July 7, 1936. F. J. CANNON 2,046,810

COUNTING MECHANISM

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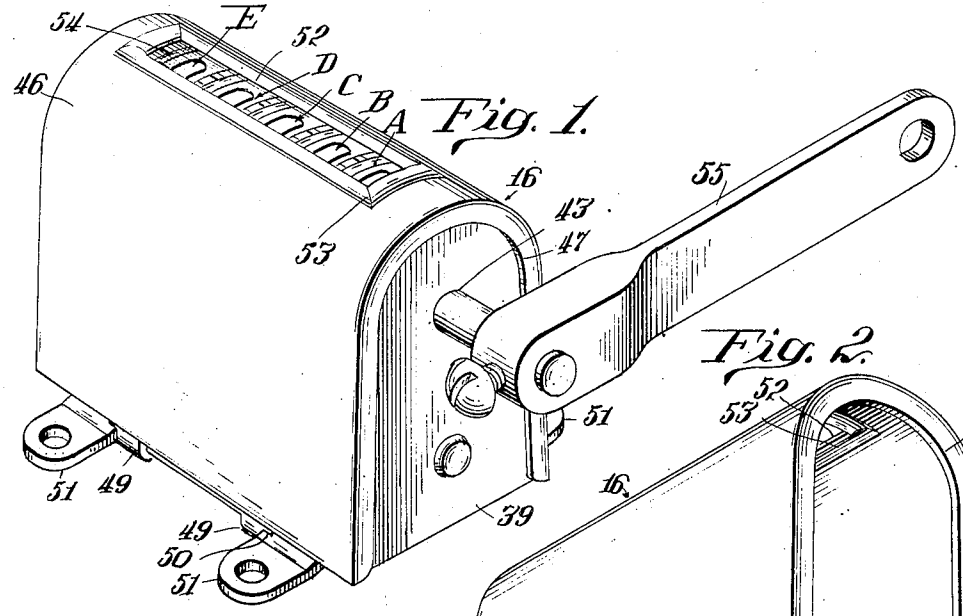


Fig. 1.

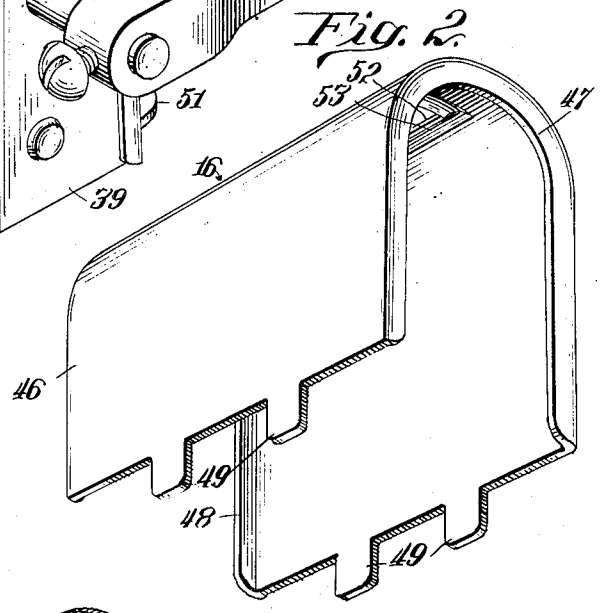


Fig. 2.

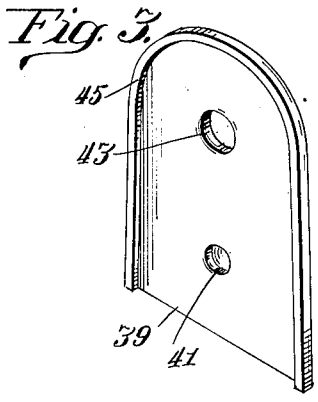


Fig. 3.

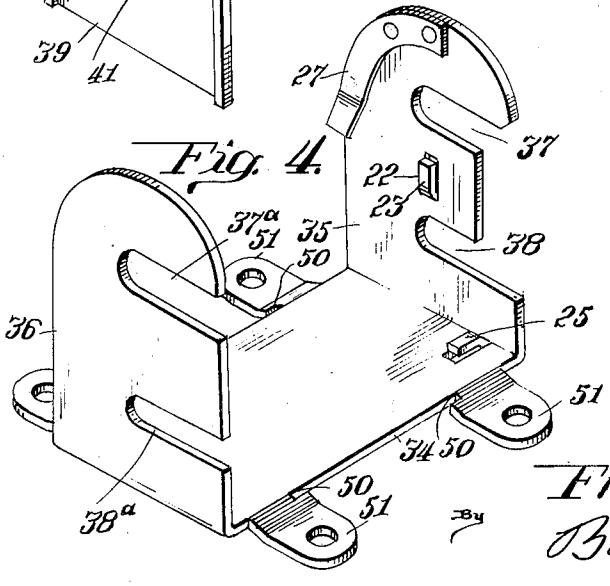


Fig. 4.

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Fig. 5.

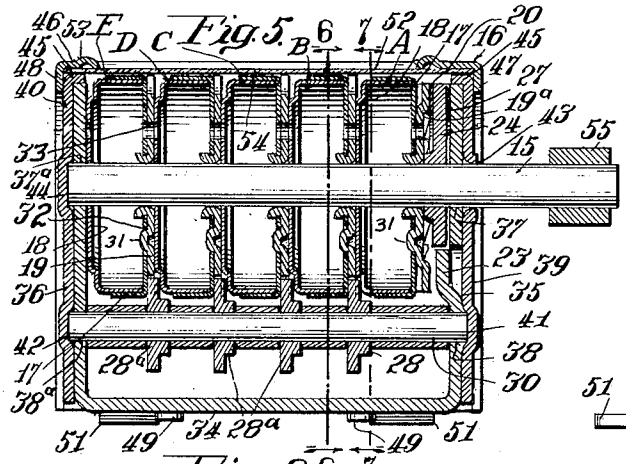


Fig. 7.

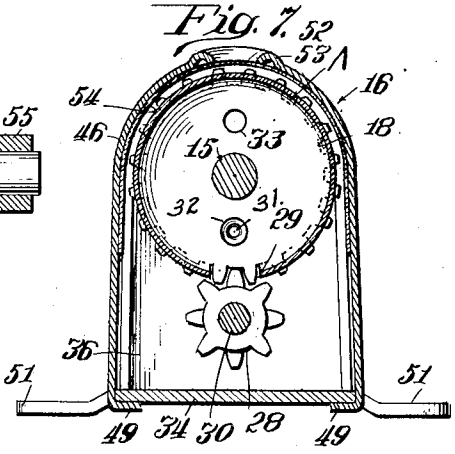


Fig. 6.

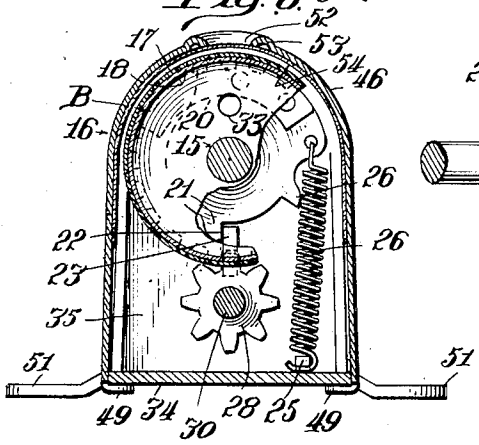


Fig. 9.

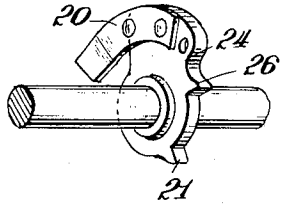


Fig. 8.

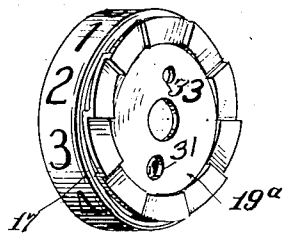


Fig. 12.

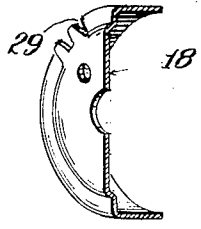


Fig. 11.

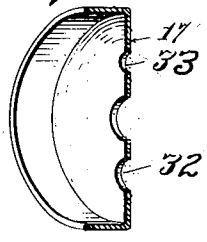
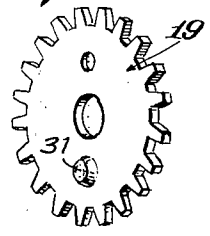


Fig. 10.



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COUNTING MECHANISM

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Application April 18, 1934, Serial No. 721,121

5 Claims. (Cl. 235—1)

This invention relates to improvements in mechanical counting apparatus and the object of the invention is to simplify the construction and assembly of the parts whereby certain of the parts of the housing and the operating mechanism, in their assembled relation, have an interlocking engagement with each other and thereby cooperate to maintain the various parts in their proper positions. In this connection the invention includes the provision of a slotted frame member for facilitating the insertion of the operating parts of the mechanism, and a casing having removable end plate members which interlock with parts of the frame and engage the shafts on which said operating parts are mounted to hold them in proper position in the frame.

A further and more specific object of the invention is to provide improved arrangements and constructions whereby the apparatus may be made very small in size without sacrificing economy in manufacture nor the accuracy of operation of the mechanism.

The invention includes the above and the various other improved arrangements, constructions, and combinations of parts hereinafter described and claimed for carrying out the above stated objects and such other objects as will appear from a description of the embodiment of the invention shown in the accompanying drawings.

One preferred embodiment of the invention is illustrated in several figures of the drawings. For the purpose of clearly illustrating the various parts of the device, the various figures of the drawings have been made on a scale three times the size of the actual device.

Fig. 1 is a view in perspective of a mechanical counter constructed in accordance with this invention.

Fig. 2 is one of the members for enclosing and supporting the operating parts in their proper position.

Fig. 3 is one of the end plates of the casing.

Fig. 4 is a pressed metal frame member.

Fig. 5 is a longitudinal section through the counting device showing the various parts in their assembled relation.

Fig. 6 is a cross section taken on line 6—6 of Fig. 5 looking in the direction of the arrow.

Fig. 7 is a cross section similar to Fig. 6 but taken on line 7—7 of Fig. 5.

Fig. 8 is a view in perspective of the numeral indicating wheel positioned at the extreme right of Fig. 5, and illustrating the ratchet wheel secured to said member.

Fig. 9 is a view in perspective of a spring pawl member which in the operation of the counting device engages the teeth of the ratchet wheel shown in Fig. 8.

Fig. 10 is a view in perspective of a gear wheel which forms a part of certain of the numeral indicating wheels; and

Figs. 11 and 12 are sectional views illustrated in perspective of the cup-shaped members which are engaged with each other to form a drum-like body for the numeral indicating wheel.

The counting mechanism herein shown is of a well known type which generally consists of a plurality of indicating wheels mounted on a shaft and operatively connected one with another by means of a mutilated sprocket wheel. The said sprocket wheels are ordinarily disposed between adjacent numeral indicating wheels and engaged with parts thereof so that a partial rotation is imparted to an indicating wheel for each complete rotation of the adjacent wheel of lower order. The present invention is not concerned broadly with the general arrangement and operation of such type of counter mechanism except in those respects herein shown in which the general arrangement of parts present special advantages in connection with the specific constructions shown whereby the assembly of the parts may be accomplished with a minimum labor cost or makes it practicable to make the said parts of relatively small size.

The counting mechanism herein shown consists of a plurality of indicating wheels designated A, B, C, D and E, all of which are arranged in axial alignment and loosely mounted on an operating shaft 15, the latter of which is supported, as hereinafter described, in a sectional casing which is designated as a whole by the reference numeral 16. Each of the numeral wheels consists of two cup-shaped members 17 and 18 and a toothed member 19 or 19a, as the case may be, secured to the numeral indicating members. The cup-shaped members 17 and 18 are preferably stamped from metal disks and arranged in telescopic relation, one fitting tightly within the other to form a hollow drum-like body. The numerals 0 to 9, both inclusive, are arranged in spaced relation around the perimeter of the indicating wheel, each numeral indicating one-tenth of the circumference of said wheel. The toothed member 19a secured to the indicating wheel A is in the form of a ratchet wheel having ten laterally disposed teeth. The said indicating wheel A is given intermittent partial rotations by means of a spring ratchet finger 20 mounted on the operat-

ing shaft 15 and adapted to engage the teeth of the ratchet wheel 19a. The ratchet finger member 20 is preferably limited in its operating movement by means of a lug 21 on said member positioned to come into engagement with the rear face 22 of an inwardly pressed stop lug 23 on the frame member. The return movement of the ratchet finger is effected by means of a coil spring connected to the operating member at 24 and to an upwardly pressed lug 25 on the base portion of the frame member shown in Fig. 4. The return movement of the said operating member 20 is limited by engagement of the lug 26 with the forward face of the inpressed stop member 23 above referred to. The said indicating wheel A is held against accidental reverse movement by means of a spring stop 27 secured to the supporting frame member (Fig. 4) and adapted to engage the teeth of the ratchet wheel 19a.

For each complete rotation of the indicating wheel A, the indicating wheel B is given a partial rotation equal to one-tenth of the circumference of the said wheel by means of the engagement of the mutilated sprocket wheel 28 with the gear 19 which forms a part of the said indicating wheel B. The said sprocket wheel is preferably provided with eight teeth, four of which are full width and four of which are of half width. Two of the sprocket teeth of full width normally bear upon the periphery of the indicating wheel A until the said wheel is given substantially a full revolution whereupon a full width tooth of the sprocket enters a radially extending slot 29 in the periphery of the cup-shaped member 18 and thereby permits the sprocket wheel to rotate a distance sufficient to move the gear wheel 19 and indicating member B one-tenth of a revolution. The operative connections between the indicating wheels B and C, C and D, and D and E are the same as that described for operatively connecting the indicating wheels A and B. The several sprockets are therefore indicated by reference numeral 28a all of which are loosely supported on the shaft 30.

An advantage of the present embodiment is the simplified manner of assembling and attaching the toothed members 19—19a to the respective numeral indicating wheel and the manner of holding the indicating wheel and parts thereof in proper assembled relation during the assembling of the various parts. The said toothed members 19—19a are secured to the member 17 of the associated indicating wheel by beading or crimping the central portion of the tooth member around the edge of the central opening in the cup member 17 in the manner indicated in Fig. 5 of the drawings. In order to insure accurate positioning of the tooth member relative to the numerals on the indicating wheels, each tooth member is indented to provide a bump or protrusion 31 adapted to extend into one of a pair of apertures 32—33 formed in the associated cup member 17. The said tooth members and likewise the oppositely arranged cup member 18 are provided with apertures which register with the aperture 33 of the cup member 17 whereby the several indicating wheels may be threaded on a wire or other rigid member and thereby held in their proper relative positions during the assembling of the various operating parts in the mechanism casing.

The assembly of the parts in the casing is materially simplified by the special construction of the casing member. In this connection the base portion 34 of the casing is provided with upturned end portions 35, 36, which are formed with open ended slots 37—37a and 38—38a which permit the shafts 15 and 30, together with the operative devices mounted thereon, to be inserted in the frame member by a lateral movement, that is to say, the said shafts 15 and 30 are merely inserted laterally through the open ends of said slots 37—37a and 38—38a. The shafts are held in their operative positions in said slots by means of end plate members 39 and 40, which are recessed to form bearing pockets 41—42 adapted to slip over and engage opposite ends of the shaft 30; the end plate 39 being formed with a bearing opening 43 for the shaft 15 and the end plate 40 being recessed to provide a bearing cup 44 adapted to slip over and engage the other end of said shaft. Both of the said end plates 39 and 40 are provided with marginal inturned flanges 45 which overlie in interlocking engagement the edge portions of the upstanding ends of the base member 34 so as to lock the said shafts 15 and 30 together with the various elements mounted thereon in their operative positions in the frame. The end plates 39 and 40 are held clamped against the end portions 35—36 of the frame by means of a U-shaped cover member 46, the opposite ends of which are provided with inturned flanges 47—48 which overlie and interlock with the marginal portions of the end plates 39—40. The lower edges of the cover member 46 are preferably provided with bendable lugs 49 which extend through the slotted edge portions 50—50 of attaching lugs 51—51 formed on the base plate portion of the frame member. The said lugs 49—49 being fitted in the slots 50—50 prevent both lateral and longitudinal displacement of the cover member relative to the base. The cover member is permanently locked to the base member by bending the lugs 49—49 around the lower edge of the base in the manner indicated in Figs. 6 and 7, the said attaching lugs of the base member being offset relative to the body of the base so as to permit the said lugs 49—49 to be bent to the position beneath the base without interfering with the attachment of the casing to another element or machine. The upper portion of the cover member 46 is provided with a window 52 the edges of which are reinforced by an upstanding corrugation 53. The said window is closed by means of a transparent strip, preferably celluloid, 54 which is supported in position by friction only, the ends of the said transparent strip being clamped between the upper portion of the cover member 56 and the inturned flanges 45 of the end plates 39—40.

The operating shaft 15 may be oscillated by means of a lever 55 or other suitable device.

I claim:

1. In combination with a shaft for supporting parts of a counting mechanism, means for supporting said shaft and for enclosing said counting mechanism parts comprising a base member formed with angularly disposed end portions having open end recesses therein to receive said shaft, end plate members engaging said shaft to maintain it in said recesses and having marginal flanges which fit over the edges of said angularly disposed end portions of said base to provide an interlocking engagement therewith, and a cover member having marginal flanges which overlap and engage marginal portions of said end plate members to hold them in position.

2. In combination with a plurality of horizontally disposed shafts for supporting parts of a counting mechanism, means for supporting said

shafts and for enclosing said mechanism parts comprising a base member formed with angularly disposed portions having open end recesses therein to receive said shafts, end plates provided with bearing cups for receiving end portions of said shafts to retain them in said recesses, and a cover member formed with flanged marginal portions which overlie, in interlocking relation, marginal portions of said end plates.

3. A sectional casing for supporting and enclosing the operating parts of a counting mechanism comprising a base plate having angularly disposed end portions and provided with attaching lugs offset with relation to the base and having slots adjacent the longitudinal edges of the base portion, and a U-shaped cover member formed with inturned edges which overlie, in interlocking relation, the end portions of said base, and lugs on said cover member adapted to extend through said slots to prevent spreading and lengthwise displacement of the cover member and adapted also to be bent over parts of said base to maintain said base and cover member in their interlocked engagement.

4. In combination with a shaft for supporting parts of a counting mechanism, means for supporting said shaft and for enclosing said counting mechanism comprising a base member formed with angularly disposed end portions having openings for loosely receiving said shaft therein, and a removable housing structure including end wall members adapted to be positioned adjacent the angularly disposed end portions of said base, one of said end walls having a recess for slip-over engagement with a portion of said shaft to retain it in its operative position in said base member.

5. In combination with a shaft structure for supporting parts of a counting mechanism, means for supporting said shaft structure and for enclosing said counting mechanism comprising a base member formed with angularly disposed end portions having openings for loosely receiving said shaft structure therein, and a removable housing structure including wall members having a slip-over engagement with the angularly disposed end portions of said base; one of said structures being recessed to slidably receive a portion of the other structure, whereby the said shaft structure is retained in its operative position in said base member.

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