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J. KEVORKIAN

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ALGESIMETER

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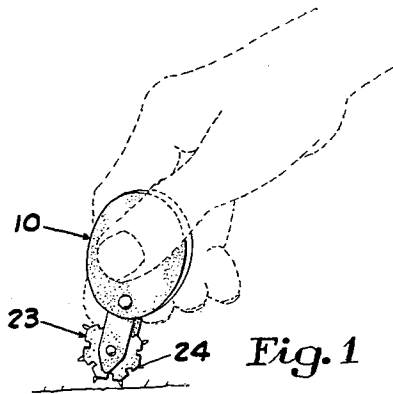


Fig. 1

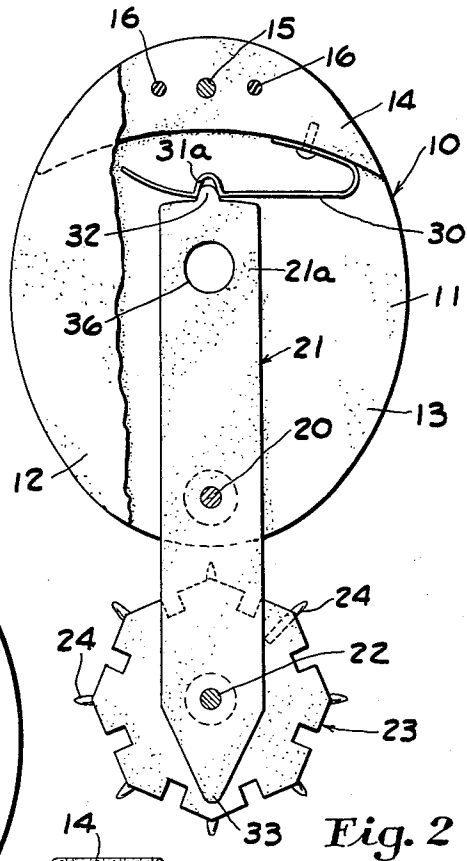


Fig. 2

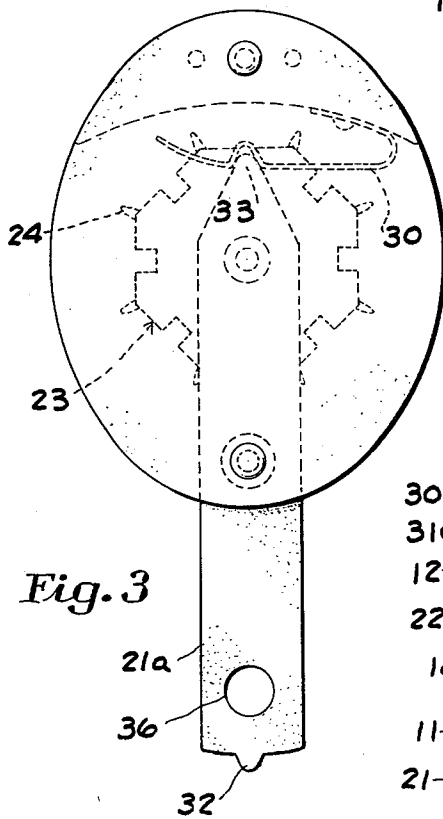


Fig. 3

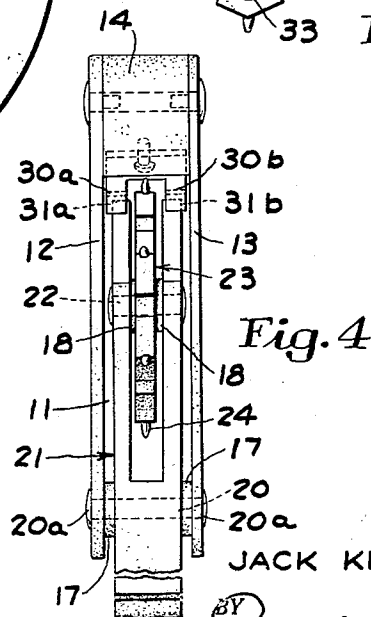


Fig. 4

INVENTOR
JACK KEVORKIAN

BY Gregory S. Dolgorukov

ATTORNEY

1

3,074,395

ALGESIMETER

Jack Kevorkian, 294 Cherokee Road, Pontiac, Mich.

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6 Claims. (Cl. 128-2)

This invention relates to an improved algesimeter or a device for testing, in medical examinations, pain sensitivity or pain responses of the skin.

In neurological and other medical examinations, it often becomes necessary to locate and to outline areas of analgesia, or no-pain sensitivity, as well as of areas of hypesthesia, or reduced pain sensitivity, of the skin of a patient. Such operations are necessary in cases of special examinations for the purpose of treatment of neurological disorders as well as in general medical check-ups, and in diagnosing other diseases. Generally, such operations are performed at the present time by lightly striking the skin with a pin, with the patient reporting the degree of pain felt. If areas of no-pain sensitivity or of reduced sensitivity are thus found, more strikes with the pin are made in that general vicinity in order to determine the boundary lines of the affected areas and to outline the same.

It can be appreciated that the closer such pin strikes are made, the more precise is the location of the affected area. Furthermore, the more uniform are the pin strikes as to their force, the more reliable are the results.

It can also be appreciated that if such an examination is conducted on large portions of the skin or over the entire body of a patient, the number of the required pin strikes may be exceedingly large and take an exceedingly long time. While examination of large relatively flat portions of the body may be facilitated by the use of a piece of wire screen and an instrument in the form of a pin brush, with the pins on the instrument correspondingly spaced, use of single pins is still required over many areas, and a full examination often takes several days.

It has also been found that muscular coordination of the medical examiner required to make such pin strikes with requisite uniformity is exceedingly difficult to attain except for persons at the height of their muscular coordination, and is often unattainable for an older practitioner. Therefore, in many cases, the differences in the pain sensitivity reported by the patient may be due not to the causes determined by the health condition of the patient but by the variance in the intensity of the pin strikes made by the medical examiner. Thus, in some cases the variance in pain felt by the patient may be the test not of the pain sensitivity of the skin but, in effect, of the muscular coordination of the medical examiner. Results of such tests are obviously unreliable for the purposes of medical diagnosis and treatment.

For several decades there has been available a device comprising a metal wheel with sharp prongs, mounted on the end of a handle approximately 8"-10" long and intended to be rolled over the skin of the patient, with the medical examiner holding such device by its handle. While such devices proved to be superior in some cases to the use of a single pin, nevertheless, they proved to possess a number of serious disadvantages. In the first place, use of a relatively long handle having considerable leverage affects the degree of control of the pressure or force exerted on the wheel, and is not used by many practitioners for this reason. Furthermore, the device itself is, in effect, a specialized tool for hospital or clinical use and is not fully suitable for a general practitioner, particularly working in a small or a crowded office or on an outside call. With such device being of relatively large size, and requiring a case for its protection, there is no room for such device in a doctor's bag, unless, while on a call,

2

the availability of other instruments could be sacrificed.

One of the objects of the present invention is to provide an improved algesimeter or a device for measuring pain sensitivity or pain responses of a patient's skin, which device includes a wheel provided with a plurality of pins and adapted to be rolled over the patient's skin for determining his responses, with the hold on such wheel being very close or virtually direct and unaffected by long leverage unavoidable with the use of relatively long handles.

Another object of the present invention is to provide an improved algesimeter having a wheel of such a shape that very short pins may be used thereon without skin interference, i.e. the body of the pin wheel touching the skin between the pins, whereby strength of the pins is greatly increased without increasing their thickness, thus making the device small and compact.

Another object of the present invention is to provide an improved algesimeter which is foldable into a small and compact package and, therefore, can be carried in a vest pocket without endangering the pins and without the possibility of the pin wheel coming out of its protective case and present the danger of causing painful pin pricks to the one carrying it.

A still further object of the present invention is to provide an improved algesimeter having a handle, which handle at the same time forms a protective case for the device.

A still further object of the invention is to provide an improved algesimeter which can be selectively put in its fully extended position for use or into its fully retractable position for storage or carrying around, means being provided to retain the wheel in either of such positions.

A still further object of the present invention is to provide an improved algesimeter providing for better pressure control on the pin wheel and in general making medical examinations better controlled and more scientific.

A still further object of the invention is to provide an instrument of the foregoing character which can be used in tests through fabric and, therefore, through clothing and thus makes it unnecessary for a patient to disrobe fully for the purpose of some examinations.

It is an added object of the present invention to provide an instrument of the foregoing character, which is simple and rugged in construction, safe and dependable in use, and is relatively inexpensive to manufacture, making it an instrument available at a relatively low cost and useful for almost every medical practitioner or even for a medical student.

Further objects and advantages of this invention will be apparent from the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

FIG. 1 is a perspective view showing my improved algesimeter in its practical use.

FIG. 2 is an elevational view showing my improved algesimeter on a larger scale with a portion of its case or handle being removed to expose its internal parts, the pin wheel being shown in its fully extended position.

FIG. 3 is a view similar in part to FIG. 2 but showing the pin wheel in its fully retracted position.

FIG. 4 is a side view of the device, with positions of its operative parts shown as in FIG. 3, a portion of the wheel-carrying lever being broken away for the purposes of a more compact drawing.

It is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments

3

and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein is for the purpose of description and not of limitation.

In accordance with the invention I provide a small wheel of approximately the size of a quarter coin made preferably of a plastic material and having embedded therein short steel pins to extend radially around the periphery of said wheel. The wheel is mounted for rotation at the end of a lever which, in turn, is mounted in a compact casing preferably having the form of a flat piece of egg configuration with an internal recess adapted to receive the wheel in the fully retracted position thereof. For use, the wheel is moved out of the casing into its fully extended position. Means are provided to lock the wheel in its fully extended position as well as in its fully retracted position. Such locking is preferably of a yielding character. Thus, the casing protecting the device in carrying and in storage operates also as a handle for the device in the use thereof. The lever also performs several functions. First, it carries the pin wheel; second, it is used to move the pin wheel in and out of its fully retracted and fully extended positions; and third, it is provided with means locking it in either of said positions.

In the drawing, there is shown, by way of example, an improved algometer embodying the present invention. Referring specifically to the drawing, the device illustrated therein comprises a casing generally designated by the numeral 10, which is preferably in the form of a flat piece having egg shaped configuration and is made of plastic or other suitable material. An internal recess 11 extends through the body of the piece 10 in the plane of its flat sides. In the present embodiment of the invention the casing is produced by two-egg-shaped plastic plates 12 and 13 having a spacer piece 14 disposed between them. The plates and the spacer piece are connected with the aid of suitable connectors such as a rivet 15. Pins 16 are provided to prevent rotation of said spacer piece 14. The casing may also be made as an integral or a one-piece body. At the opposite end of the casing 10 there is provided a shaft 20 which may be also made to serve as a connector similar to the rivet 15 and at the same time serve as a shaft for the lever 21. The shaft 20 extends transversely through the body of the lever 21 approximately at the middle thereof. Spacer pieces 17 are provided on the shaft 20 between the plates 12 and 13 and the lever 21.

The lever 21 has two ends, one of which is bifurcated and carries a shaft 22. On said shaft 22 there is mounted for rotation a rotatable member or pin wheel generally designated by the numeral 23. Spacer pieces 18 are provided on the shaft 22 for centering the pin wheel 23 thereon.

The pin wheel 23 is in the form of a polygon, in the present embodiment an octagon, having a corresponding plurality of pins 24 embedded in its body or otherwise secured to it to extend radially from the periphery of said body, and being equidistantly arranged thereon. The opposite end 21a of the lever 21 serves as a handle for moving the pin wheel 23 out of its fully retracted position as shown in FIG. 3.

Means are provided to lock the lever 21 and, therefore, the pin wheel 23 in yielding manner both in its fully retracted position illustrated in FIG. 3 and in its fully extended position illustrated in FIG. 2. Said means are exemplified by a leaf spring 30 secured to the spacer piece 14 and projecting downwardly and inwardly of the piece in the form of two leaves 30a and 30b. Bends 31a and 31b are provided on said spring leaves 30a and 30b as shown in the drawing with said bends forming depressions into which projections 32 provided on the end 21 and two projections 33 provided on the bifurcated end of the lever 21 enter with a snap and retain in a yielding manner the lever 21 and therefore the pin wheel 23 in its fully retracted position of FIGS. 3 and 4 as well as

4

in its fully extended position shown in FIGS. 1 and 2. While yielding locking means are employed in the embodiment illustrated and described herein, it will be understood that positive locking means may also be used.

With the pin wheel being in its fully extended position, the instrument is used for the purposes of testing sensitivity of the skin of a patient in the manner illustrated in FIG. 1. Generally the instrument is used on bare skin. However, I found that in many cases it may be used through clothing. When the instrument is not in use, by taking hold of the lever 21 near the rounded ends 20a of said shaft 22, the wheel is moved toward its retracted position. By the time the wheel is partially housed within the internal recess 11, the opposite end of the lever 21 has already come out of the casing, enabling the user to take hold of it and move the wheel 23 into its fully retracted position. When the wheel is so retracted, the device may be carried in a vest pocket or in a doctor's bag, kept without danger of damaging the pins on the top of a desk, in a drawer, or be hung on a board or panel for which purpose a hole 36 is provided in the free end of the lever 21.

It is desirable for the purposes of reliable tests that the body of the wheel 23 does not touch the skin and thus does not interfere with the test by changing with the amount of pressure exerted on the pins. It will be understood that the polygonal shape of the body 23 operates to achieve said purpose without the necessity of increasing the length of the pins. The casing, the lever and the pin wheel with the exception of the pins may be made of a suitable plastic material by injection molding process and thus produce an attractive and yet rather inexpensive instrument. The shaft 22 may be made removable in order to permit replacement of the pin wheel 23 should any of the pins thereof become broken or bent.

By virtue of the above disclosed construction, the objects of the present invention listed above and numerous additional advantages are attained.

I claim:

1. A device for testing pain sensitivity of the skin of a patient, said device comprising a rotatable wheel of a regular octagonal configuration having a plurality of equidistantly arranged radially extending sharp projections provided around its periphery at the corners of the octagon, with the point of said projections having sharpness required for skin tests, a flat casing of egg-shaped configuration having a recess adapted to receive and to house said rotatable wheel in the retracted position thereof and to serve as a handle for said wheel when the same is in its fully extended position, a lever having one end carrying said wheel for rotation therein and mounted on said casing, said lever adapted to be manually moved to have said wheel selectively positioned in its fully retracted position for carrying and storage, and its fully extended position for use, with said casing and said lever having dimensions adapting the device to be used while held in the fingers rather than in the full hand, with said casing terminating in the extended position of the wheel within the palm of the user.

2. The invention defined in claim 1 and including means for locking said lever in its fully retracted position and in its fully extended position.

3. A device for testing pain sensitivity of the skin of a patient, said device comprising a rotatable wheel of octagonal configuration having a plurality of radially extending and equidistantly arranged sharp projections around its periphery extending from the corners of the octagon, with the points of said projections having sharpness required for skin tests, a flat casing of egg-shaped configuration having a recess adapted to receive and to house said rotatable wheel in the retracted position thereof and to serve as a handle for said wheel when the same is in its fully extended position, a lever hinged at its middle on said casing and having one end carrying said wheel for rotation therein, with the other end providing the

5

6

handle for moving the rotatable wheel in and out of its fully extended position and fully retracted position.

4. The invention defined in claim 3, said rotatable wheel being in the form of a flat piece of plastic of a regular octagon configuration with the projections being in the form of steel needles embedded at the corners of the octagon.

5. A device for testing pain sensitivity of the skin of a patient, said device comprising a rotatable wheel having the shape of a regular octagon and including a corresponding plurality of radially extending sharp projections provided around its periphery at the corners of the octagon, a flat casing of rounded configuration having a recess adapted to receive and to house said rotatable wheel in the retracted position thereof and to serve as a handle for said wheel when the same is in its fully extended position, a lever hinged at its middle on said casing and having one end carrying said wheel for rotation therein with the other end providing the handle for moving the rotatable wheel in and out of its fully extended position and fully retracted position, and means on said casing and said lever for yieldingly locking said lever in its positions corresponding to the fully extended position and the fully retracted position of said rotatable wheel.

6. A device for testing pain sensitivity of the skin of a patient, said device comprising a rotatable wheel having a plurality of radially extending sharp projections around its periphery with the points of said projections having sharpness required for the skin tests, a casing having a

recess adapted to receive and to house said rotatable wheel in the retracted position thereof and to serve as a handle for said wheel when the same is in its fully extended position, a lever hinged at its middle on said casing and having one end carrying said wheel for rotation therein with the other end providing the handle for moving the rotatable wheel in and out of its fully extended position and fully retracted position, and means on said casing and said lever for yieldingly locking said lever in its positions corresponding to the fully extended position and the fully retracted position of said rotatable wheel, said locking means being in the form of a spring carried by said casing and projections on both ends of said lever cooperating with said spring, with said casing and said lever having dimensions adapting the device to be used while held in a few fingers rather than in the full hand.

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