is the provision of a new and improved mirror arranged to require no special fastening devices for the bezel employed, to hold the silvered glass in place, and to give the mirror a very fine appearance.

COMBINED BUCKLE AND COCKEYE.—F. W. HAWES, Henryetta, Indian Ter. The object in view in this case is to provide means for the connection of the cockeye of a trace to a buckle adapted to be adjustably connected with the rear end of the trace, so as to permit lengthening or shortening of the

trace at its rear end and dispensing with the ordinary buckled connection of the trace with a collar or breast-band of the harness.

CLOSET CONNECTION.—D. KEOHANE, New York, N. Y. The aim of this invention is the provision of a connection between the solenoid and the lower part of the bowl, said connection affording a strong and tight coupling between the parts which overcomes escape or leakage of water or sewer-gas and the possibility of the bowl becoming displaced on the floor or a marble slab.

ENVELOP.—C. A. MEADOWS, Yonkers, N. Y. In this case the object of the invention is to provide an envelop for sending letters and other communications through the mails and arranged to form an advertising booklet or like advertising medium when the envelop is opened by the receiver for the removal of the contents.

COMB.—A. F. MOTT, New York, N. Y. In this patent the invention has reference to improvements in combs designed particularly for drying a person's hair after washing or shampooing, an object being to provide a comb by means of which the hair may be quickly dried without danger of burning or singeing. Heat from a heated bar and its teeth, the same inserted into the comb, heats sufficiently to dry the hair as the comb passes through the same.

MEASURING INSTRUMENT.—P. H. WALSH, Bayonne, N. J. The object of the invention is to provide a measuring instrument arranged to permit the mechanic to readily obtain the lengths and cuts of rafters of all kinds, the joints and sides of polygonal figures, miter cuts, etc., in a very simple and easy manner without requiring further calculations or measurements.

CHEESE-BOX.—C. T. SMITH and F. P. SMITH, Canon City, Col. The invention has reference to cheese-boxes for the use of retailers which are designed to so inclose the cheese as to protect it from insects and from drying out and are provided with doors to permit the insertion and removal of the cheese and to give access to the cheese in cutting the same. Such boxes usually have a turntable upon which the cheese is mounted and turned as its segments are successively cut off. Side walls, doors, and floor bearing the table give more convenient manipulation and freer access to the cheese and occupy less space on a counter.

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- Superintendent wanted for manufacturing plant. Must be competent to take charge of machine shop—wood-working and foundry. A hustler and good organizer. References wanted. Superintendent, Box 773, New York.
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