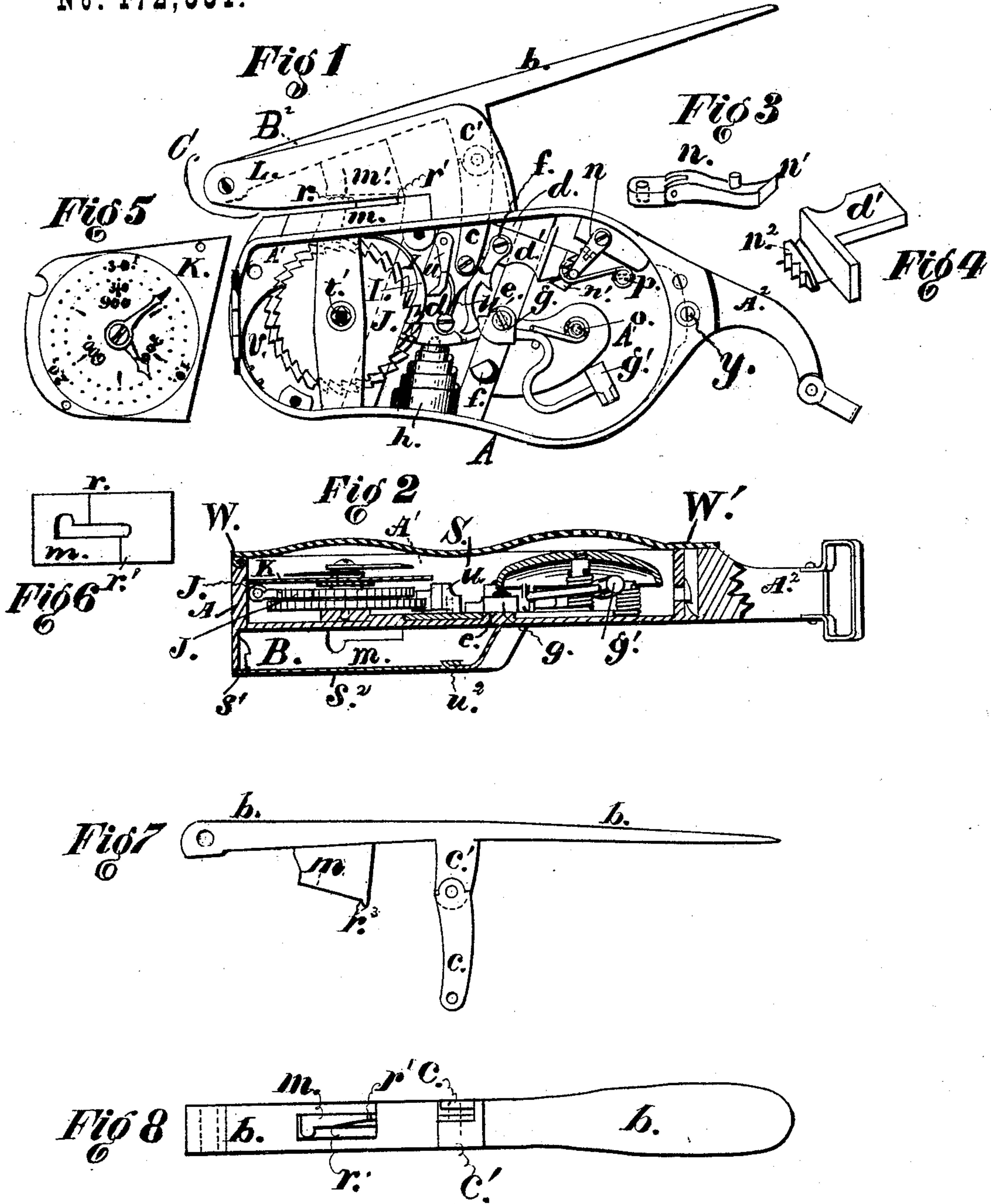


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TICKET-SHEARS, REGISTERING AND ALARM MECHANISM FOR
RAILROAD USE.

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Witnesses:

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IMPROVEMENT IN TICKET-SHEARS, REGISTERING, AND ALARM MECHANISMS FOR RAILROAD USE.

Specification forming part of Letters Patent No. **172,331**, dated January 18, 1876; application filed February 16, 1875.

To all whom it may concern:

Be it known that I, ROBERT McCULLY, of Philadelphia, county of Philadelphia and State of Pennsylvania, have invented a ticket-shears or a machine for registering fares and cutting fare-tickets for railroads, of which the following is a specification:

My invention relates to certain constructions of parts, and their arrangements and combinations in a machine for use upon street-railroad cars, whereby, first, such machine will cut off a portion of a fare-ticket by shearing action, and receive and preserve such portion in a box, which may have been before locked and its key withheld from the conductor, and which machine, by a shearing action, will cut out any of the letters of the alphabet, and while operating, either upon the end of the ticket or cutting figures or characters on the ticket, will register the receipt of the passenger's fare on a dial-plate inside of the locked box, and at the same time sound an alarm which may be heard by passengers; and whereby, second, all possible chance of forcing down the handle or lever to a position intermediate between its normal position and the position it occupies when acting upon the register and alarm, and of returning it again to its normal position before the fare has been registered and the alarm sounded, is prevented.

The objects of my improvements are to lessen the labor of operating the implement, and also to prevent a fraudulent tampering with the implement by the conductor, the first being secured by operating upon the tickets with a shearing action, instead of punching through the ticket, and the second by rendering any false and incomplete operations of the lever or handle unavailable to the conductor.

In the accompanying drawings, Figure 1 represents an elevation of one side of the machine, the cover thereof having been removed in order to display the interior parts; Fig. 2, a longitudinal horizontal section of the machine in an inverted position; Fig. 3, a detail view in perspective of the pawl which prevents the lever or handle of the implement from being moved upward before the full downward movement is made; Fig. 4, a detail perspec-

tive view of the arm of the sliding plate, which carries and actuates the alarm-hammer and the register; Fig. 5, a front view of the dial-plate of the register; Fig. 6, a top view of the lower cutter of the shears; Fig. 7, a side view of the lever or handle of the implement, with its hinged arm and the upper cutter of the shears; and Fig. 8, a bottom view of the said lever or handle.

The case A of the implement is a narrow oblong box, with a long chamber, A', on one side, for containing the register and bell, and the mechanism for operating directly upon those parts, and with a shorter chamber, B, on the other side, for receiving and confining the shearings or cuttings of the implement. The chamber B is near the front of the implement, and wholly on one side of the chamber A', and is directly under the shearing-opening in the top of the case A. The chamber A' has an opening leading into it from about the center of the case, through which a hinged leg or arm, c, of the handle or lever b of the implement, reciprocates for operating the mechanism within the chamber A. On top of the case an angular bracket, B², is constructed. This bracket is so shaped that it provides two long vertical jaws, which are, along the greater portion of their length, elevated above the top of the case A in order to admit the lower cutter m of the shears, and also form an insertion passage or slot, C, between this lower and the upper cutter m' of the shears. Between these jaws the lever or handle b, to which the upper rigid shearing-cutter m' is attached, is arranged and pivoted. This lever, with a curved extension, A², on the rear end of the case A, forms a means by which the implement is operated, and carried in the hand while being operated.

e is a raised guideway fastened upon the inside of the case A. To this guideway the rear end of the handle g of the bell-hammer g' is pivoted. f' is a trip, also attached to the guideway e, and f is a pawl pivoted to an arm, d', of a sliding plate, d. This arm d' is fitted, by a dovetail, to the front of the guideway, so as to be guided thereby, while sliding back and forth. The sliding plate d is dovetailed at its edges to the case and the guideway, and is connected to the handle or lever b by a

hinged arm, *c*, which is pivoted to a projection, *c'*, of the handle or lever *b*. This plate *d* bears a double-acting V-shaped spring, *u'*, and a driving-pawl, *u*, and is held up as high as it will go by a volute spring, *h*, attached to the bottom of the case of the implement. *n* is a pawl, jointed transversely to its main pivot, and working back and forward on said pivot, and to the right and left on its transverse or intermediate joint, as shown. *n'* is a spring, applied to press the pawl *n* both back and forward and down against ratchet-teeth formed on the back edge of the arm *d'* of plate *d*. *o* is a spring, which throws the hammer against the bell when the lever or handle has been fully pressed down. *J J* are two registering wheels, both arranged on the same axle. Both these wheels have an equal number of teeth, but the right-hand wheel is the largest in diameter, and is provided with a check-pawl, *I*, to prevent reverse action after the driving-pawl *u* has propelled it forward, and the left-hand wheel is provided with a check-pawl, *v*, which prevents a reverse action after the pawl *u* has operated upon it. This left-hand wheel is moved one notch for every revolution of the larger wheel. The larger wheel registers single fares and the smaller wheel the aggregated fares received in a given time. The dial-plate and hands indicate the condition of the register-wheels when a trip has been completed, or at the end of the day. In order that the pawl *u* shall drive this smaller wheel in the manner just stated the larger wheel is provided with one notch, which is so deep that the pawl *u* (which is made wide for the purpose) shall, when its point enters this deep notch, also enter a corresponding notch in a smaller wheel and drive this wheel along with the larger wheel. The arm *d'* of the sliding plate *d* has a groove in its face between the ratchet-teeth on its edge and the part which embraces the guideway *e*, and by reason of this construction the point of pawl *n*, when not in gear with the teeth, does not interfere with the reciprocating movements of the plate *d* and its arm *d'*, said groove forming a passage-way for the point of the pawl when the plate is rising past it.

By providing the pawl *n* and the ratchet-teeth, and at the same time making the groove in the arm *d'* of the plate *d*, the operation is as follows: The lever or handle *b*, if pressed downward gradually moves the plate *d* until its arm *d'* forces the point of the pawl back of and out from under it, at which stage, if the force upon the handle or lever *b* is withdrawn, the spring *n*, which has been holding the pawl down under the arm *d'*, now forces the pawl forward and causes it to drop into one or the other of the spaces between the ratchet-teeth, and the handle is thereby locked against any upward movement, and the conductor must complete the movement of the lever or handle, so as to register the fare and sound the alarm which tells to the passenger in the car that the fare has been registered, before he can

again raise the lever or handle. The further depression of the handle will cause the pawl *u* to move its wheel one notch and the pawl *f* to free itself from the trip or step *g* on the rear end of the handle of the hammer, and the bell to be struck by the action of spring *o* upon the hammer. This accomplished, the handle or lever *b* is released, and the point of pawl *n* being in line with the groove of the arm *d'* of plate *d*, permits the spring *h* to force the plate and its connections up to their starting position. During this return movement the toothed portion of the cam *d'* passes up in rear of the point of pawl *n*, and said point of the pawl falls into the groove which is parallel to the line of teeth, and when this movement is completed the point of the pawl falls under the arm in its normal position, as shown in Fig. 1. In order to prevent hanging of the pawl as it enters the groove a beveled form is given to the back of the groove.

The hand-lever *b*, it will be seen, is pivoted at its forward end between the jaws *L L*, and the jointed arm *c* of the handle *b* extends down between the bell and register into the interior chamber *A'*, shown in Fig. 1. The lower cutter *m* of the shears is fastened in the top of the box *A* just under the jaws, and is provided with a suitable vertical opening for the upper cutter *m'* to enter when the machine is operated.

On one side of the implement between the jaws and the lower cutter, from the point *r*¹ forward a proper distance, a stop or shoulder is formed in order that a ticket inserted from one side may abut against it while the shearing-cutters are shearing off the end or coupon thereof. Forward of the point *r* the passage for the insertion of tickets extends entirely across and to the front of the jaws, and tickets may be inserted from either side and from the front when the letters, figures, or characters are to be cut on the same. The vertical opening in the lower cutter *m* extends far enough back beyond the point *r*¹ to furnish play-room for the heel-point *r*³ of the upper cutter *m'*. The point *r*³ remains always within the vertical slot or opening, and secures true action, and prevents the two cutters of the shears from getting out of proper relation to each other, and this is furthered by the upper cutter *m'* being fastened rigidly to the lever or handle *b*, which is fitted snugly between the jaws to which it is pivoted in front of the slot.

The acute angle presented by the face of the cutter *m'* with the upper margin of the vertical slot in cutter *m* enables the implement to cut with a shearing action. The upper cutter *m'*, as shown in Fig. 7, inclines from the heel-point *r*³ upward to its front, and when a ticket is inserted at the side, to have its edge trimmed or a coupon cut off, and the handle is forced down, the shears begin to cut the margin of the ticket next the heel, and cut progressively forward toward the pivot of the handle *b* until the margin of the ticket or a coupon is wholly cut off. It will be under-

stood that the end of a ticket when inserted from the left side of the machine abuts against a shoulder formed by a forward extension of the right jaw, and the shears operating upon the ticket shear off a narrow rectangular strip or a coupon, and the portion thus sheared off falls down through a suitable opening into the box B. But when it is desired to cut out any letter of the alphabet or any other irregular figure (the upper and lower cutters having been shaped with that view) the ticket is inserted from the front, or at either side forward of the shoulder, into the opening C, and when thus inserted the cutters shown in Figs. 6 and 8 will cut the letter P. By having the cutters changeable in character, different railroads in the same city can have cutters for shearing or cutting their own symbols or characters on tickets, and the different characters cut on the tickets will serve to more effectually prevent the frauds heretofore practiced by dishonest conductors. The cutting out of the letter or character, or the cutting off of the slip from the end of the ticket, the ringing of the bell, and registering the receipt of a passenger's fare, are done successively, but by one movement of the handle or lever, and after the handle has been forced down, so that the pawl *n* enters the first or second notch, the whole downward movement must be completed, and the operation of registering the fare of a passenger and signaling the same effected before the lever or handle can be raised for a second operation. The case A has a door, which is hinged by one end at W, and locked at the other, as shown. The chamber which receives the cuttings also has a movable cover, *S*², which is locked. This cover is not hinged, but has its rear end reduced in thickness, and inserted into a beveled groove, *w*², before it is locked by the catch *S*¹. The catch of this cover is operated by the same key as the catch of the hinged cover, through a key-hole leading from the chamber A¹ of the register, and this hole can only be reached by opening the hinged door.

I would state that I prefer to have the cutter *m* of the shears cut toward the pivot of the handle or lever, as described; but I do not confine myself to this particular mode of operating.

What I claim is—

1. The pawl *n*, constructed with a joint transversely to its main hinge, and applied in relation to a retaining-plate, substantially as and for the purpose described.

2. The retaining-plate *d*, having an arm, *d'*, on it, applied in a conductor's alarm, or an alarm and register, in relation to a retaining-pawl which allows the arm *d'* to pass it in ascending, substantially as and for the purpose described.

3. A conductor's registering-implement, constructed with an end and side openings, as at C, for the insertion of tickets, in combination with a shearing-cutter below the plane of the openings, and a shearing-cutter above the

plane of the same, adapted to cut progressively from the operator, both of said cutters being rigidly attached to the parts which open and close on a pivot or hinge-joint placed beyond both levers and shears, substantially as and for the purpose described.

4. In a conductor's registering-implement, the combination of shearing-cutters, an alarm, a passenger-fare register, and operating mechanism, as described, substantially as and for the purpose set forth.

5. The combination of shearing-cutters, an alarm, a passenger-fare register, a receptacle for the shearings or cuttings, and operating mechanism, as described, substantially as and for the purpose set forth.

6. In a conductor's registering-implement, the combination of shearing-cutters and a passenger-fare register, and operating mechanism, as described, substantially as and for the purpose described.

7. In a conductor's registering-implement, the combination of the following parts: shearing-cutters, a stop for preventing an upward movement of the movable shearing-cutter after it has been pressed down a certain distance, a register and an alarm, and operating mechanism, as described, said parts being arranged in a suitable relation to a receptacle for the shearings, substantially as and for the purpose described.

8. In a conductor's registering, alarm, and shear-cutting apparatus, the case provided with the lateral receptacle B for the shearings, and having its shearing, registering, and alarm devices arranged within it, substantially as shown and described.

9. The combination of the handle or lever *b*, having a pivoted arm, *c*, sliding plate *d*, and volute spring *h*, in a registering and alarm implement, substantially as shown and described.

10. The combination of the pawl *f*, bell-hammer *g'*, having a step, *g*, on the rear end of its handle, trip *f'*, and sliding plate *d*, adapted to sound an alarm, all substantially as described.

11. The combination of the sliding plate *d*, having arm *d'*, pawl *u*, notched wheels J J, check-pawls *v* and I, adapted to register the number of fares received, constructed and arranged substantially as described.

12. The combination of the jointed pawl *n*, its spring P, arm *d'* of the sliding plate *d*, and guideway *e*, adapted to prevent any reverse action after the movement is commenced and until the same is completed, substantially as shown and described.

13. The combination of the lever or handle *b*, provided with the pivoted arm *c*, the handle A², and the sliding plate *d*, pawl *f*, trips *f'* and *g*, constituting the mechanism by which the bell is struck, substantially as and for the purpose described.

14. The combination of the lever or handle *b*, having a pivoted arm, *c*, sliding plate *d*, driving-pawl *u*, spring *h*, wheels J J, pawl *f*,

trips f' and g , and hammer g' , substantially as and for the purpose described.

15. The combination, with a stationary cutter, m , of the rigidly-attached movable cutter m' , provided with the heel-point r^3 , for the purpose described.

16. The combination of the lever or handle b , movable cutter m' , and the stationary cutter m , adapted to cut progressively from the operator toward the pivoted end of the lever or handle, all as shown and described.

17. The combination of the lever or handle b , provided with the pivoted arm c , the plate

d , the registering and alarm devices, and the upper and lower cutters m and m' , substantially as described.

18. The combination of the lever or handle b , having a pivoted arm, c , the plate d , the registering and alarm mechanisms, the cutters m and m' , and the receptacle B for the cuttings, substantially as set forth.

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Witnesses:

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