

IMPROVED OVERHEAD SEWING MACHINE.

We extract from *Iron* the annexed engravings of Laing's patent overhead sewing machine, which has the rare merit of being an entirely novel and unique method of producing a stitch. It causes the needle to pass completely through the fabric from "overhead" to the under side, and then passing upwards round the edge, once more pierces and passes through the material, and so on, *ad infinitum*. This is a copy of the action of hand-sewing in making a seam where the thread or cotton continually encircles the two edges which are brought together to be united.

This effect, or stitch, is beautifully produced by a circular helical needle, *a b*, Fig. 3, which makes two or three turns round a central spindle, *I*, Fig. 3. The interior diameter of the circular needle is considerably greater than that of the spindle within it, and as the driving band, *H*, is arranged by guide pulleys, *f*, to pass only round one side of the needle and spindle, *I*, the needle is thus pressed away from the spindle upon one side, and is suitably placed for piercing the material as it revolves. One end of the spiral needle, *b*, is,

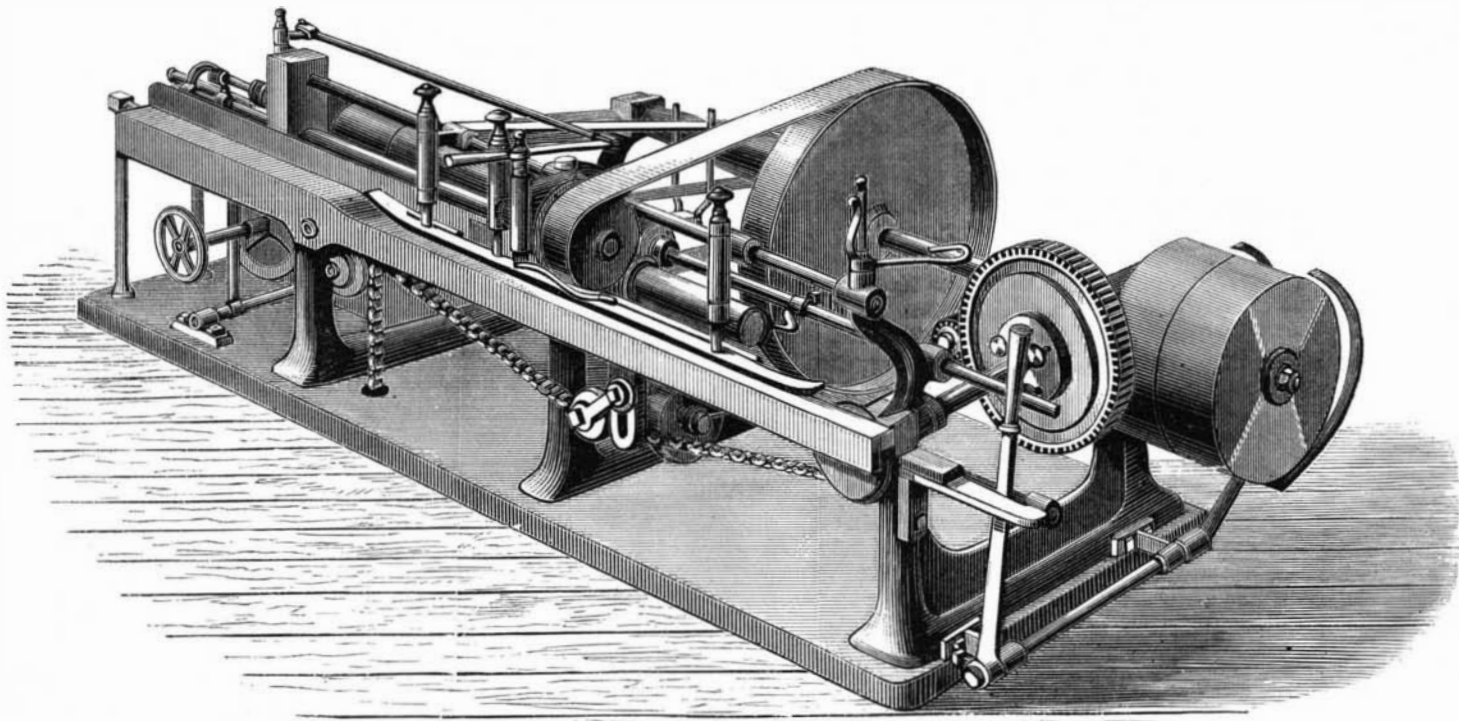
of course sharpened, and the other end, *A*, by a hook, engages the thread, and which thus carries it through and through the material, making a lapping stitch round the edges of the seam, which cannot thus be distinguished from hand sewing except by its wonderful regularity and even-

ness. In Figs. 1 and 2, *D* and *C* are the fast and loose pulleys, which may be driven by the strap from an engine shafting, or may be replaced by a hand wheel or treadle. Upon the main shaft, *B*, is a miter gearing, which drives, by the changeable cog gearing, *12*, the spiked feed chain, *9*. This spiked feed chain seizes the fabric as soon as it is fed upon

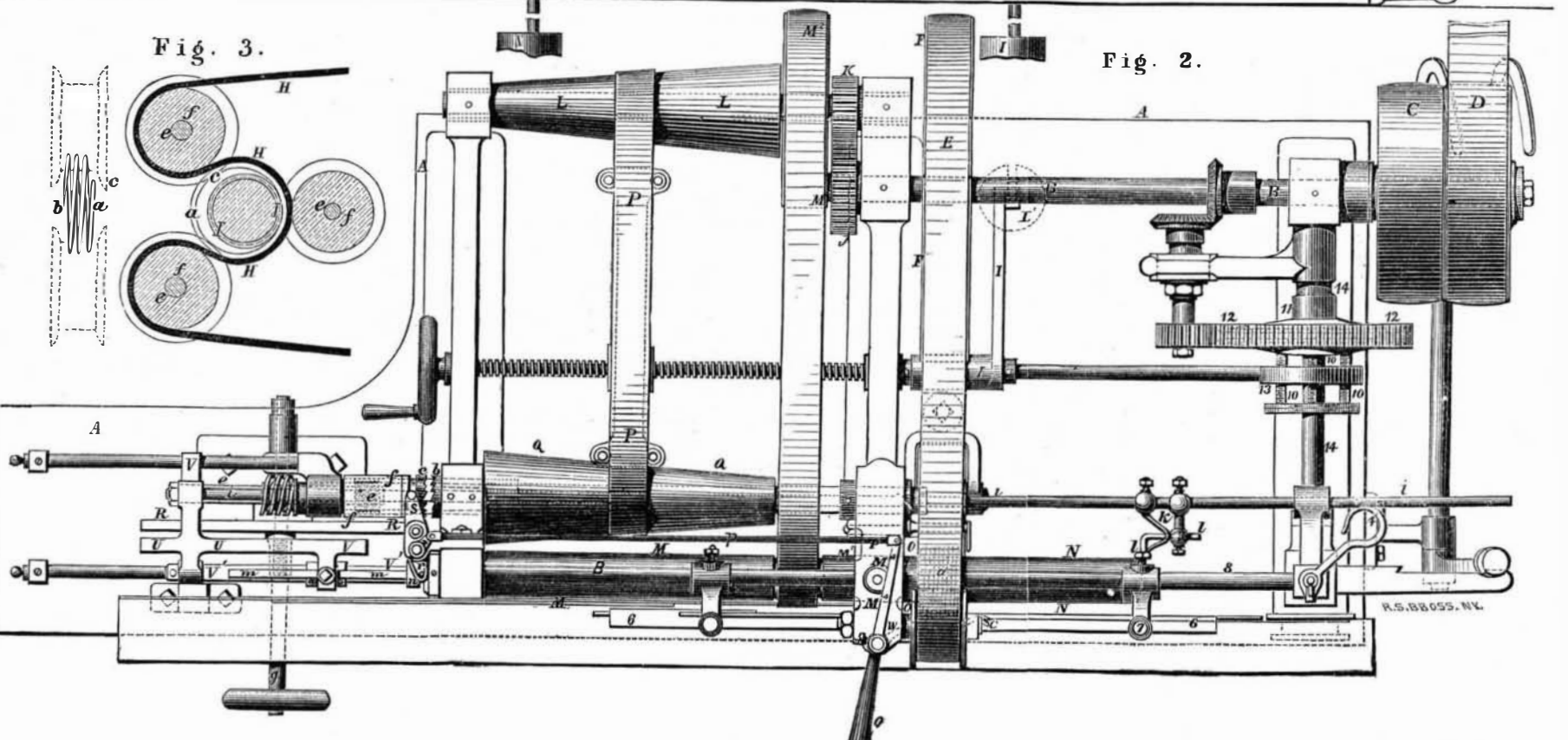
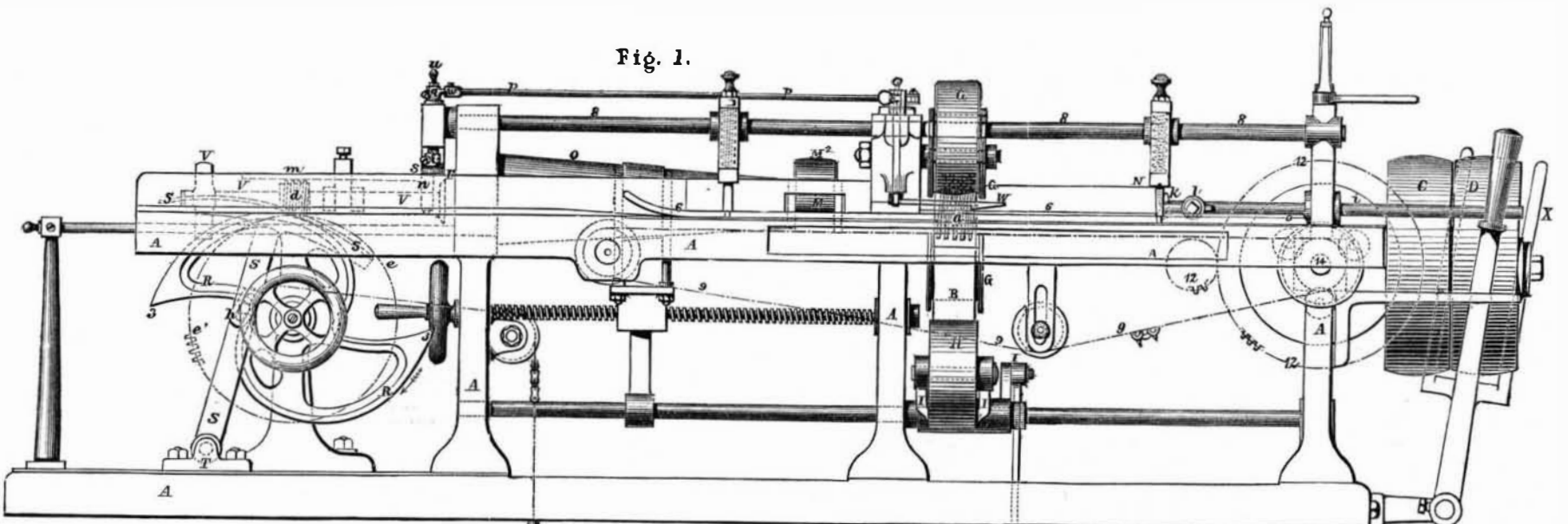
the feed table, and passes it over from left to right at a speed which may be varied by changing the cog gearing, *12*. Upon the same principal shaft is also a large pulley, *F*, which operates the band, *E*, that passes round the series of rollers, as shown in Fig. 3, and thus drives the needle. A counter-shaft has another pulley, *G*, upon it that drives by a band the thread cylinder. Upon the counter shaft, between the two standards, is a driving cone, *L*, which, by an adjusting band, *i*, may be set to drive the opposite cone, *Q*, at a varying speed, according to the position of the band, which is determined by a guide traveling upon a screwed spindle.

The use of these two differential cones is to give a horizontal variable sliding motion to the thread or string barrel. The end of the cone through which the

screwed portion of the spindle passes is provided with a movable catch which gears with the screw; the action of the machine itself throws the catch in and out of gear with the screw according as the stage of sewing operations requires that the string or thread barrel should recede slowly into the hollow cylinder, or emerge suddenly therefrom to resume its



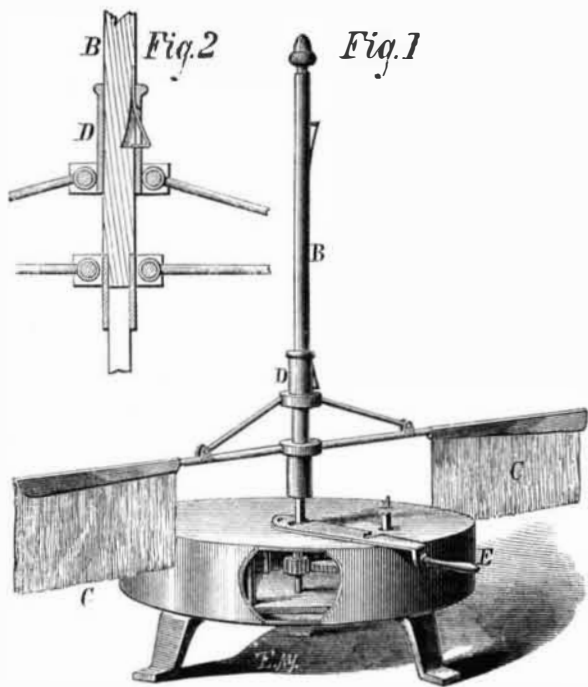
LAING'S OVERHEAD SEWING MACHINE.



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normal position. This action is very ingeniously obtained by a weight to bring the thread barrel out, and by the screw-engaging catch gradually drawing it in.

This means of obtaining the sliding motion of the thread barrel has, in the latest designs, been considerably modified. The use of the drawing thread, which also carries the whole of the suspended weight, has been substituted by an involute cam, with a double throw and deep step back to the axis, as shown in Fig. 1. The slow revolution of the cam causes the inclined surface of its throw to bear upon a stud in a rocking lever, S. At the extremity of this rocking lever, in a radius from its axis, T, is a toothed quadrant, which gears in a rack attached to the thread barrel, and which is thus steadily drawn in. When the half revolution has been completed, the drag weight, X, draws over the lever, S, down the sudden step, and thus shoots out the thread barrel ready for its next gradual feed. The length of feed may be varied by change of cams



FLY FAN.

The thread is held against the circumference of the hollow spindle when thrown from the barrel. The barrel in revolving carries round with it the thread thus held or jammed against it, and pulls tight the stitch last made, the slack of the thread being transferred to the barrel by the action of the thread catch or drag.

The fabric to be sewn is fed upon the table of the machine from left to right in a direction parallel to the axis of the spiral needle.

The amount of grip or edging embraced by the over-edge stitching will be regulated by distance from the axis of the needle at which the material is fed in, and this may be determined by a fence upon the feeding plate. As the fabric is fed past the plate or fence, it is caught and carried forward by a spiked endless chain, which passes over two chain pulleys, one at each end of and situated below the feeding table. One of the said chain pulleys is fixed upon a countershaft, which is driven by gearing from the main shaft of the machine. The speed of the feed will be varied according to the rate of revolution of the chain wheels, which can be regulated by the use of change wheels in the intermediate gearing. The fabric is held down to the feeding table by a pressure whose tension may be regulated by a screw.

The latest practical improvement in this arrangement consists in the presser being carried in two brackets from a spindle, which runs parallel to the axis of the needle. In the brackets are a couple of coiled springs, which give the necessary pressure upon the material, and when the pressure is not required it may at once be lifted up clear of the material.

An exceptionally fine adjustment for the rate of feed is now applied to the machine. This is effected by using friction wheels to pinions instead of the spur gearing, and by introducing a friction clutch on the shaft that drives the pitch chain by which the width of the stitches is regulated, as well as the tension on the spiral needle. This tension is prevented from reaching an extent which would be dangerous to the needle, by reason of the friction clutch slipping before that degree of tension is reached.

In course of time the thread coiled upon the barrel becomes exhausted, when the spiral needle may be automatically re-threaded, so that a fresh thread is placed in the eye of the needle, without stopping the machine or interrupting the progress of the work: and the string and thread barrel being again brought out of the cylinder by the action of the weight, a fresh supply of thread or string is coiled thereon, and the work proceeds as before.

The thread may be supplied to the machine in hanks of such a length as to fill the thread or string barrel. A perhaps preferable arrangement is to use a reel driven by the machine, and alternately measuring from a bobbin and transferring its measured contents to the exhausted thread or string barrel. The re-threading of the needle is effected by a tube, which, after feeding the thread or string to the

reel, catches it into the hook or eye of the needle, and afterwards severs the thread by bringing it in contact with a knife edge.

In sewing with this machine the pitch or width between each stitch may be regulated by the relative speeds of rotation of the needle and the travel of the feed chain. When the latter feeds slowly, the pitch of the thread or stitch will be very short; when the latter travels quickly, the pitch will be large. The elastic nature of the needle enables it to extend to suit the varying pitch of the stitching. The relative speeds of the feed chain and rotating needle may be adjusted by the change wheels, W.

The speed of movement of the thread barrel towards the feeding end of the machine is adjusted according to the breadth or grip of cloth through which the seam is made, that is to say, the barrel is caused to unwind the thread or cord faster or slower, according as a broader or narrower "grip" is required. This adjustment is made by shifting the driving belt on the cones by means of the belt shifting operated by the screw and hand wheel.

The automatic threading is accomplished by a very ingenious and simple operation. So long as the needle is working with a supply of thread from the sliding string box, and so long as the string box is continuing its steady travel outwards, the threading lever is pushed back out of the way. But as soon as the cylinder has almost completed its travel, the inclined side of a plate comes in contact with the end of the threading lever, which carries the end of a fresh hank, stretched across an open fork, in its extremities. Just as the stroke of the string cylinder is completed, the lever is suddenly thrust forward, so that the tail of the needle catches up the string from the loop, and re-threads itself, when at once the threading lever returns out of the way. The eye of the needle is thus not a perforated one, but a species of hook in which the string is gripped by the rotation of the needle.

IMPROVED AUTOMATIC FLY FAN.

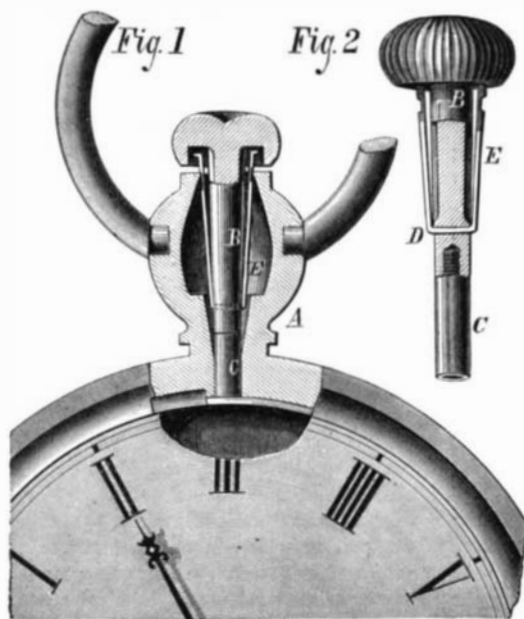
The invention illustrated herewith consists of vanes or fans which are rotated by suitable mechanism with the object of agitating the air and driving away flies. The device may be placed upon a dining table, in show windows, beside invalids' beds or children's cradles, and will prove especially convenient for confectioners.

The circular box which forms the base contains a simple train of clockwork, which is wound up by a key applied to the shaft, A. This mechanism rotates the vertical shaft, B. On said shaft is a sleeve having a ring flange, to which last are suitably hinged the arms which carry the fans, C. To the middle of the arms are attached braces which are hinged to another flanged sleeve, D. On the shaft, B, are catch springs, as shown, by means of which the upper sleeve, and consequently the arms and fans, may be adjusted to any height. The motion of the fans is thus regulated. The pivoted bar, E, has a notch which slips over the squared end of the shaft, A, preventing the latter from turning and thus stopping the movement of the clockwork when desired. In Fig. 2 a sectional view of the sleeves and method of hinging the arms and braces is given.

Patented August 21, 1877, through the Scientific American Patent Agency. For further particulars address the inventors, Prather and Shirley, Lineville, Iowa.

COMBINED PUSH-PIN AND WATCH KEY.

This invention consists in a removable push-pin for watches, which is provided with spring for holding it in place in



the stem of the watch, and with a watch key point at its inner end which may conveniently be used for winding the watch.

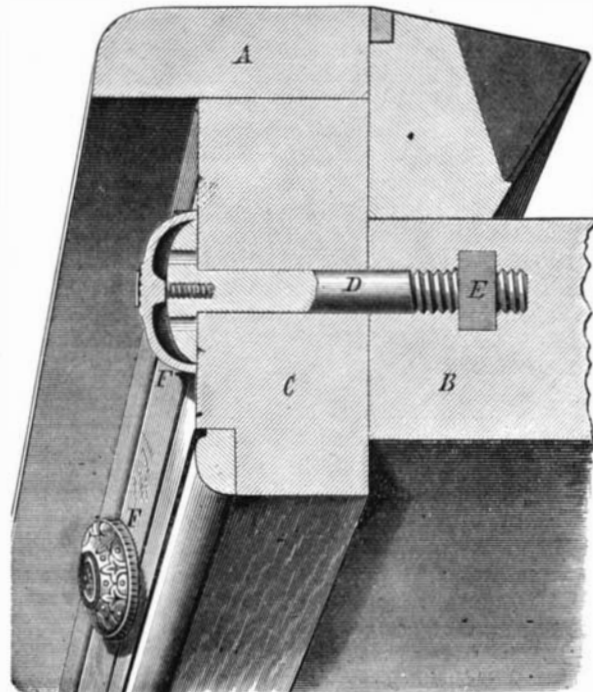
Referring to the illustration, Fig. 1, which is an enlarged sectional view of a watch stem containing the improved push-pin and key, A is the stem of a watch, which is chambered out, leaving an internal angular edge at the top of the stem. B is a push-pin, seen detached in Fig. 2, having a milled head, into the inner end of which a steel watch key point, C, is screwed. The push-pin is drilled transversely at

D, and is grooved longitudinally from this point to the head to receive a wire spring, E. This spring extends upward at each side of the push pin, and is notched to receive the edge of the watch stem. The notches are of sufficient width to permit of moving the push-pin sufficiently to operate the case spring. When it is desired to wind the watch, the key is drawn from the watch stem and used as an ordinary key. When the point, C, becomes worn or broken it may readily be unscrewed and replaced by a new one. The advantages claimed for the invention are that it obviates the complication of stem winders, and at the same time provides a key that always accompanies the watch.

This improvement was patented through the Scientific American Patent Agency, by Augustus A. Fisher and Simeon H. Lucas, of Santa Fé, New Mexico, June 26, 1877.

IMPROVED FASTENING DEVICE FOR BILLIARD CUSHION RAILS.

It has hitherto been customary to use, for the attachment of the cushion rails to the bed of a billiard table, bolts,



which were provided with large finished heads, and which were so applied that, while the body of the bolt passed through the cushion rail, and its threaded end engaged with a blind nut let into the bed, the head of the bolt took its bearing on the outer face of the cushion rail. This head, in which were holes to allow of its being turned by a suitable tool, has commonly been exposed to view. We illustrate herewith a novel device for covering the head, which may be applied without the use of any separate screw or washer, and without requiring any countersink or other alteration on the rail.

A is the cushion rail; B the bed, and C the frame of the table; D is the bolt, the threaded end of which is engaged by the nut, E. In the head of the bolt a hole is drilled and tapped to receive the screw head of the ornamental cover, F, which is set in place after the bolt is inserted. A knurled surface near the outer edge of the cap allows of its ready manipulation in screwing it upon the bolt. The cap is struck up of sheet metal in a tasteful pattern, or it may be an ornamental casting of bronze or other metal, having the screw a part of the same. By this construction the cushion rail is not weakened, as is the case where the bolt head is countersunk or let into the rails; the screw of the ornamental cap being a part of the cap itself, makes few parts; and when replacing or a new design may be wished, for ornament, the cap can be readily unscrewed from the bolt, while the table can be employed as usual. It may be made, we are informed, at a small cost, and it saves the usual expense of finishing the bolt heads, besides being an ornament to the table.

Patented July 31, 1877. For further information address the inventor, Mr. H. W. Collender, 738 Broadway, New York city.

Preparation of Celluloid.

Paper is treated by a continuous process with 5 parts of sulphuric acid and 2 of nitric acid, which convert it into a sort of gun cotton. The excess of acid is removed by pressure, followed up by washing with abundance of water. The paste when thus washed, drained, and partially dried, is ground in a mill, mixed with camphor, ground again, strongly pressed, dried under a hydraulic press between leaves of blotting paper, cut, bruised, laminated, and compressed again in a special apparatus suitably heated. It is said to be hard, tough, transparent, elastic, fusible, becoming plastic and malleable at 125°. It ignites with difficulty, is decomposed suddenly at 140° without inflammation, and gives rise to reddish fumes. It is inodorous, and does not become electric on friction.—Bull. de la Soc. Industrielle de Rouen.

STEAM POWER IN FRANCE.—It is computed that France now possesses steam engines of an aggregate force of 1,500,000 horse power. This is equal to the effective labor of 31,000,000 men, or about ten times the industrial population of the country.