April 23, 1940. E. SEIGNOL ET AL 2,198,063

REGISTERING DEVICE

Filed June 28, 1937

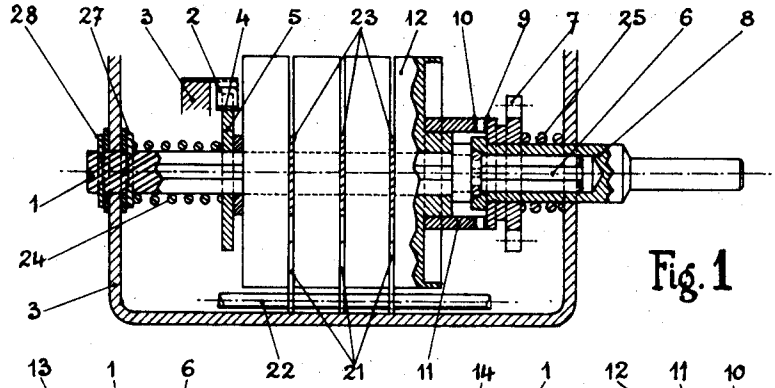

Fig. 1

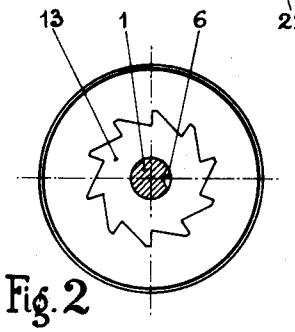

Fig. 2

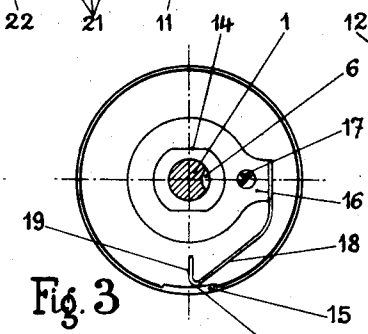

Fig. 3

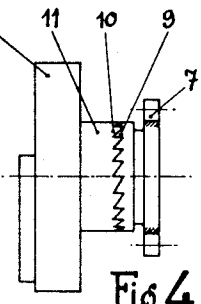

Fig. 4

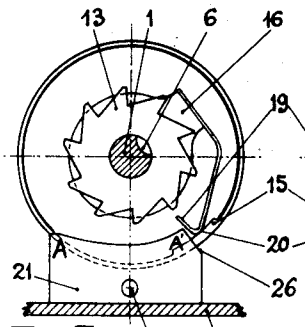

Fig. 5

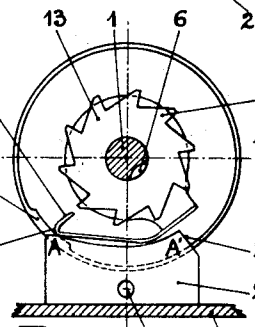

Fig. 6

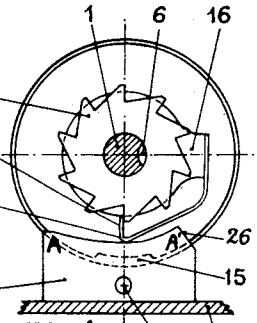

Fig. 7

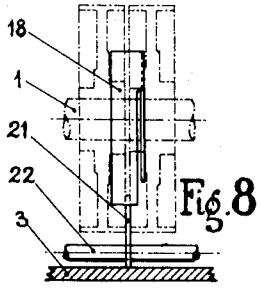

Fig. 8

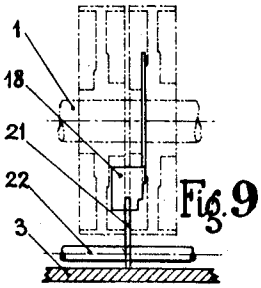

Fig. 9

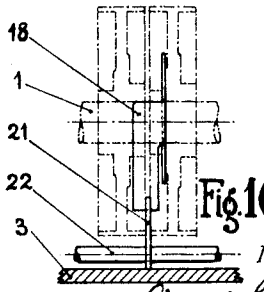

Fig. 10

Inventors

Edmond Seignol

Paul Seignol

Patented Apr. 23, 1940 2,198,063

UNITED STATES PATENT OFFICE

2,198,063

REGISTERING DEVICE

Edouard Seignol and Paul Revel, Paris, France, assignors to Societe Auxiliaire pour le Developpement D'Industries Mecaniques (S. A. D. I. M.), a corporation of Switzerland

Application June 28, 1937, Serial No. 150,818
In France July 4, 1936

4 Claims. (Cl. 235—142)

This invention relates to computing or registering machines.

It is the object of the present invention to provide an improved registering device which is characterized by its extreme simplicity, the certainty of its operation, and the very small number of strong and simple parts of which it is composed. A meritorious feature of the invention is the novel manner of returning the machine to zero by a simple backward turn of the register shaft.

The following specification and accompanying drawing represent one embodiment of the invention. It is understood that the principle of the invention is applicable to other forms of registering machines.

Various other objects, advantages and meritorious features will appear more fully from the following specification, appended claims, and accompanying drawing, wherein:

Figure 1 is a view of a registering device in assembled condition and mounted on a support,

Fig. 2 is a side elevation of the one face of a drum and its ratchet wheel,

Fig. 3 is a side elevation of the opposite face of a drum showing its hub, the spring positioned on this hub, and the boss on the inner side of the rim on which rests the bent extremity of the flexible metal blade,

Fig. 4 is a view of the gear wheel for controlling the operation of the registering device having teeth engaging with the teeth of a socket acting in place of a ratchet wheel for the first drum,

Fig. 5 is a cross sectional view of Fig. 1 on the ratchet wheel of the drum showing the starting position of the spring on the preceding drum when the same is at zero,

Figs. 6 and 7 show the positions of the spring, before and after its passage over the cam separating two adjacent drums, and its action on the ratchet wheel of the next succeeding drum,

Figs. 8, 9 and 10 are cut away front elevation views, partly in dotted outline, of the three preceding figures, setting forth the successive positions of the spring on the boss of the drum and on the cam.

The registering wheels or drums of the registering device are freely mounted on the shaft or axle 1 which is held immovable during the operation of the drums by the action of a spring 2 fixed to a support 3. The spring 2 has a bent end engaged in notch 4 of a disc 5 fixed upon the shaft 1 by a key engaged in the groove 6 of this shaft.

The device whose movements it is desired to count is connected to the first drum of the register by any suitable means, such as a worm gear. In the embodiment of the invention shown in Fig. 1, the movement is transmitted to the register by a gear wheel 7 mounted for free rotation on the hollow shaft 8, which is slidably fitted over shaft 1 and keyed thereto for joint rotation therewith. A one way drive mechanism couples the gear wheel 7 to the first drum on the shaft. As shown in Fig. 4, it comprises cooperating crown ratchet bosses on the gear wheel and a sleeve 11 fixed to the first drum, the teeth 9 and 10 of which are shaped to provide a one-way drive between the gear wheel and the drum.

The calculating machine has as many drums mounted in succeeding order as necessary. Each drum, except the first, is provided on one face with a ratchet wheel 13 (Fig. 2) having ten teeth, for example, and on its opposite face (Fig. 3) with a hub 14 and a boss 15 on the inner side of its rim. Means for connecting two drums together for joint rotation comprises a spring support 16 on the hub 14, the two elements being secured to the drum by a screw 17. Spring support 16 carries a flexible metal blade 18 bent at its extremity 19, this metal blade being of a width sufficient to rest a part of its elbow 20 on the boss 15, its middle part will climb the incline of the cam 21 interposed between two adjacent drums and its other side will extend into the plane of the ratchet wheel so that as it nears the end of its passage over this cam it will enter in engagement with the teeth on the ratchet wheel of the next succeeding drum and cause its rotation as will be explained more fully hereinafter. The boss 15 on which rests the elbow 20 of the flexible metal blade 16 is for the purpose of avoiding contact of the spring with the inner surface of the rim of the next drum.

The cams 21 (Figs. 5, 6, and 7), are formed of thin plates, such as steel for example. They are interposed between the drums, and have a contour like that shown between the points A and A'. These cams, identical in form and dimension, are positioned in the embodiment of the invention illustrated herein by the rod 22 and their support on the base 3. They are provided as shown with straight bottom edges bearing on the flat top surface of the base 3. They are mounted on the rod 22 for bodily movement lengthwise thereof and follow any axial shifting movement of the drums during the operation of the device. The engagement between the straight bottom edges of the plates and the base portion prevent

the plates from turning on the rod or following the rotative movement of the drums.

Several steel washers **23** (Fig. 1) furnished with keys engaged in grooves **6** of the axle **1** are interposed between the registering drums.

The springs **24** and **25** compressed between the end walls of the machine and the opposite ends of the drum series cause a certain frictional cohesion of the drums and the washers **23**. The springs also yieldingly force the drum assembly and the gear wheel **7** toward one another and operatively engage the teeth **9** and **10** of the drive mechanism. If the gear wheel **7** should be rotated in the direction opposite to the direction in which it drives the drums the teeth **9** will ride out of the teeth **10** and either or both the drum assembly and the gear wheel will retract back against the springs **24** and **25** to accomplish the disengagement. The operation of the registering device is as follows:

At first, when all the drums are at zero, the springs occupy the position shown in Figs. 5 and 8, that is to say, the elbows **20** of the flexible blades rest on the boss **15** and the bent extremity of the springs are adjacent to the edge **26** at the point A' on cam **21**.

Movements which it is desired to count are transmitted to the toothed wheel **7** to rotate the latter in any suitable way. The teeth **9** associated with the wheel **7** engage with the teeth **10** on sleeve **11** and impart rotation to the first drum **12**. The teeth **9** and **10** are shaped so that rotation of the wheel **7** in a counting or adding direction is transmitted to the first drum of the series but reverse rotation of the wheel **7** is ineffective upon the drums.

The first drum in turning causes the numbers 1, 2, 3, 4 to appear successively on the dial corresponding to this drum. At a certain moment, the elbow **20** of the metal blade of the spring **16** encounters the cam **21** at the point A (Figs. 6 and 9). The spring then commences to climb the incline of the cam **21**. When it occupies the position shown in Fig. 7 (and in the front view in Fig. 10), that is to say, when it is exactly in vertical alignment with the axis of the drum, the numeral 9 of the dial of the first drum appears in view. The bent extremity **19** of the spring then comes into contact with the radial side of one of the ratchet teeth of the next drum (Fig. 7) and will carry the same just past the point A' of the slope at which time the extremity **19** returns to the boss **15** after an exact turn at 36°. It will then retract from the ratchet teeth with which it has just made a tenth of a rotation, that is to say, the distance of one tooth, which causes the number 1 to appear on the dial of the second drum at the moment when the first drum reaches zero. The washers **23** which are keyed in the groove **6** of the shaft **1**, are immovable during the operation of the registering device, and frictionally act to prevent the rotation of one drum from being transmitted to the next succeeding drum. Each of the drums are thus isolated and are not able to be turned except by action on its ratchet wheel by the flexible blade of the preceding drum. The first drum then commences a new turn about the shaft **1** which upon completion will cause the second drum to rotate one tenth of a revolution or the distance of one tooth. This will cause the numeral 2 to appear on the dial, and so on.

Each complete turn of the second drum corresponds to ten turns of the first drum, and each complete turn of the third drum corresponds to ten turns of the second drum or to one hundred turns of the first drum, and so forth.

Return of the registering wheels to zero is effected by turning the hollow shaft **8** and its associated shaft **1** in the direction opposite to their operating or computing direction of rotation. This will be in a clockwise direction as viewed in Figs. 5 to 7 and will at the same time rotate backwardly the friction washers **23** and the drums **12** compressed into frictional engagement therewith. The drums will thus be rotated in a direction reverse to their normal counting direction of rotation.

Each drum is separately prevented from further reverse rotation as soon as the bent extremity **19** of the flexible blades encounter the stop **26** on the high side of the cam plates **21**. When all the drums have returned to this position, all the zeros of the graduations will appear on the dial. Then the hollow shaft **8** is freed from control. The bent end of the spring **2**, fixed on the support, returns into a notch **4** of the disc **5** which is keyed to shaft **1**. This will yieldingly hold the shaft in such position during the computing operations of the drums.

The collars **27** and **28** (Fig. 1) are for the purpose of preventing longitudinal displacement of the shaft **1** during operation.

If movements are transmitted to the registering device in the opposite or subtractive direction, these movements will not be registered because the teeth **9** of wheel **7**, if turned in a reverse direction, will not impart movement to the teeth **10** and as a result the drums are not rotated.

What we claim is:

1. A registering device comprising, in combination, a shaft, a plurality of drums rotatably and slidably carried upon said shaft, friction members slidably keyed to the shaft extending between each adjacent pair of drums and frictionally acting to restrain rotation of the drums relative to the shaft, means yieldingly urging the assembled drums and the friction members together on said shaft, transfer mechanism between the drums including a plurality of flat metal elements interleaved with the drums, said elements projecting beyond the circumferences of the drums, and means engaging the projecting portions of said elements and supporting the same for independent bodily movement parallel to the shaft but preventing the same from turning with the drums about the axis of the shaft.

2. A registering device comprising, in combination, a support including a flat top base portion and spaced parallel upright supporting portions, a shaft extending in spaced parallel relationship to the top of said base portion and having its opposite ends journaled in said upright supporting portions, a plurality of drums rotatably and slidably carried by said shaft, means associated with each drum slidable therewith but frictionally resisting rotation of the same relative to the shaft, a rod extending parallel to the shaft but in spaced relationship to the circumferences of the drums, a plurality of flat metal plates forming part of a transfer mechanism between each pair of drums independently slidably mounted upon said rod and separately interleaved with the drums, said plates having straight bottom edges bearing upon the flat top of said base portion and preventing the same from following the rotative movement of the drums about the shaft but permitting lateral bodily movement of the same to follow any slidable movement of the drums on the shaft.

3. A registering device comprising, in combination, a rotatable shaft, a plurality of drums rotatably and slidably carried by said shaft, means frictionally resisting rotation of said drums relative to said shaft, transfer mechanism for imparting rotation to the drums successively from one end of the drum assembly to the other as each drum completes a revolution about the shaft, a member freely rotatable about the shaft adjacent to the first mentioned end of the drum assembly, disengageable drive means acting parallel to the axis of the shaft, coupling said member to the adjacent drum in said drum assembly, and means acting on the opposite end of said drum assembly yieldingly urging the same along the shaft toward said member and operatively engaging the drive means between said adjacent drum and the member.

4. A registering device comprising, in combination, a shaft, a support for the opposite ends of the shaft, a plurality of drums rotatably and slidably assembled on said shaft between the supports, friction discs slidably keyed to the shaft between the drums and acting to frictionally resist rotation of the drums relative to the shaft, transfer mechanism associated with each drum for imparting rotative movement to the drums successively from one end of the drum assembly to the other end as each drum completes a revolution about the shaft, said transfer mechanism including a plurality of thin flat plates interleaved between the drums and extending outwardly beyond the circumferences of the drums, means mounting the outer exposed portions of said plates for bodily movement parallel to the drum shaft but restraining the same from movement about the axis of the shaft, a member freely rotatable on the shaft adjacent to the first mentioned end of the drum assembly, a one-way drive crown ratchet wheel means operatively coupling said member to the first drum of the drum assembly and adapted to impart rotation to this drum when the member is rotated in one direction only about the shaft, and coil springs encircling the opposite ends of said shaft and yieldingly urging the drum assembly and the rotatable member toward one another whereby the teeth of said crown ratchet wheel means are interengaged for operation.

EDOUARD SEIGNOL.
PAUL REVEL.