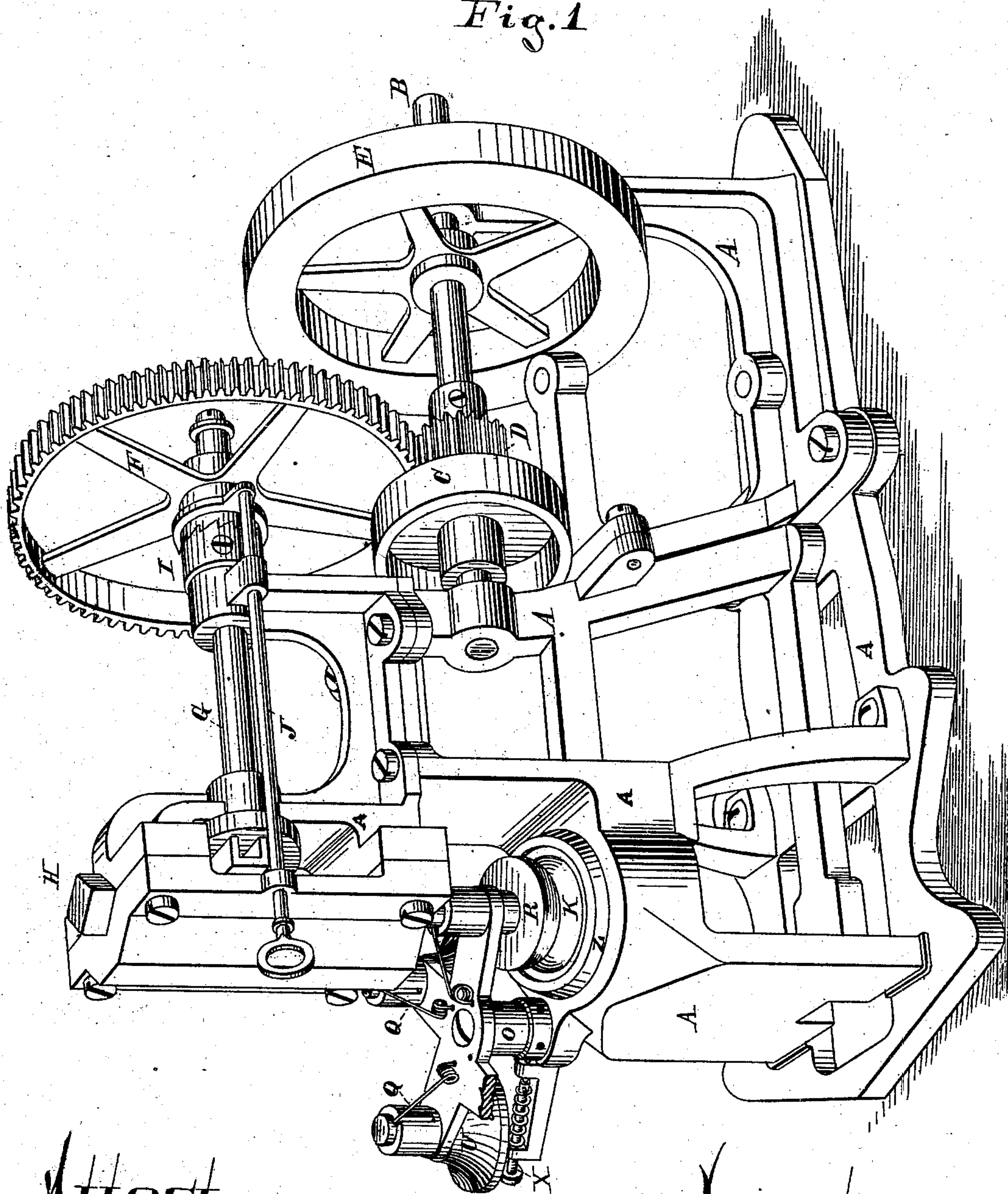


A. E. SPANGLER.
Machine for Making Watch Cases.
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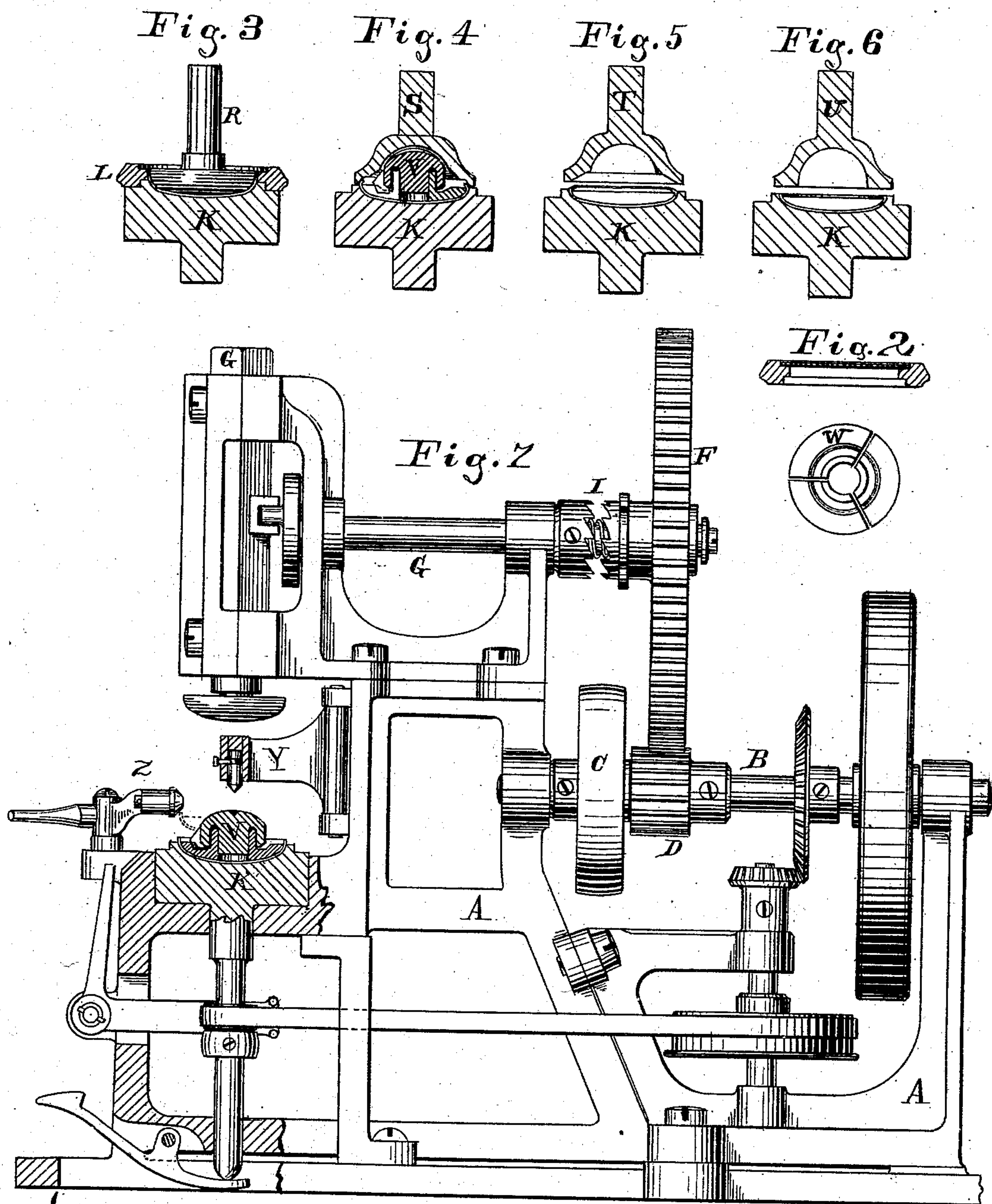
Fig. 1



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Fig. 8

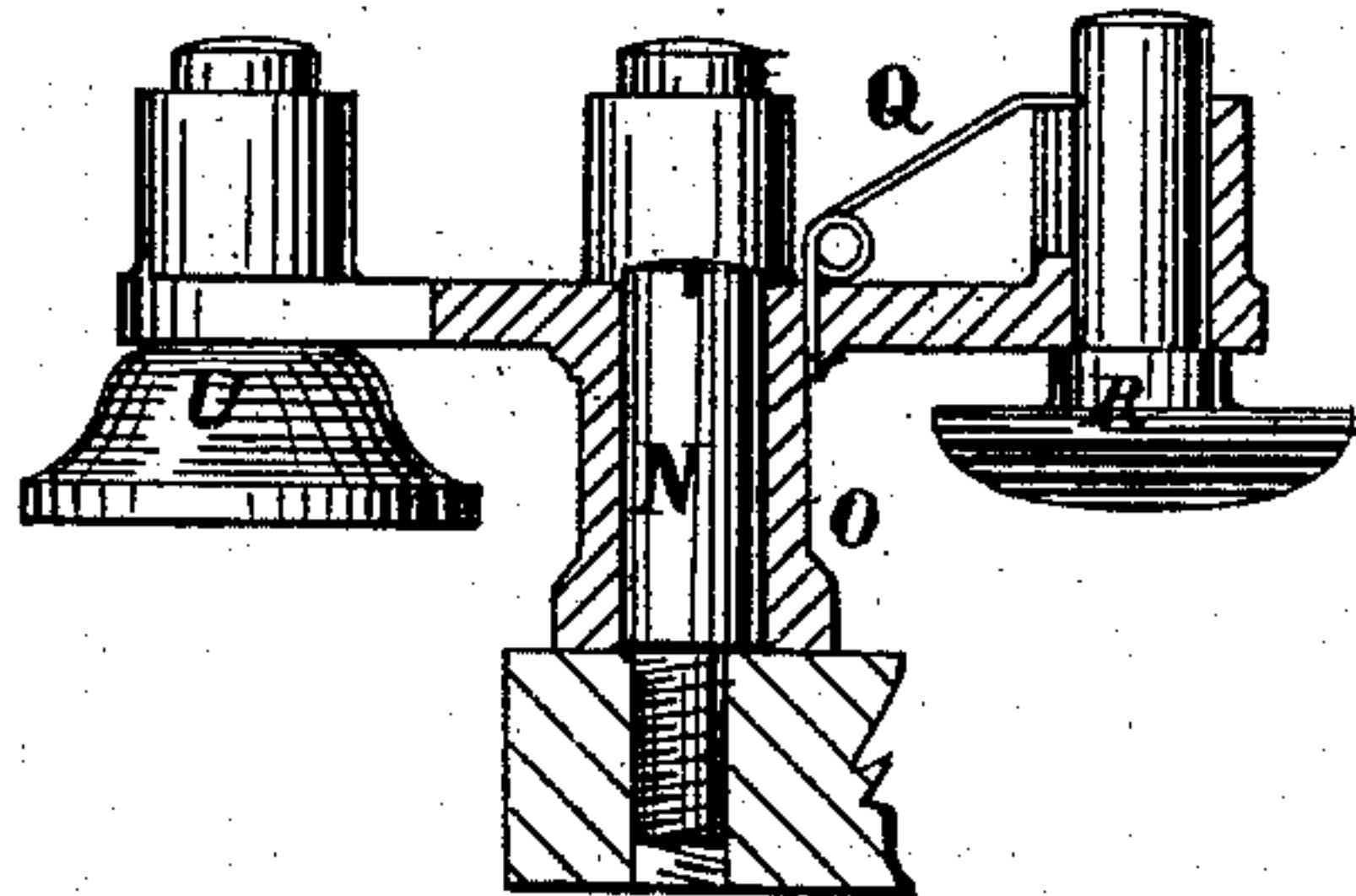


Fig. 9

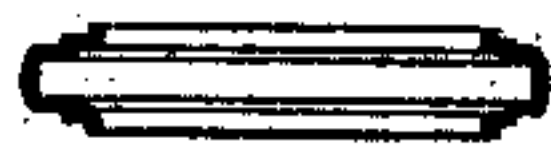


Fig. 10

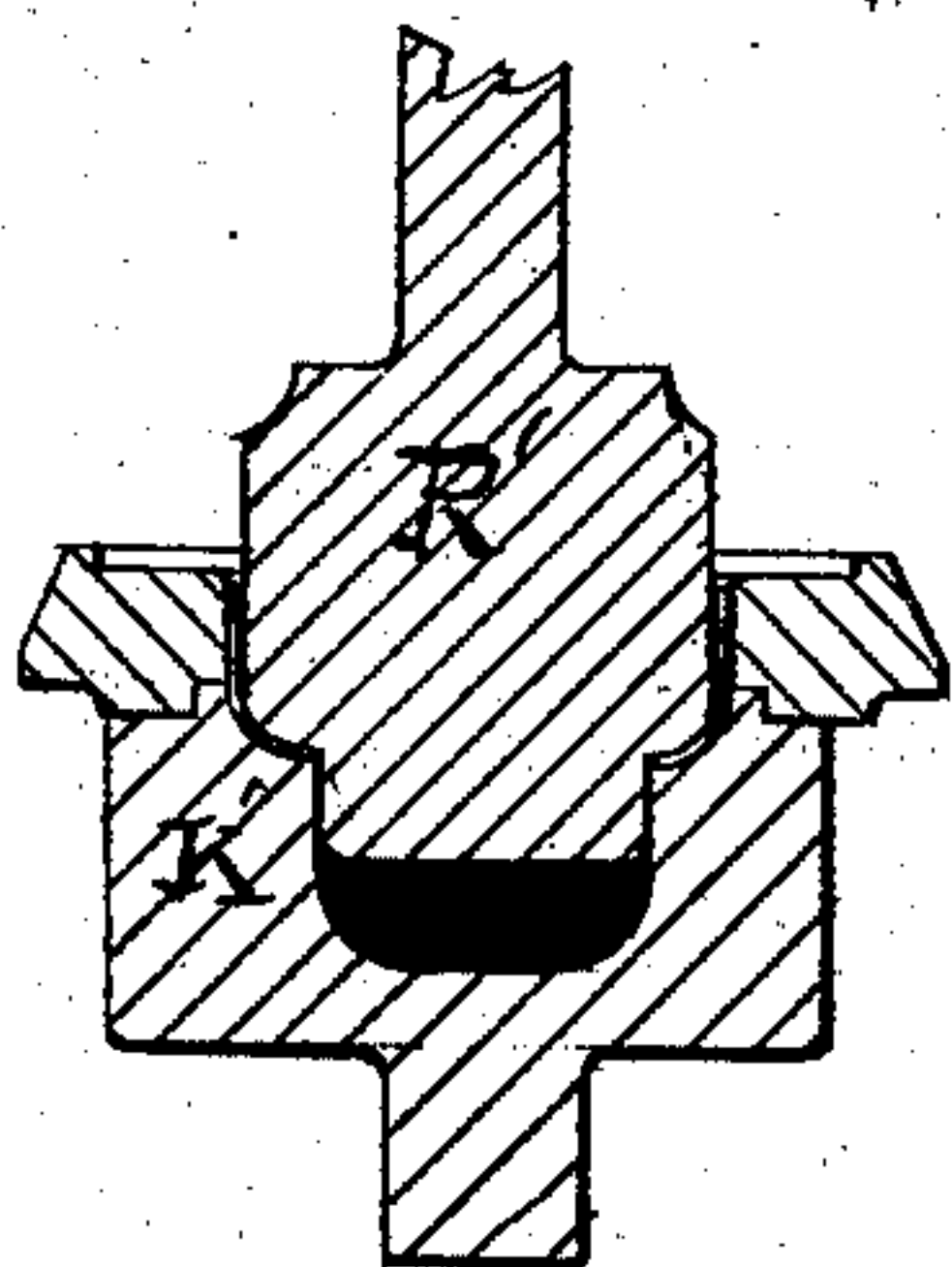


Fig. 11

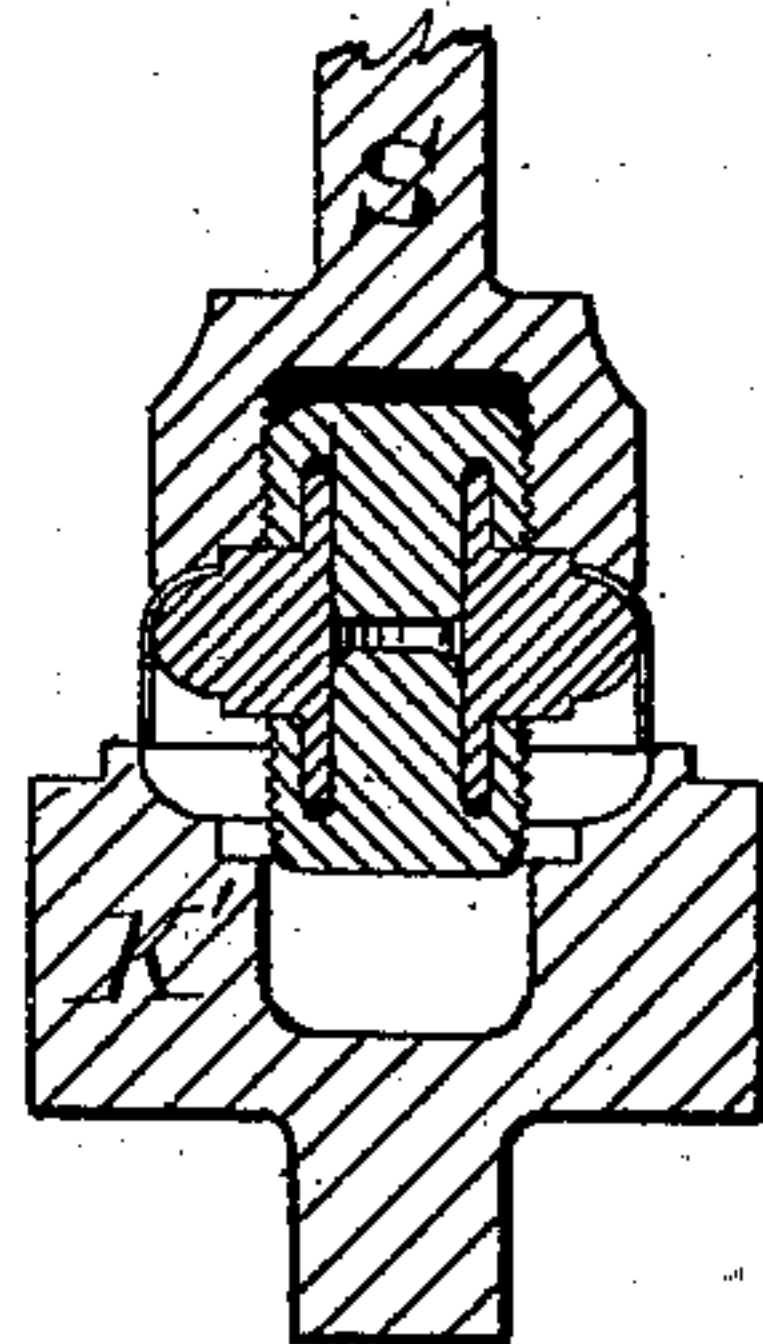


Fig. 12

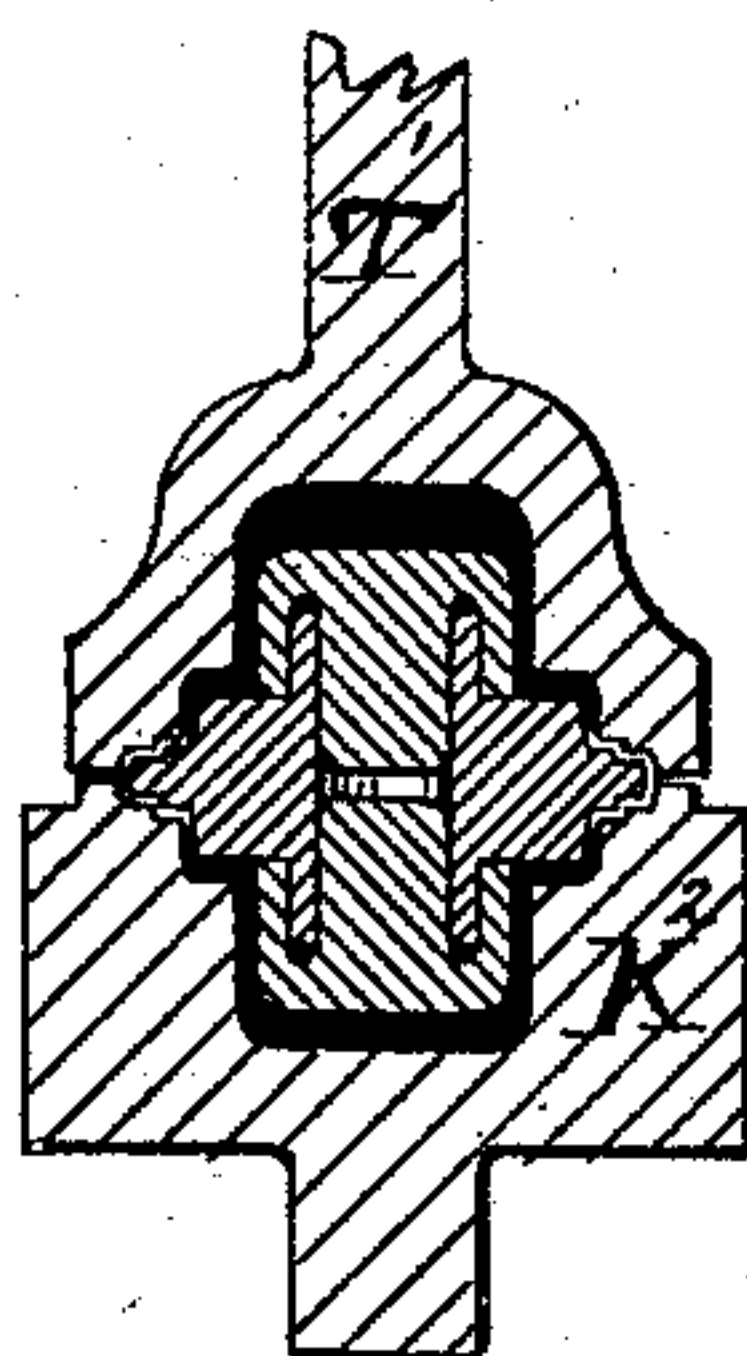


Fig. 13

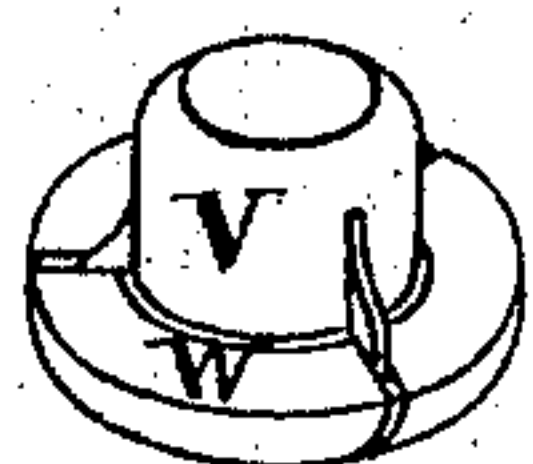


Fig. 14

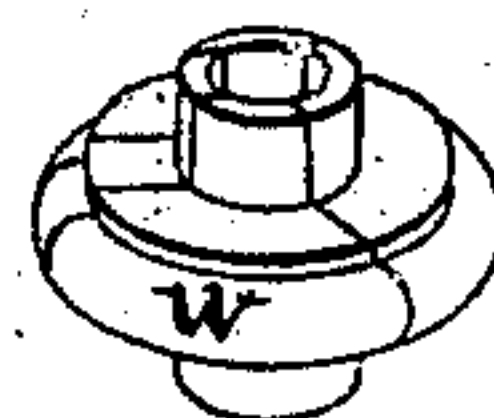


Fig. 15

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UNITED STATES PATENT OFFICE.

ALBERT E. SPANGLER, OF CINCINNATI, OHIO.

MACHINE FOR MAKING WATCH-CASES.

SPECIFICATION forming part of Letters Patent No. 238,007, dated February 22, 1881.

Application filed September 2, 1879.

To all whom it may concern:

Be it known that I, ALBERT EDWARD SPANGLER, of the city of Cincinnati, county of Hamilton, State of Ohio, have invented a new and useful Improvement in the Method of Making Watch-Cases, and in Machinery for Manufacturing the Same, of which the following is a specification.

This invention relates to the manufacture of watch-cases. Its object is to produce a stronger and better case than has been heretofore made, at a less cost of labor and material.

The invention consists, first, in certain dies, in combination with a separable removable core, for constructing the backs, fronts, and centers of watch-cases of single pieces of metal without joints, with the "snaps" upon the fronts and backs and the snap-bearings upon the centers completely formed.

It consists, also, of a new process for forming the backs; and it finally consists in certain combinations, set forth in claims, in a machine which adapt it to the manufacture of my improved backs, fronts, and centers.

The invention will be fully described in the following specification, in connection with the drawings, and particularly pointed out in the claims.

Heretofore the fronts and backs of watch-cases have been made by stamping a disk of metal up to a concavo-convex shape, then soldering another piece, usually a wire formed into a ring, around the upturned edge, and finally turning this ring off to form the snap.

In order to obtain the requisite amount of strength for a good case considerable metal is required, as the process of soldering makes the metal soft, and the snap for this reason soon wears out in use.

Patents have been granted describing a method of forming a back with a snap integral therewith; but my process of making such a back with a snap is different from the process described in such patents, and possesses that amount of practicability which makes it an important improvement in the art. Centers have also been struck up complete with snap-bearings; but my dies and machinery used to accomplish this end differ from those heretofore known.

In the accompanying drawings similar let-

ters of reference indicate identical parts in the various figures.

Figure 1 is a perspective view of my improved machine, one of the turret-heads being broken away to expose the spring-stop. Figs. 2 to 6, inclusive, are vertical sectional views of the different forming-dies for the backs and fronts. Fig. 7 is a side elevation of the machine altered and adapted to form the snap by spinning instead of stamping it over, as in the preferred form shown in Fig. 1. Fig. 8 is a vertical section of the revolving turret or head. Fig. 9 is an axial section of my center, and Figs. 10 to 13, inclusive, are detached vertical section views of the core and dies for forming the same. Fig. 14 is a perspective view of the core for forming case backs and fronts, and Fig. 15 is a similar view of the center-forming core.

A represents the frame of the machine; B, the driving-shaft. Upon this is secured the driving-pulley C, driving-pinion D, and fly-wheel E. The pinion D meshes into a cog, F, journaled loosely upon shaft G, which operates a plunger, H, by means of a wheel and crank-pin secured upon the front end of shaft G. The shaft G is revolved by a clutch or coupling, I, one member of which is secured to the shaft G and its opposite member to the cog-wheel F. A rod, J, is used to throw the two parts of the coupling in gear, and a spiral spring disconnects the coupling so soon as the rod J is released.

The bed of the machine beneath the plunger H is bored out to receive the female die K, which is of the proper shape to form backs and fronts of watch-cases, which die is supplemented by a ring, L, Fig. 2, that has an offset or recess turned in its upper side to receive the blank disk M, from which the backs and fronts are formed.

The revolving turret, which carries the male back and snap forming dies, is fitted to turn upon a stud or pin, N, (plainly shown in Fig. 8,) which is secured in a projecting portion of the bed of the machine. The lower part of this pin is eccentric to the upper or journal part, this provision being made for the purpose of adjusting the revolving head or turret to bring the centers of the upper dies directly over the center of the female die in the bed of

the machine. I am thus enabled to compensate for slight inaccuracies in fitting the parts together.

The revolving head or turret consists of a sleeve, O, which is centrally bored to fit over the pin N, upon which it turns, and arms extending from the top of the sleeve carry hubs P at their outer ends to receive the stems of the upper forming-dies. The hubs P are slotted vertically to permit the springs Q, which enter the stems of the upper dies, to pass downward when the dies are depressed by plunger H. The opposite ends of these springs, which return the dies to and retain them in their elevated position after they are released from the action of the plunger, are secured to the revolving head. There are four of these upper forming-dies, secured by their stems and springs Q to the revolving head. The first one, R, is of the form now usually employed to stamp up backs and fronts of cases, except that the head is of a little greater dimension in vertical section, so as to turn up enough of metal to form the snap. The other dies of the series, Figs. 4, 5, and 6, are concave or cup-shaped, so as to permit the clamping-plug V, Figs. 4 and 14, to enter the cavity. The inner and lower edge of die S has considerable of a bevel, so that when it is brought down upon the upturned edge of the partially-formed back or front it will give the edge a bend inward. The die T has less of a bevel, so as to nearly turn down this edge, and the die U has its lower edge flat, so as to completely turn the edge down and thus complete the snap.

The core W, Fig. 14, is sectional, of a shape, when the parts are put together, to neatly fit within the perfectly-formed case. In making it, it is first turned up of a single piece with a centrally-bored hub upon its upper side to fit into a groove turned in the clamping-plug piece V, after which it is divided, so that the parts may be separately removed from the formed back or front. If divided radially, enough metal should be cut away to permit one of the pieces to be slipped toward the center when the clamping-piece is removed to free its edge from the overturned snap. The clamping-piece V has pins projecting from its periphery, which enter the slots formed by cutting away the metal, and retain the pieces of W in their normal position. The small slot thus left in the core-piece W will not interfere with the proper formation of the snap; but even this opening may be avoided by dividing the core in the manner shown in Fig. 15—that is, by cutting one of the pieces slightly wedge-shaped, the largest end of the wedge being at the hub.

X is a spring-catch, the bolt of which passes through lugs projecting up from an arm of bed A, and which, by entering any one of a series of perforations in the base of sleeve O, stops the revolution of the series of dies at a point that insures to one of the dies of the series a position directly over the female die, and in position to be acted upon by the plunger H.

I will now describe the different steps in my process of forming my backs and fronts by stamping.

A disk of metal, of the proper gage and size, is first placed within the offset in ring L. (The machine being in the position shown in Fig. 1.) The machine is started by pulling forward the rod J, throwing the coupling I into gear, and causing the die R to descend and force the disk through the ring L into the female die K. The clutch is held in gear long enough to permit the shaft G to make one revolution, which forces the die R down and elevates the plunger to the position shown in Fig. 1. The die being carried up by the spring Q, the bolt of catch X is now withdrawn, and the turret is moved slightly to the left, when the ring L is removed and the core, Fig. 14, inserted. The turret is now turned to the right until the bolt of catch X enters the second hole in the sleeve O. This brings the die S beneath the plunger H; the machine is again started, bringing down die S, which starts the turn of the snap. (See Fig. 4.) The catch is again withdrawn and the turret revolved to bring die T under the plunger. This die nearly turns the metal down upon the core W, Fig. 5. By a similar operation the die U is brought under the plunger, and by it the metal is pressed down flat upon the core W, which completes the snap. In Figs. 4 and 5 the core is not shown, it being omitted from the drawings to more clearly show the formation of the dies. The core, with the formed back or front upon it, is now removed from the die K, the clamp V pulled off, when, by moving one of the pieces of W toward the center, the core is removed, the ring L, with another disk in it, is replaced upon the female die, and the die R brought to the position shown in Fig. 1, preparatory to another operation.

The watch-case center, Fig. 9, is struck up from a flat ring of metal. The process of forming the center is as follows: The female die K, Figs. 11 and 12, is placed in the bed of the machine, and the upper forming-dies, R', S', and T', secured in the turret-arms in place of the dies R, S, and T, Fig. 1. Only three forming-dies are required in the turret. A blank is placed in ring L, which is then placed upon the die K', Fig. 11. The machine is started, and the die R' forces the blank through the ring. The blank and ring are then removed, and the center-forming core, Fig. 15, is inserted in the partially-formed center. The core, with the center inverted, is placed in the next die, S', which is now brought under the plunger and the latter forced down upon it. This brings the center to a U shape in vertical section. The core and partially-formed blank is now removed from the die S' and the core withdrawn. The partially-formed center is now annealed by heating, and a core of the exact size and shape of the interior of the perfectly-formed center, Figs. 9 and 13, is inserted. The die K' is replaced by die K², which, like the upper die, T', is of the exact shape and

size of one-half of the formed center, which dies, pressing the metal between them, as seen at Fig. 13, perfectly form the snap-bearings and the center bead, and at the same time 5 harden the metal. The core is removed in the same manner as the back and front core, already described. I thus make a perfectly-formed case-center without surplus metal, and as it is of uniform thickness and corrugated in 10 vertical cross-section it has more elasticity or spring, and a closer and better joint between the parts of the case is obtained.

An advantage, not before adverted to, of my separable core is that the backs, fronts, and centers may be turned and "stoned" upon it, to 15 which end the clamping-plug is inserted in the lathe-chuck, and, the interior of the shell being completely filled by the core, a firm support is obtained against the action of the lathe-tool. 20 I am thus enabled to do better work than can be done by the common mode, and save the time and trouble now required to adjust the cases upon the common chucks.

Fig. 7 shows a different combination of 25 mechanism, which may be used to advantage to "spin" over the snaps of backs and fronts made of light material or of composition. Y is a centering-arm hung upon the frame of the machine, and Z is a lever fulcrumed upon stud-pin N, the revolving turret being removed. 30 The stem of die K' is extended downward, the lower end resting upon a treadle. This stem or shaft is provided with a tight and a loose pulley, and is revolved by a belt from a pulley upon a vertical counter-shaft at the rear of the machine. This counter-shaft is driven 35 by bevel-cogs, one of which is secured to it and the other upon shaft B. The male die R is in this case secured to plunger G.

40 The operation of the machine so changed is as follows: The arm Y being turned aside, the ring I, containing a blank, is placed upon the female die and the plunger brought down to form the belly of the case. The ring is removed, the core 45 inserted, and the arm Y turned with its centering-pin, which revolves in its bearing directly over a countersunk depression in the top center of the core-plug. The parts are now in the position represented in Fig. 7. By pressing 50 ing down the treadle the die is elevated, bringing the belt upon the tight pulley. The snap is now spun over by turning lever Z to bring the revolving cone-shaped wheel, which is journaled in one of its arms, against and over 55 the edge of the back or front held between the core and female revolving die.

It is understood that the back and front of a watch-case are of the same shape and are formed in the same manner by the same means.

60 It will be seen that I contemplate forming by successive steps a watch-case back in its entirety from the first formation of the blank, and that the blank is not given a preliminary

inward bend, nor is it previously beveled, bent, or compressed; and that, also, I do not form 65 the back by turning its edge inward and swaging it down at a single operation; and so far as these preliminary steps and the completion of the snap at a single operation of the machine are comprised in the method of, first, 70 forming the blank by compression with the general form of a watch-case back, second, inserting into said blank a male die which is detachable from a finished snap, and, third, turning the edge of said blank inward and swag- 75 ing it down upon said male die to form the finished snap, I disclaim the same; but

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

1. The combination of the male and female 80 dies, sectional cores W, and clamping-piece V, substantially as described.

2. The method of forming a watch-case back with a complete and finished snap from a sheet-metal blank, substantially as before set forth, 85 consisting of the following steps, viz: first, pressing the blank into a cup-shaped form; second, inserting a separable core or die therein; third, giving preliminary successive inward bends to the upturned edge of the cup- 90 shaped blank; and, fourth, swaging the inwardly-bent edge down upon the separable core or die.

3. In a watch-case-stamping press, the combination, substantially as set forth, of the 95 plunger, the revoluble head or turret, consisting of a central sleeve with radiating arms, and the forming-dies held in said arms and movable successively under the plunger.

4. In a watch-case-stamping press, the combination, substantially as set forth, of the 100 plunger, the revoluble head or turret, consisting of a central sleeve with radiating arms, and the forming-dies held in said arms and movable successively under the plunger, and 105 spring-stop, as X, substantially as and for the purposes set forth.

5. The combination of the turret-pin N, having eccentric journal, the revoluble turret or head, having slotted die-holding sockets, the 110 series of dies, and the springs Q, connecting said dies and turrets, substantially as set forth.

6. The combination, substantially as before set forth, of the eccentrically-journaled pin, the revoluble head or turret, and the reciprocating 115 plunger.

7. The combination of the upper or exterior forming-dies, a female die, and the rabbeted ring L fitted thereto, said ring being removable for the purpose of exposing the upturned 120 edge of the metal to the action of the exterior forming-dies, as specified.

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Witnesses:

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