Science and Art.

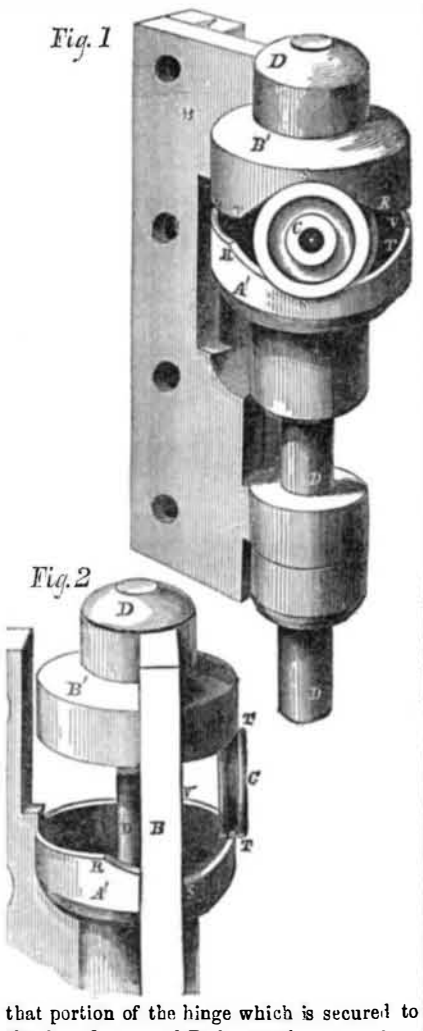
Bullard's Door Hinge.

The accompanying figures represent a hinge invented by S. M. Bullard, of Holliston, Mass. It is intended to serve in lieu of one of the ordinary hinges for doors, gates, blinds or shutters, for the purpose of closing the same by their own weight as the motive power; it is termed by the inventor a *self-closing door hinge.*

The hinge is without a spring of any kind, and consists of four parts made of iron or other metal. It involves simply a detached anti-friction roller, grooved or hollowed on its edge, moving between two circular inclined planes, which are formed upon the edges of cup-shaped pieces, connected with the flanges of the hinge, the upper inclined plane to the flange attached to the door; and the lower inclined plane to the flange attached to the door frame.

Fig. 1 represents the hinge in the position it assumes when the door is closed. Fig. 2 is a view of the hinge one-quarter open, or in the position it would be when the door was at right angles to its frame. A represents

Fig. 1



that portion of the hinge which is secured to the door frame, and B the portion secured to the door, the fastenings being of the ordinary character. A′ represents a cup-like projection cast on A, with the hollow part of the cup presented upwards. B′ represents a corresponding cup fixed on B, with its open portion downwards. C represents a roller or small wheel, grooved on its edge, and traveling between the rims of the cups A′ and B′. This roller thus receives the whole weight of the door, and as the door is opened or closed by the hand, the roller C travels around between the rims of the respective cups.

Were the rims of the cups perfectly level, the wheel or roller C would serve simply as a friction wheel, to facilitate the turning of the door. But this is not the form employed. The rim of the cup A′ is hollowed out at one point, as represented at the portion R S T, and the rim of B′ is also hollowed as represented by T S R. The gravity of the door, therefore, tends to turn the parts into the position represented in Fig. 1, where the roller C stands between the points S S, and allows the door to swing to the lowest practicable position, which is so arranged as to be the shut position. As the door is opened, the roller C is compelled to ascend the gradual incline S T, on the rim of A′, and assume the position shown in Fig. 2, while the same motion also compels the inclined surface T S of the cup B′ to ride up or mount upon C, so that the action is that of a double inclined plane, and the door is elevated to a considerable extent, reaching, in practice, to one inch, or more if necessary. When the door is open to a certain extent, represented in our engravings as about one-quarter of a revolution, the roller C mounts upon the plane or level portion of the respective cups, and from this point any further opening of the door does not raise it. Consequently the roller C serves simply as a friction roller on such portions of the revolution as lie beyond these inclines; but the gravity of the door acts as a weight to draw itself into a shut position, whenever the roller C stands on the respective inclined surfaces between S and T.

It will be seen that this roller performs no duty except that of supporting the weight, and possesses no ability to resist a lateral force. The whole lateral strain on the hinge, therefore, must be sustained by the bolt D, which passes, as represented, through both the parts A′ and B′ of the hinge, and also of a portion below, fast to each of the parts A and B. These lower parts are arranged and constructed in a manner similar in effect to ordinary gate hinges. These support the lower extremity of D, and secure the strength and perfection of the whole construction. The inventor has had one in use on a heavy door, for many months, and represents its action as all that can be desired. There are no springs employed, and the stout castings are evidently little liable to wear or fracture.

For further information, address the inventor, S. M. Bullard, at Holliston, Mass., or at 409 Washington street, Boston, Mass. This invention was patented June 2, 1857.

BRADLEY'S SHEEP-SHEARING MACHINE.

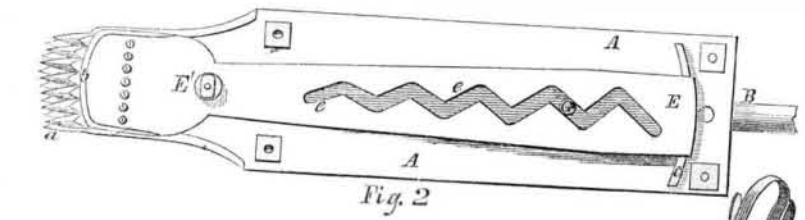
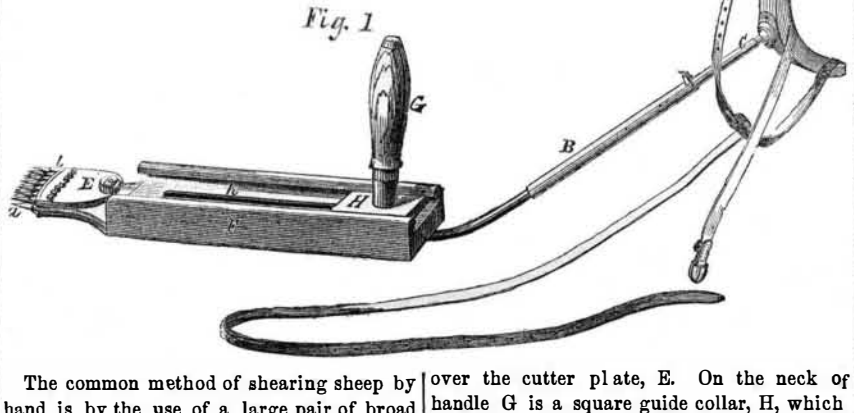


Fig. 2

Fig. 1



The common method of shearing sheep by hand is by the use of a large pair of broad spring-bladed shears, having no pivot or pin like common scissors, but are clasped in the hand, and the blades pressed together to make a clip, then the hand is partially opened for the blades to spring back, then closed again for a succeeding clip, and so on. Shearing sheep is a slow operation, and requires considerable practice to make the clips evenly, which is the most important part, because the wool should be shorn as close to the skin as possible, and the clips should be uniform in the depth of cut. By common shears this is not an easy task, for there is no positive guide for the hand of the shearer; he is therefore liable to make deep and light clips, and oftentimes cuts the animals.

The accompanying figures represent a neat, small machine for shearing sheep, and is designed to do the work quicker, and in a more uniform and simple manner than by common sheep shears. The principle upon which the cutters operate is similar to that of harvesting machines, and the operator simply guides the machine over the body of the animal with his left hand, while his right only moves the handle of the cutters backward and forward, giving them a reciprocating cutting action. Fig. 1 is a perspective view of the machine or instrument, and Fig. 2 is a top view, with the guide box or plates removed, showing the cutter plate and its zig-zag guide slot. A is a bottom plate, having a series of fingers, *a*, on its outer end. The inner end of this plate is attached to a bent tube, B, into which is fitted a rod, C, held by a screw. A shoulder piece, D, is secured to this rod by a universal joint. E is a plate having a series of cutters fastened on its outer end, and it is pivoted at E′ to the lower plate A; its back end rests upon a curved guide, *c*, which raises it a short distance above the lower plate. There is a zig-zag slot, *e e*, running lengthwise, and in this is inserted the guide pin of handle G. This plate is operated by the handle, and forms a clipping lever vibrating on the fulcrum pin, E′. A box composed of two side plates, F, and a top plate with a straight slot, *h*, in it, is secured over the cutter plate, E. On the neck of handle G is a square guide collar, H, which moves in grooves in the side plates, F. These are all the parts of this sheep-shearing machine, except the binding straps.

Operation.—The shoulder-piece, D, is placed under the right shoulder in the armpit, and the instrument is strapped to the body. The operator is then ready to commence shearing; he places the point or fingers of the instrument on that part of the animal where he wishes to commence cutting, then pushes handle G back and forth, thrusting, at the same time, the instrument forward as fast as he cuts over the body of the sheep until the whole fleece is shorn. The clips are made so as to allow the wool to fold over right and left to give the operator a clear view of what he is doing. The pin of handle, G, in the zig-zag slot, *e e*, gives the cutters a vibrating motion, and they cut like shears as it (the pin) is moved back and forth by the handle. Five clips in each direction are made while the handle is moved back and forth. The cutters, therefore, are capable of receiving a very rapid motion, and the fingers, *a*, enable a cut of a uniform depth to be taken throughout the whole operation.

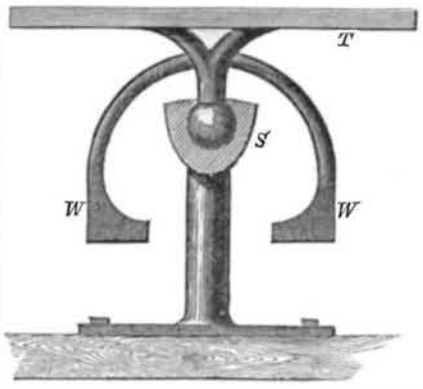
This machine or instrument for shearing sheep is of simple construction, and it can be operated with great dexterity and ease, as the universal joint of the crutch allows great freedom of movement to the operator. A patent was granted for it on the 27th of January last to R. P. Bradley, of Cuyahoga Falls, Ohio, from whom further information may be obtained by mail.

Ohio Cannel Coal and Coal Oil.

A company has been organized, and has purchased a considerable extent of cannel coal lands in the counties of Coshocton, Muskingum and Licking, in Ohio. Some of the seams are seven feet thick, and the coal is of the best quality. This company is now erecting substantial brick buildings in Newark, Ohio, for the manufacture of coal oil, and also to supply that city with gas. These works are expected to be in full operation in the month of September next.

Dining Tables at Sea.

A correspondent of the London *Mechanics' Magazine* proposes the following mode of constructing tables, in order that they may keep their horizontal position when a vessel is in



motion. The table, T, moves by means of a ball fixed in the socket, S, which is fastened to the deck. W W are weights which preserve it in a horizontal position. The same principle, he urges, would of course apply to many forms.

Fair of the Tennessee Mechanics' Institute.

The third annual fair of the above institution, as will be found by reference to our advertising columns, is to be held in the city of Nashville, in the month of October next. Exhibitors from all parts of the country are invited to enter articles to compete for the premiums. This is a spirited Mechanics' Institute, designed to advance manufactures and the arts in the State of Tennessee. We trust that the mechanics, manufacturers and agriculturists of Tennessee will not count upon sacrifices in endeavoring to make this fair the very best they have yet held.