(No Model.) 2 Sheets—Sheet 1.

A. A. EKLIFF.

BUTTON TRIMMING MACHINE WITH AUTOMATIC KNIFE SHARPENER.

No. 545,275. Patented Aug. 27, 1895.

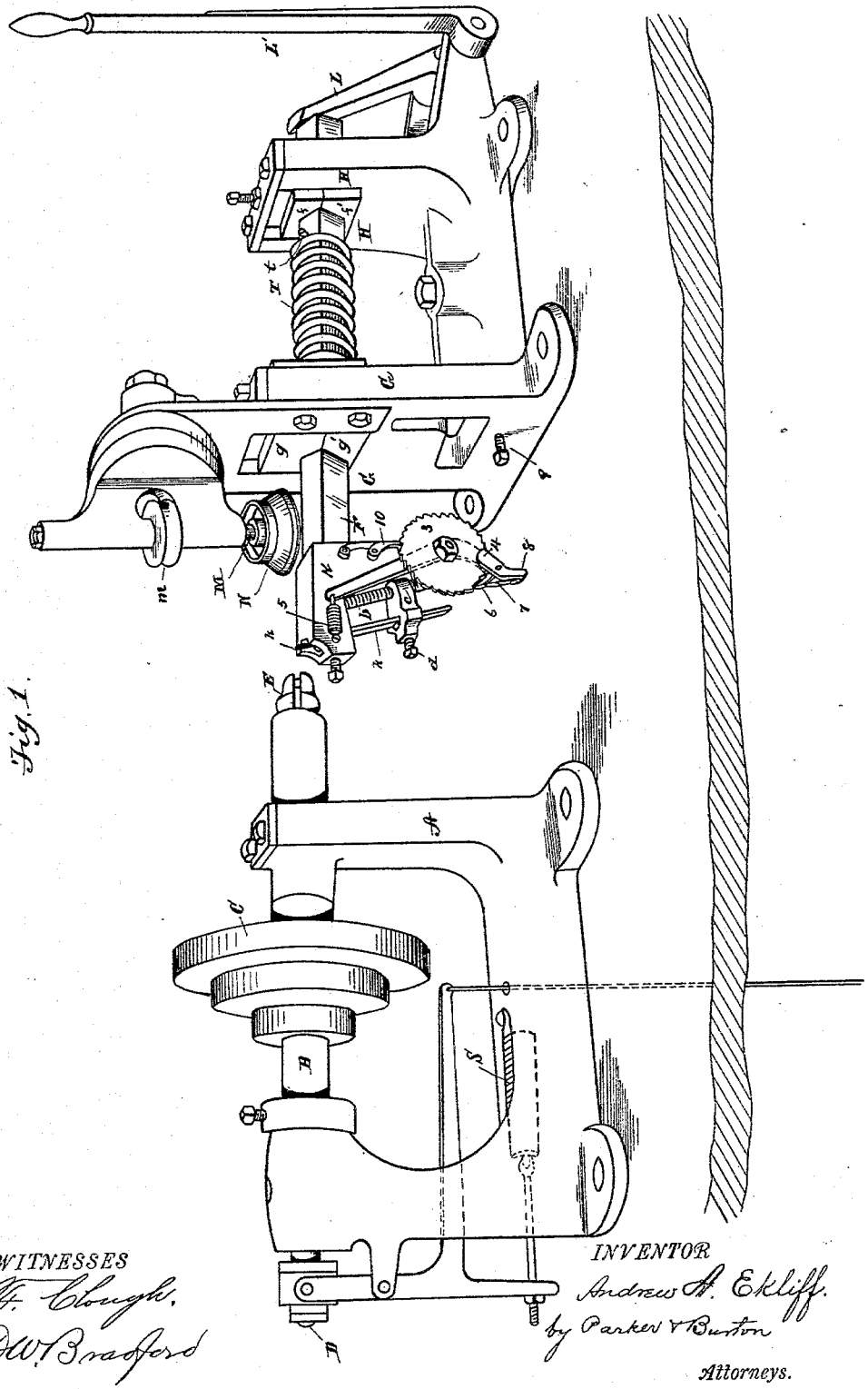

Fig. 1.

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Fig. 2.

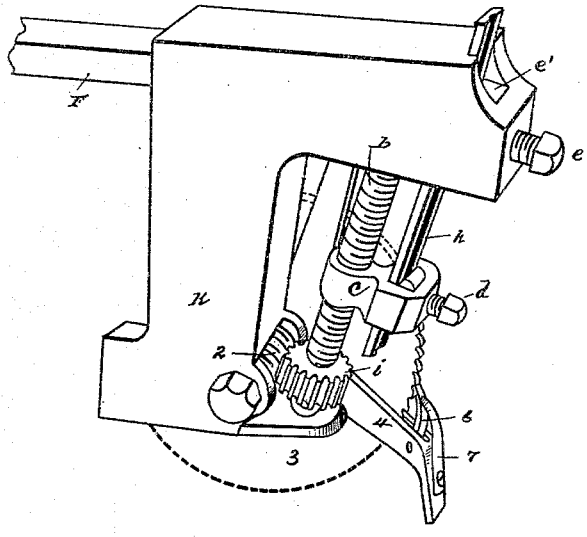
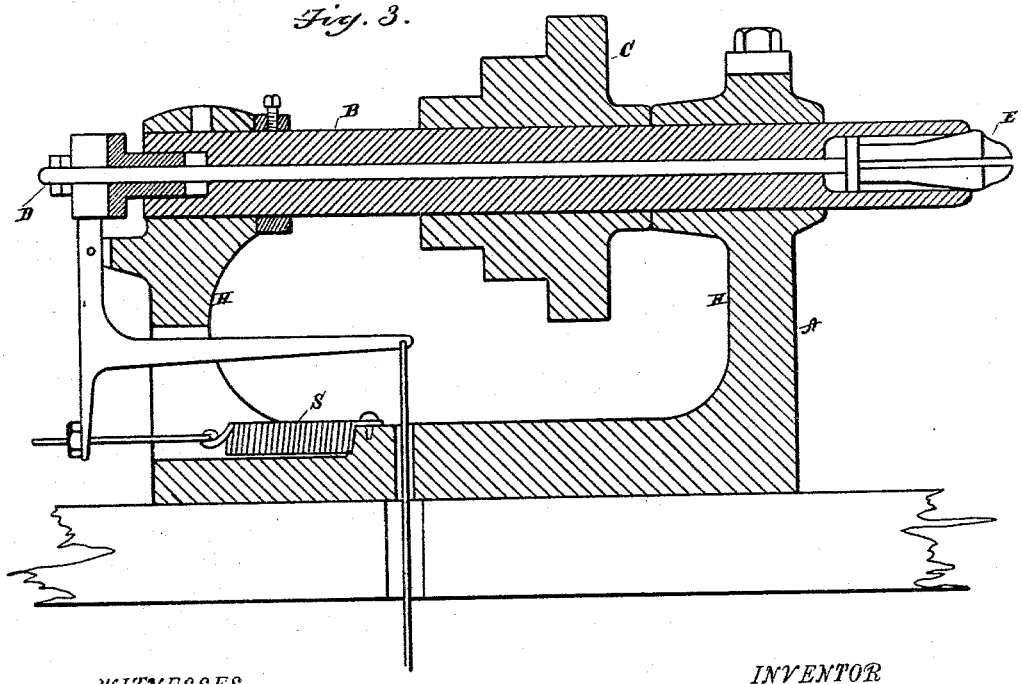


Fig. 3.



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UNITED STATES PATENT OFFICE.

ANDREW A. EKLIFF, OF DETROIT, MICHIGAN.

BUTTON-TRIMMING MACHINE WITH AUTOMATIC KNIFE-SHARPENER.

SPECIFICATION forming part of Letters Patent No. 545,275, dated August 27, 1895.

Application filed October 26, 1893. Serial No. 489,224. (No model.)

To all whom it may concern:

Be it known that I, ANDREW A. EKLIFF, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Machines for Sharpening the Knives of Pearl-Button-Trimming Machines; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to button-turning machines, and has for its object an improvement in machines for cutting and turning pearl buttons.

In turning and trimming pearl buttons with machines using steel cutting-knives, the knife dulls very rapidly, requiring a constant stopping of the machine to replace the dulled knife with a freshly-sharpened one, or requiring some means of sharpening the knife without removing it from the machine.

It is the object of this invention to provide means for sharpening the knife and giving it a fresh edge between the time it is used in trimming one button and the time it is used in trimming another, the means employed in the improvement being such that between each two successive operations the beveled edge of the knife is drawn across the flat surface of a rapidly-revolving emery-wheel and is freshly ground by the wheel; also at the same interval the knife is advanced axially a short distance, so as to insure contact with the emery-wheel and the production of a fresh edge for cutting purposes.

In the drawings, Figure 1 represents the entire button-trimming machine in perspective. Fig. 2 shows an enlarged detail of the knife-holder and the means for advancing the knife. Fig. 3 shows an enlarged detal of the button-holding chuck.

The button-holding chuck shown in Fig. 3 does not differ materially from those in common use. It consists of a supporting framework A and a hollow shaft B, on which is a cone-pulley C. Through the hollow shaft B extends a rod D, which carries at one end the jaws of a chuck E, and at the other end is fitted with suitable levers by which it can be moved endwise through the shaft B, the lever shown in the drawings being one which is adapted to be connected to a foot-piece and operated by the foot to throw the rod D through the shaft B and loosen the jaws E of the chuck, the action of the lever when the foot-power is pressed being against the tension of the spring S, which tends to throw the rod D in a direction through the shaft B to close the jaws of the chuck.

Opposite to the chuck E, and moving in a line parallel with the axis of the rod D, is a sliding carriage F, supported between four bearing-plates *g g' f f'*. The bearing-plates *g g' f f'* are supported between posts G G H H, by which they are held from horizontal movement in either direction, but which permit of a vertical adjustment. The carriage F is preferably square in cross-section and set with the diagonal of the square in a vertical line, and it supports at its inner end—the end toward the chuck E—a knife-frame K.

Between the posts G H, surrounding the bar F, which forms the knife-carriage, is a spring T, that bears against the post G and against a pin *t* in the bar F. The tension of the spring T tends to throw the carriage and the knife away from the chuck E, and is arranged to hold the carriage F and the knife-frame K against the power applied to it by means of the push-lever L and hand-lever L'. When no force is applied to the hand-lever L' the carriage F and knife-frame K move outward away from the chuck E until the knife-frame K is stopped by striking the supporting-post G.

To the supporting-post G is secured a bracket in which is journaled a vertical spindle M, on the lower end of which is a grinding-wheel N. The spindle M is given a rapid rotary motion by a driving-belt that passes around the pulley *m*. The under surface of this wheel N is flat, or preferably flat at the rim and with a sunken center. It is so hung that its flat lower surface is in or nearly in a plane that passes through the center of the chuck E.

The knife-frame K is a block of metal and has a passage-way through it vertically for the knife *k*. The passage-way is oblique to the axis of the carriage F and the axis of the chuck E, the amount of obliquity being determined by the amount of clearance it is de-

sired to give to the knife-edge. The knife-frame supports a screw *b* which has the same obliquity that the knife is intended to have. The screw *b* is supported at its upper and lower ends in suitable bearings in which it can turn freely, and upon the screw is a runner or nut *c*, provided with a slot through which the lower end of the knife *k* is passed. The knife *k* is secured in the slot of the runner-nut *c* by a set-screw *d*, which holds it tightly to the nut. The upper end of the knife *k* is held loosely in the hole or passage through the knife-frame K by a screw *e* and a block or cotter *e'*. The screw *e* is not intended to be turned down tightly against the knife, but only sufficiently to properly guide the knife without preventing its free motion due to the motion of the runner nut *c* when the screw revolves in it.

On the lower end of the screw *b* is a pinion 1, which meshes with and is driven by a worm-screw 2. The worm-screw 2 is journaled in the knife-holder K, and has as the driving-wheel by which motion is given to it a ratchet-wheel 3. On the shaft of the ratchet-wheel 3 is hung a pawl-lever 4, the upper end of which is held by a spring 5 in its forward position. (Shown in Fig. 1.) To the lower end of the ratchet-lever 4 is pivoted a pawl 6 and the pawl 6 is held in engagement with the teeth of the ratchet-wheel 3 by a spring 7. The end of the lever 4 engages with the main frame-work or post G or a suitable stop connected therewith just before the outward motion of the carriage is stopped by the engagement between the knife-frame K and the frame G. The slight backward movement of the carriage after the end 8 of the ratchet engages with its proper stop, and before the carriage is finally stopped, moves the lever 4, the pawl 6, and feeds the ratchet-wheel forward one or two notches according to the adjustment that has been made of the stop 9. The forward motion that has been gained is held by the pawl 10, which the feeding-pawl 6 returns under the tension of the spring 5, when the carriage is again advanced toward the chuck E. At each forward-and-back movement the upper beveled end of the knife *k* passes across the grinding-surface of the wheel N and at each backward movement of the carriage the knife is advanced a very slight distance to permit of its receiving a fresh edge. The two screws that are used in feeding the knife forward make the feed very slow, but very absolute.

The knife may be of any one of several forms best adapted to produce the formation of button that is desired, as the form of grinding-wheel and the way of feeding the knife to the grinding-wheel enables me to sharpen a convex or concave or irregular knife with equal facility.

What I claim is—

1. In a lathe for trimming pearl buttons, the combination of a knife holding frame adapted to move axially toward and away from the button holding chuck of said machine, a knife feeding screw placed obliquely with respect to the path of travel of said frame, a ratchet wheel and intermediate gearing whereby said ratchet wheel is adapted to rotate said screw, and a ratchet driving pawl adapted to coact with a fixed part of the frame-work and drive said ratchet wheel, substantially as described.

2. In a lathe for trimming pearl buttons, the knife frame K, adapted to be carried by the horizontally moving carriage F, the knife feeding screw *b*, having its ends journaled in said frame, the nut *c*, adapted to engage the feeding screw, the knife *k*, adjustably held at one end by means of the nut whereby it is compelled to move with said nut and having its opposite end guided by means of an opening through the frame, the pinion *i*, mounted on the screw, the worm screw 2, journaled in the frame and adapted to engage said pinion, the ratchet wheel 3, secured to one end of said worm screw, and the pawl lever 4, loosely hung on the shaft of the ratchet wheel adapted to coact with the frame whereby said ratchet wheel is operated, all combined to operate substantially as and for the purpose described.

In testimony whereof I sign this specification in the presence of two witnesses.

ANDW. A. EKLIFF.

Witnesses:
CHARLES F. BURTON,
MARION A. REEVE.