

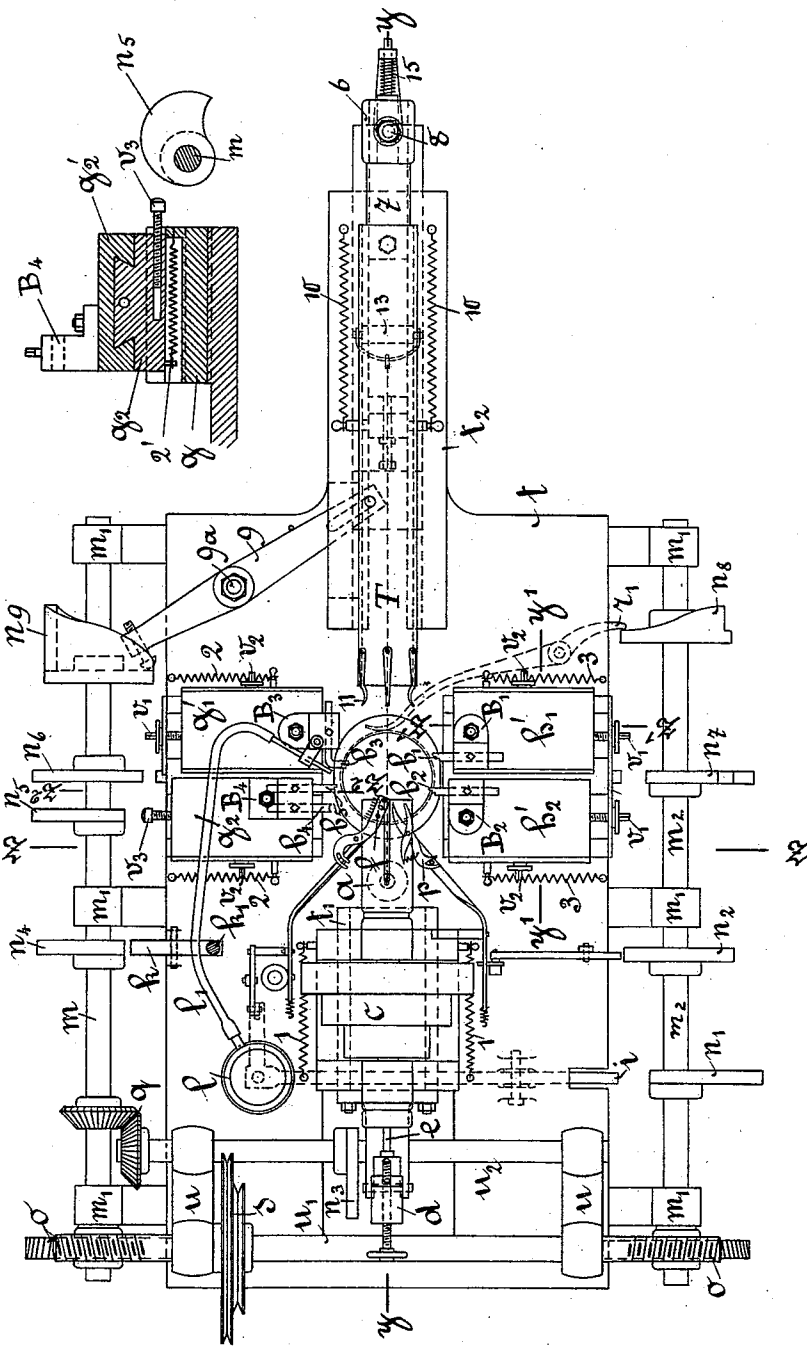
C. E. HENRIOD-BACHNI.
WATCHCASE TURNING MACHINE.

No. 530,227.

Patented Dec. 4, 1894.

Fig. 1a

Fig. 1.



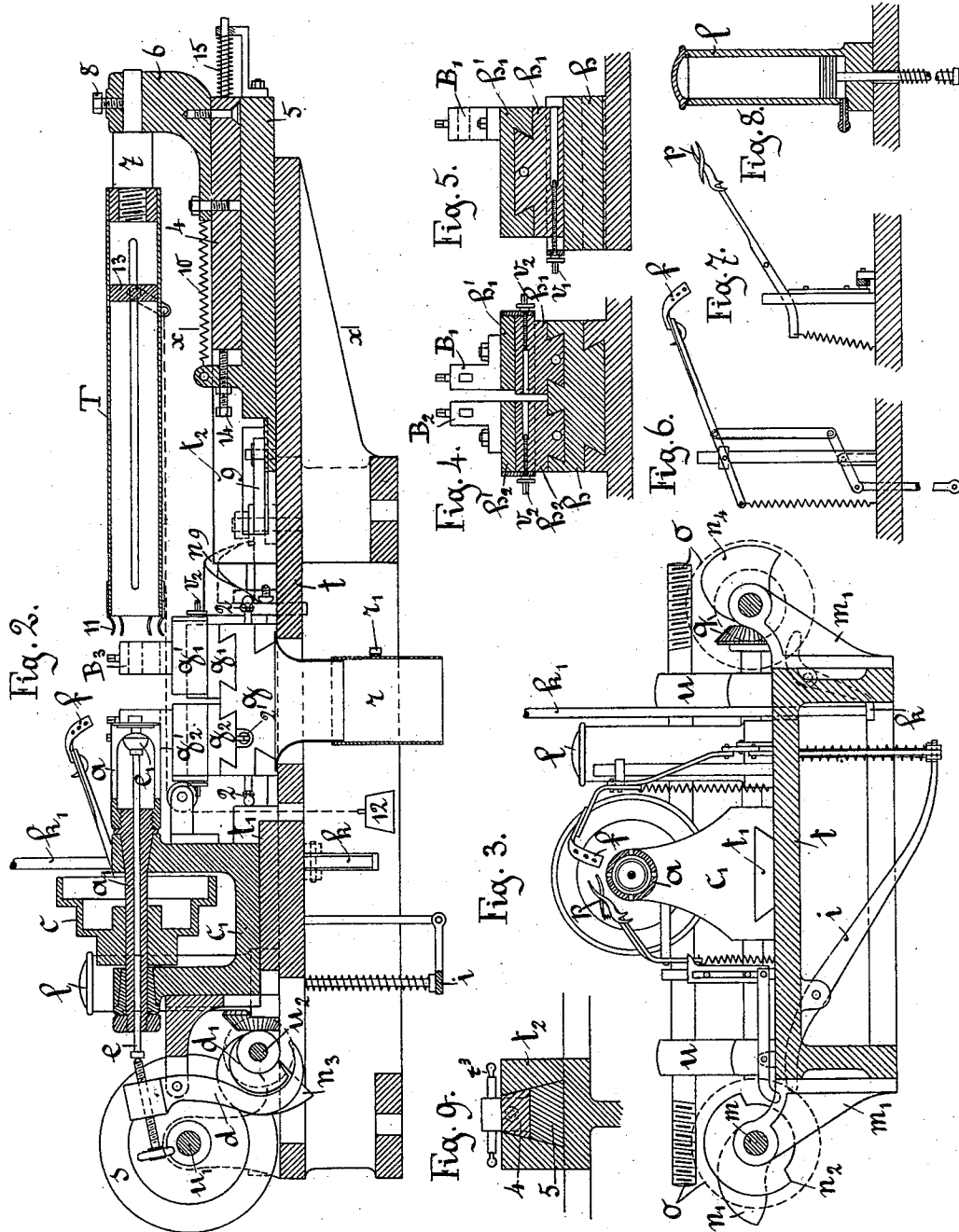
Witnesses.
John F. Gairns.
Albert Jones.

Inventor
Charles E. Henriod-Bachni
By his Attorneys
Wheatley & Mackenzie.

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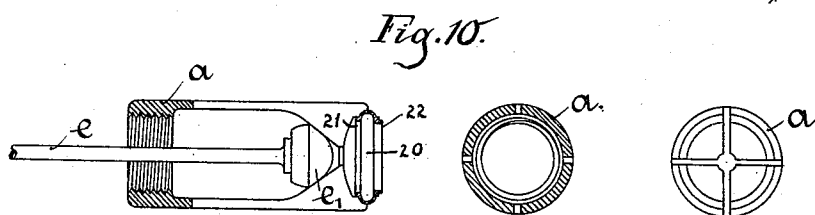
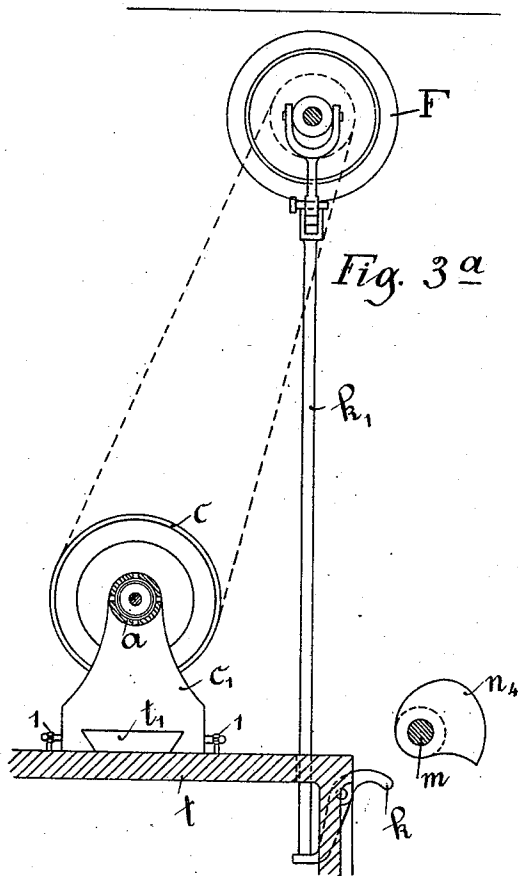
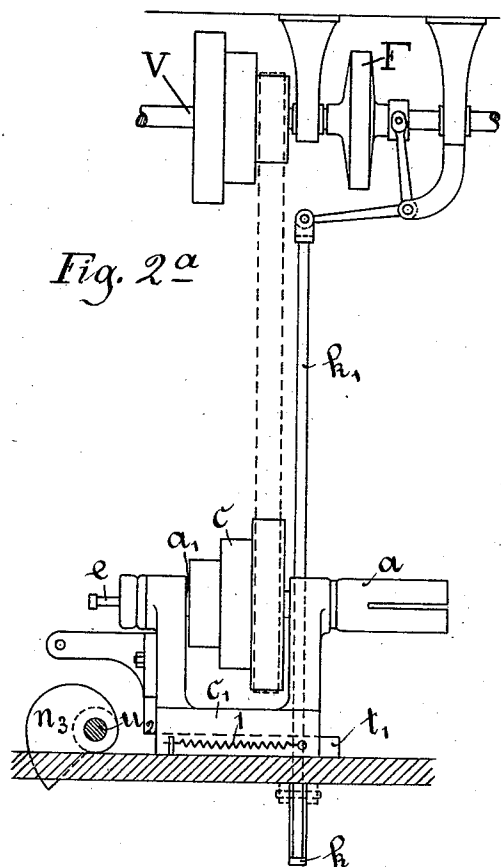
(No Model.)

3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

CHARLES EDOUARD HENRIOD-BACHNI, OF BIENNE, SWITZERLAND.

WATCHCASE-TURNING MACHINE.

SPECIFICATION forming part of Letters Patent No. 530,227, dated December 4, 1894.

Application filed May 29, 1893. Serial No. 475,911. (No model.) Patented in Switzerland October 5, 1892, No. 5,840; in France February 16, 1893, No. 227,977, and in England July 19, 1893, No. 14,008.

To all whom it may concern:

Be it known that I, CHARLES EDOUARD HENRIOD-BACHNI, a citizen of the Republic of Switzerland, residing at Bienne, canton of Berne, in the Republic of Switzerland, have invented certain new and useful Improvements in Watchcase-Turning Machines, (for which I have obtained patents in Great Britain, No. 14,008, dated July 19, 1893; in France, No. 227,977, dated February 16, 1893, and in Switzerland, No. 5,840, dated October 5, 1892,) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention for improvements in watchcase turning machines has for its object to turn watch cases from the blanks by means of machinery to which the blanks are automatically and successively fed, chucked, turned and released thus insuring accurate and standard work and considerably increasing the output hitherto attainable.

Hitherto the watch cases have been chucked, turned, and released by hand and consequently it has been impossible to obtain accurate and standard work as the size varied with the pressure on the turning tools and the clamping was liable to dent or press the case out of shape if the pressure exerted was too great while on being clamped automatically they are always subjected to the same pressure.

In the accompanying three sheets of illustrative drawings Figure 1 is a plan of a machine for automatically turning watch cases, constructed according to this invention, and Fig. 2 is a central and vertical longitudinal section, and Fig. 3 a vertical cross section on the line $z-z$, Fig. 1, of the same. Figs. 4 and 5 are vertical sections of the slides carrying the cutting tools. Figs. 1^a, 2^a, 3^a, 6, 7, 8, 9 and 10 are detail views.

The head-stock c_1 is fitted on the table t in such manner that it may be slid along the runner t_1 in the direction of its axis and toward the slide rests by means of the cam shaped disk n_3 on the shaft u_2 . The springs 11 fixed to the head-stock c_1 and the table t bring the

head stock back to its first position so soon as the cam shaped disk n_3 ceases to act thereon, as shown in Figs. 1 and 2^a.

In the head-stock c_1 is fitted the spindle a_1 which is hollow and carries between the bearings of the headstock the cone pulley c by means of which it is driven from the countershaft V as shown in Figs. 2^a and 3^a. On the end of the spindle a_1 projecting toward the slide rests is screwed a hollow chuck a provided with longitudinal slots and in the slotted front portion of which is clamped the object to be worked. Through the hollow spindle a_1 and through a part of the chuck runs a rod e carrying a cone e_1 on the front part within the chuck a . This cone e_1 presses outward in a radial direction the slotted parts of the chuck a which is also of a conical shape inside, as soon as the rod e is moved against the front end of the chuck a . The forward movement of the rod e takes place each time an object to be worked is clamped in the chuck a or when a finished article leaves the chuck. It is effected by means of a lever d which is moved against the back end of the rod e by the cam d_1 which is fitted on the shaft u_2 as shown in Figs. 1, 2, 2^a and 10.

In front of the head-stock are fitted, one on each side, the slides g and h which slide in corresponding guides fitted to the table t at right angles to the axis of the spindle. The movement toward the chuck a , that is the spindle axis, is effected, in the case of the slide g by the cam n_6 , and in the case of the slide h by the cam n_7 . The opposite movement, that is away from the chuck and spindle axis, is effected so soon as the cams have ceased to act, by the closing together of the springs 22 and 33 which have been extended by the previous movement toward the chuck. On the slide g are fitted two slides g_1 and g_2 each of which carries another slide g'_1 and g'_2 on which last slides are fixed the cutter holders B_3 and B_4 . The slide g_1 is adjustable in the direction of movement of the slide g by means of the screw v_1 while the slides g'_1 and g'_2 can be adjusted at right angles to this direction by the screws v_2 . The slides g_1 and g'_1 and the cutter holder B_3 always follow the movement of the slide g . The slides g_2 and g'_2 and the cutter holder B_4

receive, beyond the movement imparted to them by means of the slide g , a further forward movement from the cam n_5 acting on the screw v_3 whereby the corresponding backward movement takes place through the spring 2' (Fig. 1^a) which is fixed at one end to the slide g and at the other end to the slide g_2 . By means of the screw v_3 which is screwed into the slide g_2 and on the head of which the cam n_5 acts the extent of the movement of the slide g_2 effected by the cam can be regulated as desired. On the slide h are fitted the pairs of slides $h_1 h'_1$ and $h_2 h'_2$ together with the cutter holders B_1 and B_2 . Both these pairs of slides only follow the movement of the slide h and none of them receive a special movement after the manner of the pair of slides $g_2 g'_2$.

In the cutter holder B_1 is fixed the cutter b_1 , in B_2 the cutter b_2 , in B_3 the cutter b_3 and in the cutter holder B_4 the cutters b_4 and b_5 .

The two shafts $m m_2$ of which one m carries the cams n_5 and n_6 and the other m_2 the cam n_7 , are fitted at the two sides of the table t in bearings m_1 and are driven by means of the worm gearing o from a shaft u_1 in the bearings u . The shaft u_1 is driven from shafting through the cord pulley s . Parallel to this shaft u_1 and in the same plumber-block u is fitted a shaft u_2 on which are fixed the cams n_8 and d_1 already mentioned, and which receives its movement from the shaft m through the cone gearing q .

On the shaft m which carries the cams n_5 and n_6 is fitted a further cam n_4 which works on a lever k . This lever k carries a rod k_1 which by means of an elbow lever is connected with a friction coupling F on the counter-shaft V in such manner that each time a fresh object is to be clamped in the chuck that part of the counter shaft V which carries the cone pulley is put out of gear whereby the spindle a_1 is also brought to rest as shown in Figs. 2^a and 3^a. On the shaft m_2 which carries the cam n_7 are also fitted the cams n_1 and n_2 and the side cam n_8 . By means of the cam n_1 a lever i connected to the piston of an air pump l , Fig. 8, is moved whereby air is forced through the tube l_1 onto the cutters and the chuck a . With the same lever i is connected a suitable system of levers moving a brush f , Fig. 6, against the chuck a_1 whereby the latter is cleaned, and this takes place each time before a fresh object is taken by the chuck. By means of the cam n_2 a jaw p , Fig. 7, connected to a system of levers and carrying a moist roll, is moved against the article being worked so that the latter is always moistened. By means of the side cam n_8 in connection with the two armed lever r_1 the longest arm of which rests on the funnel r , Figs. 1 and 2, this funnel is pushed on one side each time the object being worked leaves the chuck a . The purpose of this is that the waste turnings which are led through the funnel or hopper r into a cask placed thereunder may be kept away from the finished articles falling out of the chuck a , so that the funnel

r may be more easily moved to one side. The upper part thereof is made of leather or other suitable material.

The distributing apparatus serving to take automatically into the machine the articles to be worked, is formed essentially of a tube T intended to take the objects such as the middles, bottoms and bezels to be distributed and is held in a support 6 by means of the piece 7 and the screw 8. The support 6 is fixed on the part 4 of a carriage sliding in the groove t_2 of the base t of the machine and composed of two parts 4 and 5. This carriage is put in movement by a lever 9 jointed at the point 9^a and actuated by the cam n^9 in such manner that the extremity of the tube carrying the springs 11 approaches the chuck a in such manner that the latter can take hold of and grasp the object to be worked. During this movement of the carriage 4, 5, the springs 10 fixed to a cross piece t^3 mounted on the carriage and to the base t are compressed and can thus produce the return movement of the distributor as soon as an article has been dealt with.

The articles to be distributed are piled up in the tube T the bore of which corresponds to their diameter. They are pressed against the end of the tube carrying the springs 11 by means of the piston 13 actuated by the weight 12. The springs 11 project toward the inside of the tube T so that the articles to be worked although pressed forward by the piston 13 cannot fall. The springs 11 being pushed against the chuck a by the movement of the carriage 4, 5, open out and then allow the front piece therein to come out. This article is then pressed into the chuck a by the pressure of the piston 13.

If by chance the article is not of the required diameter allowing it to be taken in the chuck a , the tube T or the lever 9 might be bent under the considerable strain that they would have to surmount. In order to obviate this inconvenience the upper part 4 of the carriage 4, 5 is attached only by a spring 15 to the lower part 5 so that the tube T may if necessary be stopped before the part 5 of the carriage has arrived at the end of its course. The screw 14 arranged on the part 5 of the carriage serves to regulate the distance between the two parts of the carriage.

Suppose the machine to be at work and turning the cases:—In order to turn the inside and outside of the middle 20 at the bottom end 22 the middle is held in the chuck a by the bezel end 21 as shown in Fig. 10. The head stock and the chuck a then advance so that the cutter b_3 is inside the middle. The cutters b_3 and b_1 are then pressed against the middle by the eccentrics n_6 and n_7 in such manner that the cutter b_3 cleans off the inside of the middle while the cutter b_1 roughs out the ornamentation, the two cutters acting at the same point with only the thickness of the metal between them. When there is much material to be removed the cutter b_3 is

placed by means of the regulating screws v_1 and v_2 so that it may assist in this operation. In this case the cutters b_3 , b_1 and b_5 work at the same time. As soon as the eccentrics n_3 and n_7 have ceased to operate the cutters leave the work and at the same time the head stock moves back with the chuck a . The cutter b_2 is then forced against the middle and finishes off the ornamentation of the bottom end of the outside. During this time the work is kept moist by the roll of the clip p thus preventing the cutters from getting too warm. The machine is then stopped by means of the eccentric n_4 and the chuck is opened by means of the eccentric d_1 and the middle falls through the funnel r . During the latter period the brush f cleans the chuck a and the pump l blows away the refuse. The feed apparatus then brings a fresh case to the chuck a and the operation is again effected and so on.

In order to turn the inside and outside of the middle at the bezel end, the middle is held in the chuck by its bottom end. The cutters b_3 and b_1 then work again as has been described. This done the chuck moves back, the cutter b_2 finishes the outside of the bezel end and at the same time the cutter b_4 finishes the center of the outside of the middle. The cutter b_5 may again help in the turning when there is much material to remove. The chuck then opens and the case falls out through the discharger. For each end of the middle the cutters must be changed and their position must be accurately adjusted. For turning the bezels and bottoms two cutters are used working successively. The piece to be turned is first clamped in the chuck so that one of the cutters cleans out the inside. It is then clamped on the other side so that a second cutter may finish the outside. During this operation the head-stock keeps its position, the eccentric n_3 having been put out of gear.

The machine can also be constructed with a single spindle carrying the eccentrics for the carriages, &c., instead of the two spindles m and m_2 . This spindle is placed below the machine. The carriages, &c., are operated from the eccentrics by means of suitable intermediary gearing.

What I claim, and desire to secure by Letters Patent, is—

1. A machine for turning watch cases which comprises a holder in which the cases are held, a rotating chuck, and a series of cutters, means for automatically feeding the cases from the holder to the chuck, means upon the said chuck for gripping the same, means whereby the cases are automatically brought successively in front of the several cutters, and forced in contact therewith when opposite the same, and means for releasing each case immediately upon its being completed, substantially as shown and described.

2. A machine for turning watch cases, which comprises in its construction the rotating

chuck a having means thereon for holding the cases, a sliding headstock carrying the said chuck, a series of cutters in front of the said chuck, a plurality of cams as shown, mounted upon a slow-running countershaft, the said cams being so formed and arranged thereon as to engage with the headstock and reciprocate the same and bring the cases successively opposite and adjacent to the cutters, and slide-rests carrying the said cutters, a second countershaft having cams mounted thereon which engage with the slide-rests to force the same inwardly, and means whereby the said cams are brought into engagement with the rests immediately upon each case being fed forward by the chuck, substantially as shown and described.

3. In a watch case turning machine the combination, with a chuck having spring jaws adapted to grip the watch case, a sliding headstock carrying the said chuck, and means for intermittently reciprocating the headstock to force the cases forward successively, of a cone adapted to enter between the jaws of the chuck to open the same and release the case therefrom, a cam mounted upon a slow-running countershaft, and means whereby the said cam forces the cone against the jaws of the chuck, substantially as shown and described.

4. In a watch case turning machine, the combination, with a chuck, means for automatically causing the said chuck to grip a watch case and release the same after turning, and a series of cutters, of a bellows having its mouth opposite the chuck and the cutter, and a cam adjacent to the said bellows, mounted upon a slow-running shaft and so arranged as to intermittently actuate the bellows and force a blast upon the cutters and the chuck, substantially as shown and described.

5. In a watch case turning machine, the combination, with a chuck adapted to automatically grip and release a watch case, of a bellows opposite the chuck, a brush adjacent thereto, a moist roll held against the case while being turned, and means whereby the said bellows, brush and roll are automatically brought to bear upon the chuck, and the watch case, respectively after and during each operation, substantially as shown and described.

6. In a watch case turning machine, the combination, with a chuck having spring jaws adapted to grip the watch case, of a tube provided with a stop arrangement at its end and adapted to receive the watch cases therein, a feeding device for forcing the cases toward the end of the tube, a cam mounted upon a slow running countershaft and engaging with the tube to intermittently force the same against the chuck and release the stop arrangement thereon, whereby a case may be inserted in the said chuck, and an attachment adapted to enter between the jaws of the chuck and release the case therefrom after

the completion of the operation, substantially as shown and described.

7. In a watch case turning machine the combination, with a chuck, a sliding head-
5 stock carrying the same and intermittently reciprocated, a tube provided with spring jaws at its end adapted to carry the cases, means for forcing the cases toward the end
10 of the tube, a cam mounted upon a slow running countershaft, and engaging with the tube to force the same against the chuck, whereby the jaws of the tube are opened and a case inserted in the chuck, and an automatic at-
15 tachment for releasing the case from the jaws of the chuck after the operation is completed, substantially as shown and described.

8. In a watch-case turning machine, the combination with an automatic chuck, of a

tube provided with spring jaws at its ends and adapted to carry the cases, of a means 20 for forcing the cases toward the said end, of a sliding holder on which the tube is mounted, of a slide rest on which the sliding holder can slide, of a spring to retain the holder and rest in their relative positions and of an ec- 25 centric or cam on a slow running countershaft for operating the rest to force the tube against the chuck substantially as specified for the purpose set forth.

In testimony whereof I have affixed my sig- 30 nature in presence of two witnesses.

CHARLES EDOUARD HENRIOD-BACHNI.

Witnesses:

T. A. ROSSEL,
T. BACHNI, Fils.