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COMBINED TIME INDICATOR AND STETHOSCOPE CHESTPIECE

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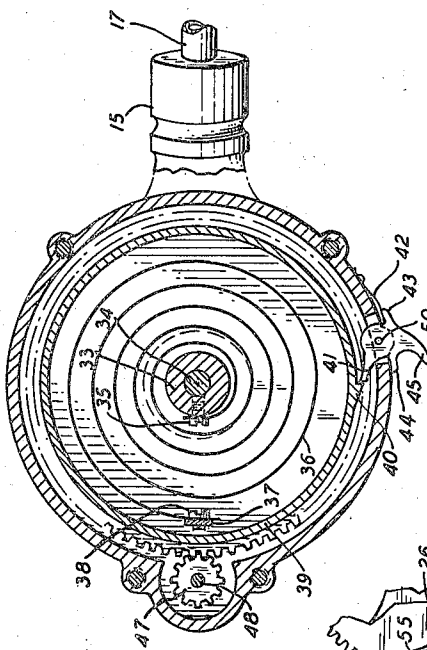


FIG. 3

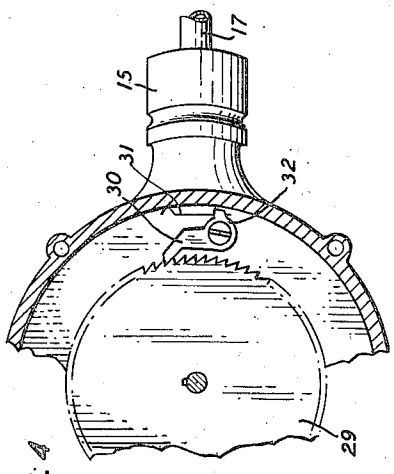


FIG. 4

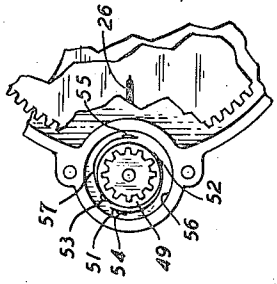


FIG. 5

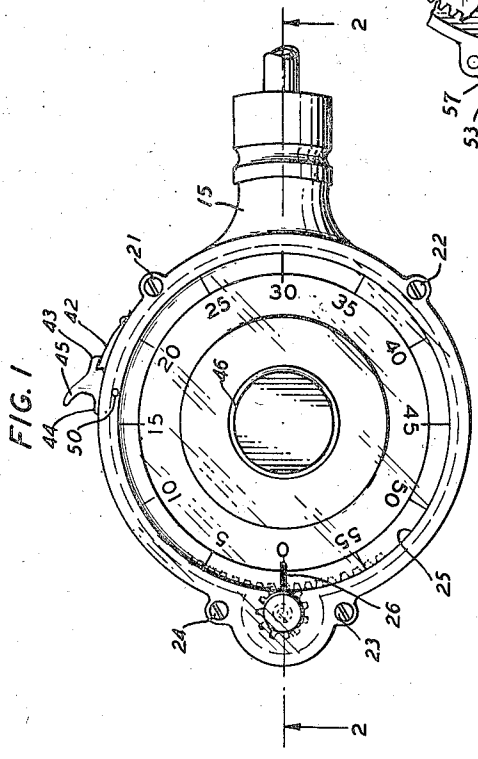


FIG. 1

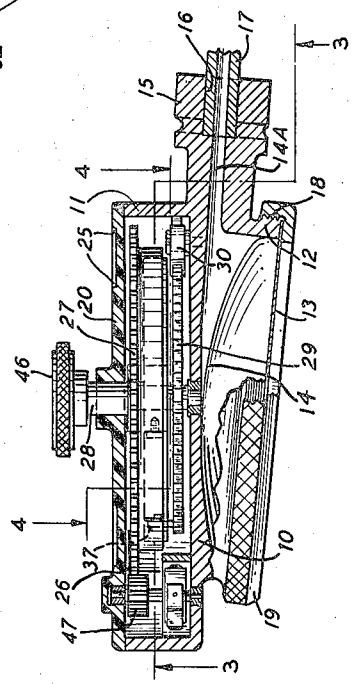


FIG. 2

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COMBINED TIME INDICATOR AND STETHOSCOPE CHESTPIECE

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8 Claims. (Cl. 181—24)

This invention has reference to a device in which a time indicator and a stethoscope chestpiece are combined into a unit structure to facilitate the reading of time for a given number of heart beats or pulses picked up by the stethoscope chestpiece.

The applicant has found, in actual practice, that it was not entirely satisfactory to ascertain the number of heart beats of a person, for example, by holding a stethoscope chestpiece with one hand and holding a time piece with the other hand, which, in turn must be so positioned as to be viewed at a close distance while also observing the person whose heart beats are to be counted for possible signs which may lead to accurate diagnosis of the patient's physical ailment. Applicant has found that frequently a patient could have been helped in some way if the hand required for holding the time piece had been free for administering other treatment to the same patient and, in some cases, to other patients simultaneously.

The applicant therefore contemplates, as one of the objects of his invention, a device in which a stethoscope chestpiece and a time indicator device are combined in a manner to form a unit structure, thus making possible the holding of the stethoscope chestpiece which forms part of the combination in place on the chest of a patient with one hand, while with the same hand, simultaneously operating the time indicator mechanism in conjunction with the listening of the operation of the stethoscope chestpiece in response to the heart beats of the patient and thereby freeing the other hand of the observer to be used as other condition of the patient requires.

The above mentioned object is accomplished, according to the present invention, by the provision of a plurality of means defining a mounting constructed to form in combination with a diaphragm the stethoscope chestpiece air chamber and in combination with a stationary dial of transparent material a second chamber for housing the time indicator mechanism, the latter having an index carried by a gear movable in juxtaposition to the transparent dial for indicating the time of the heart beats, for example, per unit of time as one minute under control of a governor mechanism, and repeat as desired by the simple manual operation of a trigger-like pawl shaped member which normally serves to hold the time indicator from operating from its zero or normal non-operated position upon the tensioning of a motor spring, the manual operation of the trigger pawl member, as above mentioned, being effective to release the time indicator mechanism upon the starting of the heart beats' count for ascertaining the number of such beats for each turn of the index as indicated by the dial, and to again normally stop the operation of the indicator mechanism upon each turn of the dial.

Other novel features and advantages of the invention will appear from the following description and by the claims appended thereto, reference being had to the accompanying drawing in which:

Fig. 1 is an enlarged plan view of the time indicator and stethoscope chestpiece devices combined into a unit structure according to the present invention;

Fig. 2 is a vertical sectional view taken on line 2—2 of Fig. 1, shown with the stethoscope chestpiece housing with portions broken away;

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2 and looking in the direction indicated by the arrows;

Fig. 4 is a partial view in section taken on line 4—4 of Fig. 2, and

Fig. 5 is a top view of the time indicator speed governor mechanism shown with the casing and the driving gear with portions broken away, the cover dial being removed.

According to the present invention a stethoscope chestpiece and a time indicator mechanism are combined, as best seen in Figs. 1 and 2, into a unit structure in which housings are formed on the sides of a plano-concave separating wall 10 having a rim 11 and on its opposite side a rim 12, the concave side of wall 10 forming in cooperation with a diaphragm 13 an air chamber 14 connecting with an air passage-way 14A in a cylindrically shaped extension 15 formed integrally with the wall 10 and the rims 11 and 12, while the end of the cylindrical extension 15 is provided with a bore 16 for tight fit engagement by a rubber tubing 17, shown with portion broken away in Figs. 1, 2, 3 and 4, leading to the stethoscope ear pieces (not shown) at the opposite end of this tubing.

The rim 12 of the casing which forms an element of the stethoscope chestpiece housing, is peripherally screw threaded, as at 18, for receiving a similarly screw threaded ring 19 serving for clamping the peripheral edge of diaphragm 13 to the face of the rim, as best seen in Fig. 2.

The rim 11 of the plano-concave wall 10, above mentioned, co-operates with a cover 20 of transparent material, such as Lucite, to form a housing for a time indicator mechanism, which will be hereinafter described in detail, the cover 20 being secured to the rim 11 as by a number of screws 21, 22, 23 and 24, Figs. 1 and 3, and is formed with a circular channel shaped groove 25 in which are printed or formed integrally therewith indicia, for example 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55 and 60, thus forming a stationary dial for co-operation with an index 26 carried by a gear 27 of the mechanism for indicating the time of a number of heart beats, as for example in a period of time of 60 seconds in five second increments.

The time indicator mechanism consists of a shaft 28 journaled at one end in a bearing fitted in the wall 10, and its other end in a bearing formed in the cover 20, and to the other end of shaft 28 is keyed a ratchet wheel 29, Figs. 2 and 4, engaged by a retaining pawl 30 under the tension of a retractile spring 31 having one of its ends clamped in a lug 32 formed with the pawl 30 and its other end abutting against the inner disposed surface of rim 11 of the casing housing the time indicator mechanism.

The gear 27 which carries the index 26 is provided with a hub 33, best seen in Fig. 3, fitted for free rotation on a reduced portion 34 of the shaft 28 and is provided with a radially disposed screw threaded hole for receiving a similarly threaded screw 35 serving for securing the inner disposed convolution of a spiral spring 36, the outer convolution of which is secured as by means of a screw 38 to a lug 37, Figs. 2 and 3, carried by the ratchet wheel 29. The gear 27 is provided with a circular rim 39 serving as a guard around the spiral spring 36 and to the outer disposed periphery of rim 39 is formed a ratchet tooth 40, Fig. 3, normally engaged by a trigger-like

shaped pawl 41 fitted in a slot formed in the rim 11 and mounted on a pivot 50 supported at one of its ends to the wall 10 of the casing and its other end by the cover 20, the pawl 41 being caused to engage the tooth 40 under the tension of a retractile spring 42 having one of its ends secured to the rim 11 and its other end bearing against the underside of a lug 43 formed with the pawl 41, the movement of the latter being limited in a direction toward the periphery of rim 39 by a lug 44 formed with the pawl and engaging the outer periphery of casing rim 11, as best seen in Figs. 1 and 3, but it is to be noted that pawl 41 is constructed in a manner as not resting at any time against the rim 11 so as to permit at any time free rotation of the gear 27.

The pawl 41 is also formed with a trigger-like lever member or handle 45 serving for manually operating the pawl for permitting the rotation of gear 27, following the tensioning of motor spring 36 by the rotation of a knob 46 keyed to the end of shaft 28 which protrudes through the cover 20.

The gear 27 meshes with a pinion 47 keyed on a shaft 48, the gear ratio being made in the order of 10 to 1 while the number of convolutions of spiral spring 36 being such as to impart any number of turns desired to the gear 27, depending upon the space capacity in the guard formed by the rim 39. In the present construction, twelve turns have been found sufficient for each winding of spring 36.

Rotation of gear 27 is controlled by the operation of a centrifugal governor mechanism comprising a drum 49 keyed to the shaft 48 and to the periphery of this drum are secured, as by screws 52 and 53, the ends of two diametrically opposite bowed springs 57 and 51 having pads 54 and 55 of suitable material, such as brass, adapted to engage the inner disposed periphery of a drum 56 formed integrally with the wall 10 and rim 11 of the casing, as best seen in Figs. 2 and 5.

In an actual operation of the combined stethoscope chest piece and time indicator of the present invention, the turning movement of knob 46 is effective to rotate the ratchet wheel 29 keyed on shaft 28 for tensioning the motor spring 36, the gear wheel 27 being held against rotation by the ratchet tooth 40 now engaged by the trigger shaped pawl 41, the tensioning of spiral spring 36 in the present device being effective to impart substantially 12 revolutions of the gear wheel 27 in 12 minutes' time under control of the speed governor above described.

The manual operation of the trigger pawl 41 out of engagement from the tooth 40 on rim 39 is effective to release the gear wheel 27 and thereby permitting the rotation of this gear by the tension of spring 36, while the re-engagement of pawl 41 with the tooth 40 as effected by spring 42 will stop the operation of the gear 27 following each turn of the latter, thus making possible the repeating of the heart beat count by simply holding the trigger pawl operated at a point where the index mark 26 carried by the gear 27 passes the indicia 0–60 on the dial, the retractile spring 42 however being effective to return the trigger pawl 41 in reengagement with the ratchet tooth 40 following each turn of the driving gear, which may be repeated as above described, the rim 39 carried by the gear 27 however may be provided with any number of ratchet teeth, as 40, so as to stop the operation of the time indicator in any position corresponding to the time marks 5, 10, 15 seconds, etc. as desired.

What I claim is:

1. A device of the character described in which a stethoscope chestpiece is combined with a time indicator mechanism into a common casing having a wall separating the stethoscope and the time indicating mechanism, the time indicator mechanism having a driving gear, an index carried by said gear, a stationary dial having time marks carried thereby, a shaft rotatably mounted in said wall and said dial, a motor spring connected to said shaft and to said gear, manually operable means for tensioning said spring for moving said index relative to said time marks for indicating the time of a number of impulses picked up by the stethoscope chestpiece, and speed controlling means for said time indicator mechanism.

2. A device of the character described comprising a stethoscope chestpiece and a time indicator mechanism, a casing shaped to form elements of the stethoscope chestpiece air chamber and a housing for the time indicator mechanism, said mechanism comprising a shaft, a ratchet wheel keyed to one end of said shaft, a gear mounted for free rotary movement on said shaft, a motor spring operatively connecting said ratchet wheel and said gear, a governor mechanism for controlling the operation of said gear under the tension of said motor spring and means carried by said gear for indicating the operation of said time indicator mechanism in comparison to the beats transmitted by the stethoscope chestpiece.

3. A device of the character described comprising a casing having a substantially plano-concave partition wall forming a stethoscope chestpiece housing and a housing for a time indicator mechanism, a cover of transparent material for the time indicator housing secured to said casing, a diaphragm secured to said casing forming a closure for the stethoscope chestpiece housing, said cover having indicia representing periods of time printed thereon cooperating with index means moved by said mechanism for indicating the operation of the latter relative to sound impulses transmitted to the ear pieces of the stethoscope and means manually operable for controlling the operation of said time indicator mechanism relative to the indicia.

4. A device of the character described comprising a casing formed with a partition wall of plano-concave cross section and a rim portion forming with the concave side of said wall elements of an air chamber for a stethoscope chestpiece and another rim portion forming in cooperation with the plane side of said wall the elements of a housing for a time indicator mechanism opposite the stethoscope chestpiece chamber and a cylindrically shaped projection formed with said casing and extending radially from each of said rim portions and said wall for connecting one end of the stethoscope chestpiece hearing tube.

5. A device of the character described comprising a casing of unit structure forming the air chamber of a stethoscope chestpiece and an air conduit for connection to a tubing leading to the ear pieces of the stethoscope, a diaphragm closing the air chamber, a circular rim formed integrally with the wall of the air chamber opposite the latter and forming elements of a housing, a time indicator mechanism mounted in said housing and an arcuate rim extension formed integrally with said casing into said housing forming an element of a speed governor for said time indicator mechanism.

6. A combination of devices in which the elements of a stethoscope chestpiece are combined with a time mechanism into a unit structure having a wall forming a mounting base for said time mechanism and a partition between the stethoscope chestpiece and said time mechanism, a circular rim formed with said partition and cooperating therewith to form an open housing for said time mechanism, a dial of transparent material secured to said rim to form a closure for said mechanism housing, a shaft journaled in said partition and in said dial, a knob keyed to one end of said shaft for manually rotating the latter, a ratchet wheel keyed to the other end of said shaft, a gear mounted on said shaft for free rotation thereon, a spiral spring having its inner and outer convolutions secured respectively to said gear and to said ratchet wheel whereby the rotation of said knob is effective to tension said spiral spring for rotating said gear, means for holding said ratchet wheel against rotation in one direction, means defining a pawl for normally holding said gear against

rotation upon the tensioning of said spring, manually operable means for actuating said pawl to cause the operation of said time indicator under the tension of said spring, means for controlling the operation of said time indicator mechanism, and an index mark carried by said gear disposed in juxtaposition to the under disposed side of said dial and cooperating with indicia carried by said dial for indicating the time corresponding to a number of beats picked up by the stethoscope chestpiece.

7. A device of the character described in which a stethoscope chestpiece is combined with a time indicator mechanism into a common casing, said casing having a partition forming a common wall between the stethoscope chestpiece air chamber and a housing for the time indicator mechanism, a cover member of transparent material for the housing of the time indicator mechanism, a shaft rotatably mounted in said cover member and in said partition, a gear mounted for free rotation on said shaft, an index carried by said gear in juxtaposition to said

cover member, motor means for actuating said gear, said cover member having a circular recess formed into one face thereof and having time marks cooperating with said index for indicating the movement of the latter with reference to the number of beats transmitted by the stethoscope chestpiece.

8. A device of the character described in which a stethoscope chestpiece and a time indicator mechanism are combined into a casing of unit structure having a plano-concave partition, the concave surface of the partition forming an element of the stethoscope air chamber and the plane surface an element of a housing for the time mechanism.

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