H. D. BARRETT & M. ALDRICH.

KEY DUPLICATING AND RECORDING MACHINE.

APPLICATION FILED AUG. 28, 1913.

1,086,883.

Patented Feb. 10, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

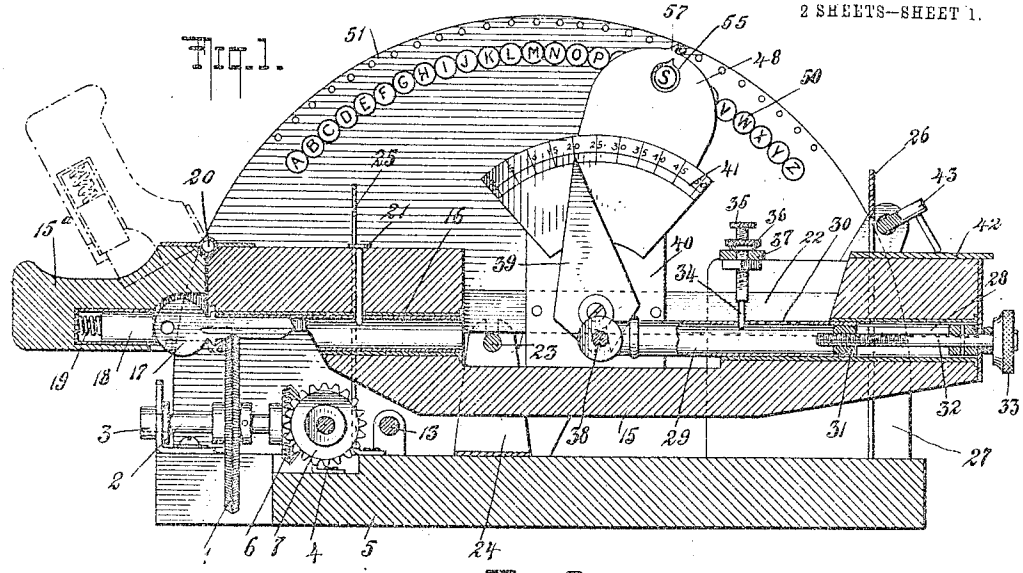
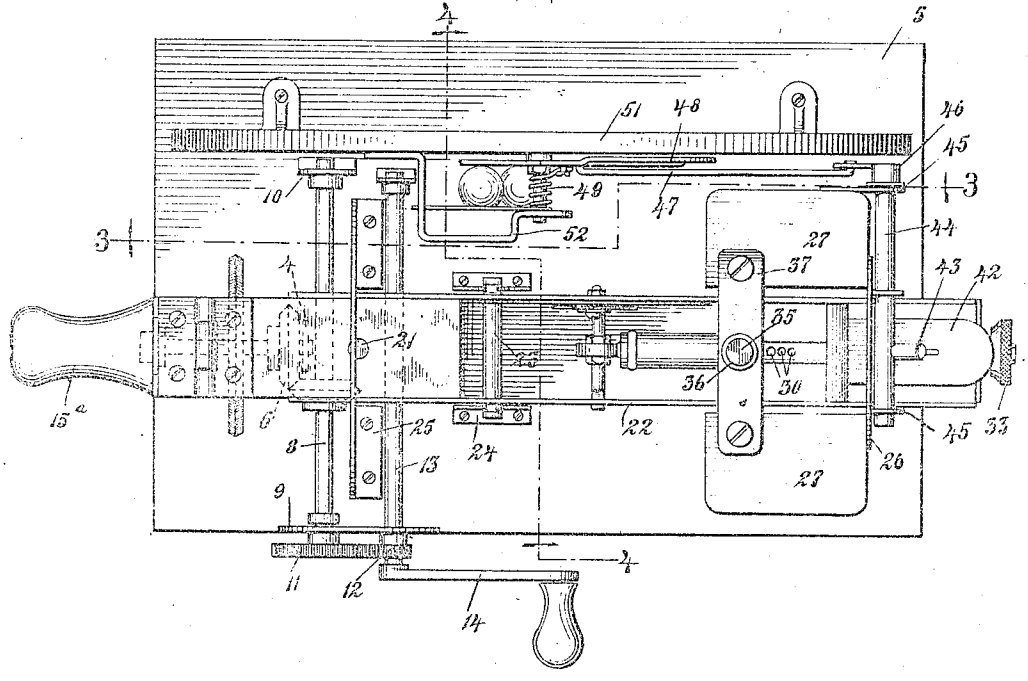


Fig. 2.



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Fig. 3.

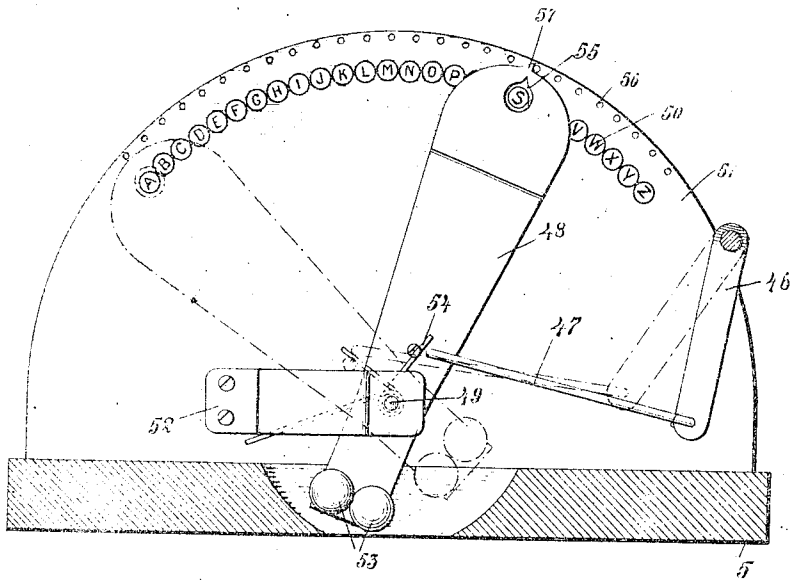
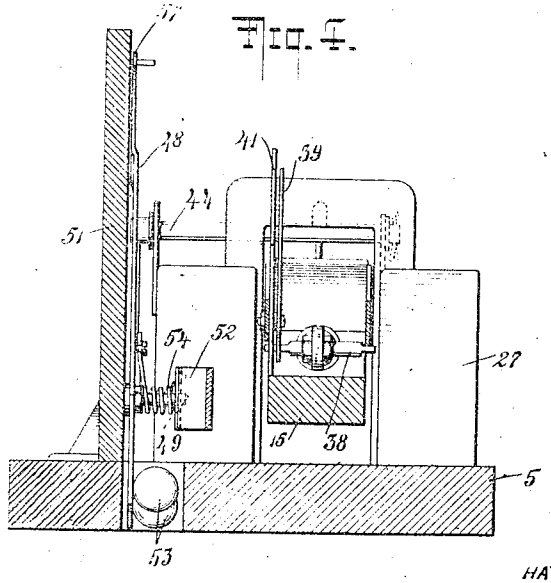


Fig. 4.



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UNITED STATES PATENT OFFICE.

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KEY DUPLICATING AND RECORDING MACHINE.

1,086,883. Specification of Letters Patent. Patented Feb. 10, 1914.

Application filed August 28, 1913. Serial No. 787,075.

To all whom it may concern:

Be it known that we, HARRY DENTON BARRETT and MAXWELL ALDRICH, citizens of Tucson, county of Pima, and State of Arizona, have jointly invented certain new and useful Improvements in Key Duplicating and Recording Machines, of which the following is a specification.

Our invention relates to a machine for duplicating keys of various makes, which is provided with means enabling the operator to record the position and depth of the wards or notches in any key and at any time thereafter reproduce or duplicate the key from the record. Our machine is particularly adapted for duplicating flat or corrugated keys of any of the well known makes.

The object of our invention is to produce a machine with which it is possible to exactly duplicate a key either while the original key is in the locksmith's possession or at any time thereafter, from a cipher record made from the original key which record may remain on file with the locksmith for safe keeping. This is an important consideration, in that it frequently happens that the key or keys for a certain lock become lost or mislaid, in which case the locksmith can readily duplicate the key from the cipher-record of the key he has on file. Furthermore it would be a simple matter of precaution for one having keys that are liable to require duplication to previously take them to a locksmith having one of our machines and have him make and file away cipher records of the keys so that duplicates thereof may be obtained at any future time.

A further object is to so construct the machine that the records taken therefrom and duplicate keys made upon the machine from such records, will be accurate and reliable.

With these objects in view our machine is simple in construction and positive in action, readily and reliably adjusted and contains few or no parts liable to become disarranged or require careful attention.

As illustrative of our invention we have shown, in the accompanying drawings, one form of machine for carrying out the above objects.

Figure 1 shows a longitudinal section and partial elevation of our machine; Fig. 2 is a top plan view; Fig. 3 shows parts back of section line 3—3 of Fig. 2 and Fig. 4 is a cross-section on line 4—4 of Fig. 2.

In machines of this character a file is usually used for cutting the wards or notches in the key and in the form of device shown, we preferably employ a circular file 1 which is mounted upon a shaft 2 and revolubly supported in bearings 3 and 4 which are secured to a base 5 in any suitable manner. The file or cutting wheel may be power driven in any suitable or preferred manner and is here shown as driven by a crank. The end of the shaft 2 is fitted with a beveled gear 6 which meshes with a similar beveled gear 7 secured to a transverse shaft 8 and is adapted to revolve in suitable bearings 9 and 10 secured to the base 5. The forward end of the shaft 8 is provided with a spur gear 11 which is adapted to mesh with a pinion 12 secured to a crank shaft 13 to which the crank handle 14 is secured in the usual or any preferred manner. Extending across the machine above the file wheel is located a rocker bar 15 which may be of any preferred construction, but is preferably fitted near the left end thereof, as shown in Figs. 1 and 2, with a key holding cylinder 16 adapted to hold a key 17 or a key blank to be converted into a key. The left end of the rocker bar beyond the key holder is provided with a plunger 18 which is spring pressed by a spring 19 as indicated in Fig. 1. The portion 15ª of the rocker bar carrying the spring plunger is preferably hinged at 20 so that it may be swung upward to the position indicated by dotted lines in Fig. 1 so that the key or key blank may be readily inserted. As our machine is intended to duplicate keys of various styles, we have preferably shown the key holder 16 as removably secured in the end of the rocker bar 15, so that key holders adapted to hold other styles of keys than the one shown in the drawings may be inserted. This is provided for by fitting the end of the rocker bar 15 with a hole adapted to take the key holder cylinder 16 therein, a pin 21 being inserted through the rocker bar into the tube 16 and thereby holding the same securely in place while in use.

In order that the key or key blank 17 may be properly positioned with respect to the file wheel 1, the rocker bar 15 is longitudinally movable and may be rocked in the plane of the key in order to determine the

depth of the wards in the key, the longitudinal motion of the rocker bar being necessary to position the key in accordance with the several notches or wards therein and also when reproducing corresponding wards in a key blank. The rocker bar 15 is provided with side bars 22 which ride on a pin or supporting rod 23, which is preferably mounted in a bracket or brackets 24, secured to the base 5 of the machine. The rocker bar by this means is enabled to slide longitudinally and rock over the bar 23 in the manner previously described. The left end of the rocker bar is preferably guided in a suitable manner as by the bracket 25 which extends over the rocker bar and assists in securing and guiding the same. The rear end of the rocker bar may be guided by a similar slotted plate or bracket 26 which as shown is secured to supporting blocks 27 which are secured to the base 5 of the machine and are adapted to support and guide some of the parts thereof.

It is desirable in duplicating keys to have the position of the wards or notches accurately placed in conformity to the original key and as the position of the wards may vary slightly with reference to the key stop, we have provided special means for properly adjusting the gage which is adapted to determine the position of the wards. For this purpose the right end of the rocker bar 15 is preferably provided with a hole 28 in which is fitted a tubular gage 29 which is provided at 30 with a plurality of holes spaced apart to correspond with the distance between the wards of the key. One end of the tube 29 is fitted with a threaded plug 31 in which a screw or bolt 32 takes for the purpose of adjusting the position of the gage tube 29 relative to the key or key holding device in the opposite end of the rocker 15. The screw 32 is adapted to be readily turned to adjust the gage by means of a knurled head 33. An adjustable pin 34 is positioned above the line of holes 30 in the gage tube 29 and adapted to enter the holes of the rocker bar 15 when it is rocked to bring the key or key blank into engagement with the file wheel 1. The pin 34 is preferably made adjustable up and down by threading the upper portion thereof and providing it with a knurled head 35 and lock nut 36 for securing it in any adjusted position. The pin 34 is held in proper cooperative position by being passed through a threaded hole in a bar 37 which is secured to and supported on the top of the brackets 27 as shown in Figs. 1 and 2 of the drawings. It will be seen that when the pin 34 enters the first hole 30 in the gage tube 29 the first notch or ward of the key should be accurately positioned over the file wheel 1, and can thus be positioned by turning the screw 32 in the proper direction. This will give the position for the first ward and the spacing of the succeeding holes in the gage tube 29 will accurately locate the succeeding wards of the key.

As previously explained it is desirable to be able to duplicate a key without having the key to copy and our machine is adapted for this purpose by providing the end of the tube 29 with a pin 38 which is adapted to actuate a pointer 39 secured to a bracket 40 carried by the rocker bar 15 as shown in Fig. 1 of the drawings. A coöperating scale 41 is secured to the upper end of the bracket 40 and is graduated in any suitable manner so that the locksmith can readily determine the position of the first ward in a given key and make a record thereof and from that record he is enabled to duplicate it at any time thereafter. The position of the pointer 39 on the scale 41 will readily determine the distance between the first hole 30 of the gage and the first ward of the key.

The next important measurement to be determined in duplicating any key is the depth of the wards in the key. In our machine this is readily obtained by rocking the rocker bar 15 and suitably measuring or recording the rocking motion according to the depth of the respective wards of the key. For accurately indicating this rocking motion and hence the depth of the wards, the right end of the rocker bar 15 is provided with a plate or smooth surface 42 which is adapted to contact with a suitable rock arm 43 extending from a rock shaft 44, which, as indicated in the drawings, is located above the right end of the rocker bar 15 and pivotally mounted in bearings 45 secured to the supporting blocks 27. The rock shaft 44 is provided with a depending crank arm 46 which, as indicated in Figs. 2 and 3, is connected by means of a link 47 with a pointer 48 pivoted at 49 in any suitable manner. The pointer 48 is preferably mounted to move over a scale 50 carried by a bracket 51 secured to and extending above the base 5, substantially as indicated in the drawings. The lower end of this scale bracket is shown as provided with a bearing bracket 52 which, together with the scale bracket, forms a bearing support for the pivot 49 of the pointer 48. The pointer 48 is represented as counterbalanced by the weights 53 secured thereto below the pivot point 49. The pointer is preferably spring pressed toward the left as indicated in Fig. 3 of the drawings, so that the pull on the link 47 will, through the rock arm 46 and the rock shaft 44, keep the point of the rock arm 43 in contact with the plate 42 on the end of the rocker bar 15. A spring 54 is provided for thus purpose and when the rocker bar 15 is up out of use the pointer would normally stand at the dotted position indicated in Fig. 3 with the indicator opening 55 thereof at A. It will be

understood that the length of the various rock arms connected with the shaft 44 may be varied to give the proper relation between the movements of the rocker bar 15 and the scale 50. It will also be understood that any suitable graduations may be used on the scale 50 either figures, or letters as represented in the drawings. It will be understood from this construction that the scale 50 coöperating with the pointer 48, will accurately indicate the depth of the respective wards in the key or in a key blank while being cut. Thus it will be readily apparent that the locksmith may measure a key, both as to position of the wards and the depth thereof, and make a cipher record thereof which may be filed away and a duplicate key can be readily made at any time thereafter by setting the machine or moving the pointers to the positions indicated by such record. If desired, holes 56 may be placed in the dial plate 51 opposite the indicating characters 50 and a pin inserted therein adapted to contact with a lug 57 projecting from the pointer 48 so as to positively limit the movement of said pointer. Such pin can readily be inserted and removed from the holes in accordance with the record as to the depth of the wards of any key being duplicated.

It will readily be understood that we do not wish to be limited to a particular construction and arrangement of the device as shown for various modifications in the specific details of construction and arrangement may be made without departing from the spirit and scope of the invention.

We claim:

1. In a key duplicating and recording machine, the combination of means for obtaining a record of a key to be duplicated, comprising gages for determining and indicating the position and depth respectively of the wards of the key and means for cutting wards in a key blank in accordance with the readings of said gages.

2. In a key duplicating and recording machine, the combination of means for holding a key to be duplicated, a gage for determining and indicating the position of the wards, a gage for determining and indicating the depth of the wards and means for cutting corresponding wards in a key blank when placed in said key holding means.

3. In a key duplicating and recording machine, the combination of a movable member provided with means for holding a key to be duplicated, means operatively connected with said member for determining and indicating the position of the wards in said key, means coöperating with said member for determining and indicating the depth of said wards and means for cutting corresponding wards in a key blank when substituted for the key in said key holding means.

4. In a key duplicating and recording machine, the combination of a movable member provided with key holding means, means for removably securing said key holder to said member to permit the substitution of one key holder for another, an indicating gage carried by said member and adapted to determine the position of the wards of a key placed in said key holder, an indicating gage mounted adjacent to said movable member and adapted to be actuated thereby to determine the depth of the wards and means for cutting wards in a key blank, placed in said key holder, in accordance with the readings of said gages.

5. In a key duplicating and recording machine, the combination of a movable member provided with key holding means, means for supporting said member for reciprocation longitudinally and for rocking movement in the plane of a key in said key holder, an adjustable gage for positioning said member longitudinally according to the wards of a key in said key holder, a gage for determining and indicating the rocking movement of said member according to the depth of the wards in said key and means for cutting corresponding wards in a key blank placed in said key holder said movable member being moved longitudinally and rocked in conformity to the previously recorded indications of said gages for the wards of the key to be duplicated.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

HARRY DENTON BARRETT.
MAXWELL ALDRICH.

Witnesses:
T. W. Longworthy,
Irvin Douglas.