

[72] Inventor **Jordan M. Scher**
Marina City West Tower Suite 5908,
Chicago, Illinois 60610
 [21] Appl. No. **547,494**
 [22] Filed **May 4, 1966**
 [45] Patented **Oct. 13, 1970**

3,093,135 6/1963 Hirschhorn..... 128/303.1
 3,274,995 9/1966 Eidus..... 128/2
 3,281,637 10/1966 Hultquist..... 320/2

Primary Examiner—William E. Kamm
 Attorney—Jerry D. Hosier

[54] **DIAGNOSTIC INSTRUMENT USED IN TESTING
 PATIENT RESPONSE TO HEAT, COLD AND
 ELECTRICAL STIMULI**
8 Claims, 8 Drawing Figs.

[52] U.S. Cl..... 128/2,
 62/3, 62/293, 128/2.1, 128/399, 128/405, 128/423,
 320/2

[51] Int. Cl..... A61b 10/00

[50] Field of Search..... 128/2, 303,
 2.1, 303.1, 362, 380—382, 394, 399, 401,
 404—406, 410, 411, 419, 421, 423, 424; 320/2;
 62/3, 293; 219/229, 241, 242

[56] **References Cited**

UNITED STATES PATENTS

1,374,414 4/1921 Weiss 128/406X

ABSTRACT: A diagnostic instrument is disclosed for use in testing the responsiveness of a patient to certain neurological stimuli as heat, cold and electrical shock. A hollow handle supports a rechargeable battery supply, while different instrument modules are removably attachable to a top closure of the handle for selective energization by the battery source.

A first module includes a thermoelectric device having opposed electrode surfaces adapted for developing a heating and cooling effect, respectively, the electrodes being further adapted for individual contact with the skin of a patient in testing the patient's reaction to such stimuli. A second module includes a pair of electrodes for applying an electrical impulse to selected areas of the patient's skin. Other features are disclosed.

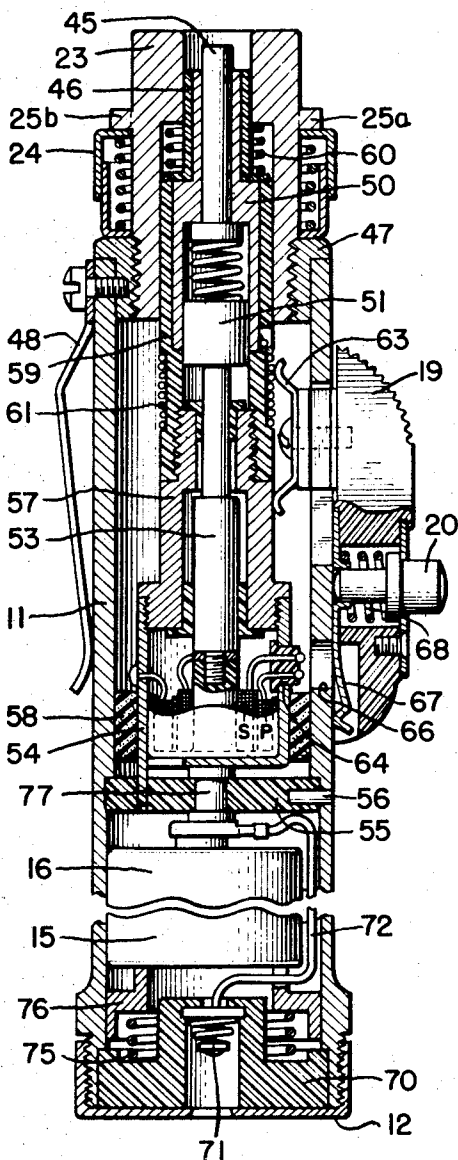


FIG. 3

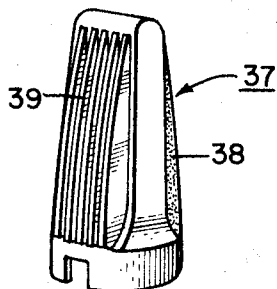


FIG. 3a

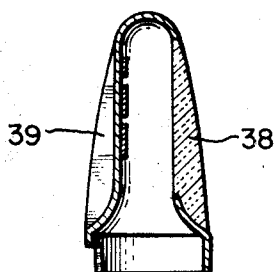


FIG. 2

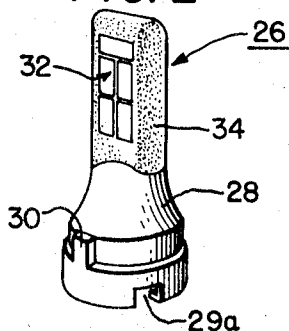
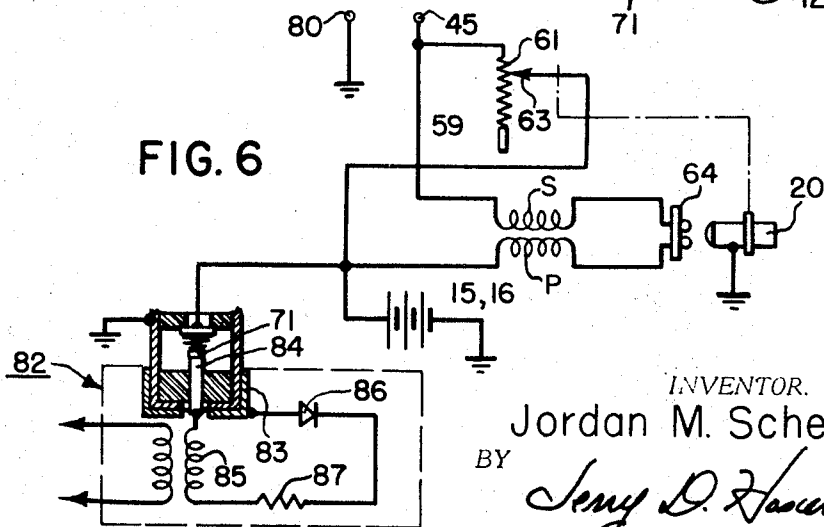
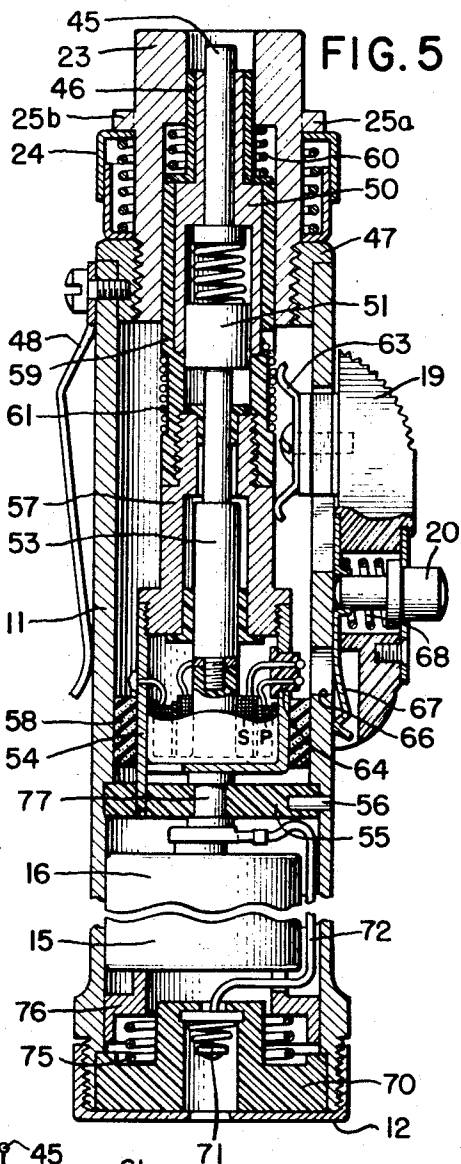
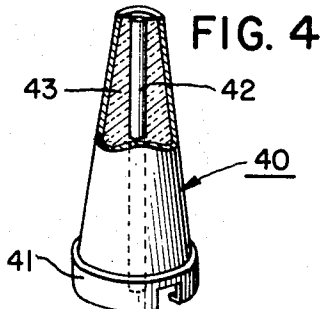
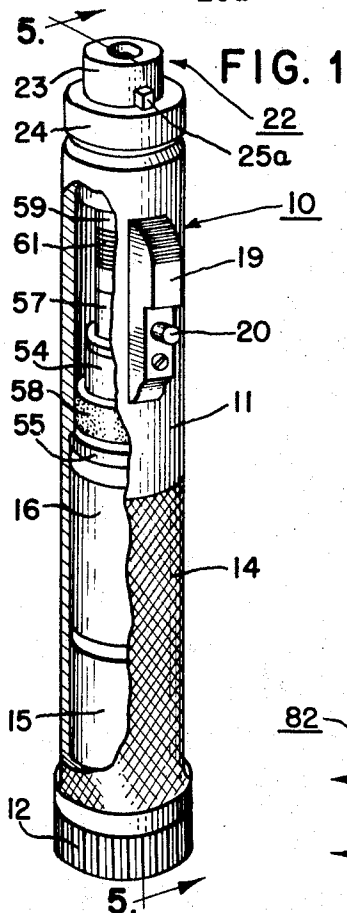
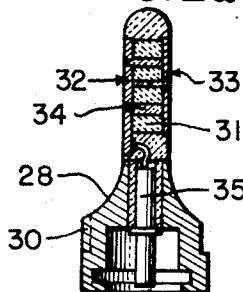


FIG. 2a



INVENTOR.
Jordan M. Scher
BY *Seng D. Harris*
Agent

DIAGNOSTIC INSTRUMENT USED IN TESTING PATIENT RESPONSE TO HEAT, COLD AND ELECTRICAL STIMULI

The present invention relates to medical diagnostic instruments and more particularly is directed to new and improved instruments of the above type which are especially well-suited for use in a practical, clinical environment.

Historically physical examination of patients for responsiveness to certain neurological stimuli has been largely neglected at the clinical level, or alternatively, such examinations have been conducted in a cursory and substantially uninformative manner. This is the case despite substantial medical and psychiatric evidence that such an examination, if properly conducted, can provide significant insight into the particular maladies affecting the individual. For instance, it is well established that cutaneous and paracutaneous projections of pain sensitivity and sensibility are of great value in determining the extent of nerve damage or loss and in prognosticating a rate or likelihood of recovery from certain neurological conditions whether these conditions be of traumatic, infectious or idiopathic origin. Further, there is respected medical authority that the modalities for the transmission and/or perception of heat and cold are at least to some extent dissociated from one another and from the modality for pain perception, and that a correlation of probative diagnostic value is provided by the character and extent of this dissociation, as well as by the pure response to the separate individual stimuli.

Conventional laboratory instruments for measuring pain, heat and cold sensibility, are for the most part technically competent, but these devices, and most especially those devices for evaluation of heat and cold responsiveness, are of a sophistication, cost and/or cumbersomeness completely impractical or unnecessary for clinical use. On the other hand, most clinical devices are grossly inadequate and present day cold and heat perception devices have even taken the totally crude and unsatisfactory form of two test tubes filled respectively with hot and cold water. Thus, there is an important and useful purpose, in addition to a significant need, for efficient, practical instruments, designed for application at a clinical level, which are useful in evaluation of cold, heat and pain sensibility.

It is of the greatest importance to recognize that suitable clinical instruments for measuring cold, heat and pain sensibility need not have the sophistication or quantitative accuracy of a laboratory device for purposeful utility, but rather should emphasize convenience, portability, simplicity of operation, and low cost with a proper measure of sophistication. In addition, all of these instruments preferably should be integrated with other instruments conventionally carried and used by the average practitioner.

It is therefore an object of the present invention to provide new and improved medical diagnostic instruments satisfying the foregoing criteria.

It is another object of the present invention to provide devices of the foregoing type which are economical, portable, simple to operate and well integrated into the basic instrument complement of the average practitioner.

It is a more specific object of the present invention to provide medical diagnostic instruments adapted for use at the clinical level in measuring the responsiveness of an individual to sensations of cold, heat and pain.

Accordingly, the present invention is directed to a portable, hand-held, hand-operated diagnostic instrument operable from a self-contained battery supply for qualitative testing of the responsiveness of a human being to neurological stimuli. Such an instrument constructed in accordance with the teachings of the invention comprises a hollow handle for containing the battery supply, a top closure for the handle and a first instrument module. The module comprises a support member removably attachable to the top closure, a thermoelectric device having a pair of electrode surfaces and responsive to an applied electrical current for developing a cooling effect at one of the electrode surfaces and a heating

effect at the other of the electrode surfaces, and thermally insulative material for holding the thermoelectric device in spaced relation to the support member with the aforesaid one electrode surface being adapted for selective contact with the skin of a patient in testing his responsiveness to sensations of cold. Further provided are means including a manually operable switch for alternately establishing and interrupting a first electrical circuit between the battery supply and the thermoelectric device.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims.

The invention, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawing, in the several figures of which like reference numerals identify like elements, and in which:

FIG. 1 is a perspective view of the handle of the diagnostic instrument of the invention having portions of the handle casing broken away;

FIG. 2 is a perspective view of a first instrument module constructed in accordance with the present invention;

FIG. 2a is a cross-sectional view of the instrument module of FIG. 2;

FIG. 3 is a perspective view of a cover useful with the instrument module of FIG. 2;

FIG. 3a is a cross-sectional view of the cover of FIG. 3;

FIG. 4 is a perspective view of a second instrument module constructed in accordance with the invention and having a portion thereof broken away;

FIG. 5 is an enlarged, fragmentary view taken in cross section along line 5-5 of FIG. 1; and

FIG. 6 is a schematic diagram of the electrical circuit of the diagnostic instrument of the invention.

Referring now to FIG. 1, there is shown an instrument handle 10 comprising a hollow tubular body member or casing 11 having a removable bottom closure member 12 threaded to the lower end thereof. Preferably casing 11 is formed of stainless steel or other suitable current conducting material and is of such a size that it can be easily held in the hand and, further to this end, is provided with a knurled lower section 14 for ease in gripping. Within casing 11 is a source of electrical energy for powering various instrument modules, to be considered hereinafter, and this source preferably comprises one or more batteries, such as vertically stacked batteries 15 and 16, which may be of the nickel-cadmium rechargeable type. As will become apparent hereinafter, means are disposed above uppermost battery 16 for controlling application of the stored battery energy to the aforementioned instrument modules and this means includes a thumb-operated slide member 19 positioned on handle 11 and provided with an associated pushbutton 20. Instrument handle 10 also comprises a top closure 22 of stainless steel or other electrically conductive material for both mechanically captivating and electrically coupling a selected instrument module to the handle. Specifically, closure 22 includes a centrally apertured core 23 having thereabout a collar 24 which is normally spring biased in an upward direction into engagement with a pair of lugs or ears formed integrally with and semi-circularly spaced about core 23. Only one of these lugs, 25a, is visible in the drawing.

The construction of a first instrument module 26 of the invention and the manner in which modules in general are coupled to top closure 22 of handle 10 is readily understood by consideration of FIGS. 2 and 2a. The device there shown is adapted for use in establishing responsiveness of a patient to sensations of cold and heat and to this end has opposed surfaces each adapted for contact with a patient's skin and developing respectively cooling and heating effects thereat. Structurally, module 26 comprises a base or support member 28 having a contoured upper portion and a truncated cylindrical lower portion separated from one another by a step. Formed at the step is a key 30 for reasons to be explained hereafter. To accommodate coupling to handle 10, the lower

portion of member 28 is provided with a pair of semi-circularly spaced slots, only one of which, 29a, is visible in the drawing, and a cooperating inwardly extending flange located on its underside defining an annular shoulder on the interior of member 28 as clearly seen in FIG. 2a. Member 28 supports a thermoelectric device comprising a plurality of semiconductor cubes 31 of suitable construction and electrically coupled in series by copper bridging plates which form a pair of space opposed composite electrode surfaces or faces 32 and 33. Each pair of cubes joined electrically in series establishes a "couple" and the composite device illustrated consists of four such couples, although it will be appreciated that the construction and selection of a particular device is merely a problem of design choice and is in no way a part or restrictive of the present invention. As is well understood in the art, thermoelectric devices are responsive to an applied electrical current of uniform polarity for developing a cooling effect at one of a pair of electrode faces and a heating effect at the remaining electrode face. In the present case with module 26 powered from instrument handle 10, a heating effect is developed at electrode face 32 and a cooling effect at face 33. The thermoelectric device is supported in spaced relation to base member 28 and out of thermal or electrical contact therewith by a suitable material 34 which is molded about the device. An electrical contact post 35 seated in an electrically insulative sleeve within support member 28 establishes the primary current path between the batteries of instrument handle 10 and the thermoelectric device, a return current path being through metal support member 28 and handle casing 11.

A cover 37 for first instrument module 26 is shown in FIGS. 3 and 3a and comprises a first section 38 of a thermally insulative material, such as polystyrene, for surrounding and thermally insulating electrode face 33 of instrument module 26 from ambient temperature conditions. A second section 39 of the cover includes a plurality of external radiating fins and raised internal segments, the latter appropriately formed to individually and intimately contact the conductive segments of electrode face 32 to act as a heat sink therefor without electrically shorting the metal plates of the electrode. If desired, the separate internal segments of cover section 38 may be avoided by constructing this internal surface of a thermally conductive, but electrically nonconductive material. Cover 37 is fitted over instrument module 26 such that the circular base of the cover rests on the step of member 28 and the cover is slotted, as shown, to accept key 30 and thus provide for insertion over module 26 only at a singular relative angular orientation.

A second inventive instrument module 40 is shown in FIG. 4 and as will be understood this module is adapted for applying an intermittent electrical shock to selected areas of the skin of a patient in testing the patient's responsiveness to sensations of pain. Specifically, module 40 comprises a cylindrical base section 41 provided with semi-circularly spaced slots and an inwardly extending flange on its underside in the same manner as support member 28 of the first instrument module. Module 40 further comprises a pair of concentric electrodes consisting of the frustoconical exterior of module 40 which extends upwardly from base 41 and rod-shaped electrode 42 centrally supported within the outer electrode by an electrically insulative medium 43.

The control apparatus within handle 10 for proper utilization of the instrument modules shown in FIGS. 2 and 4 and for utilization of conventional instrument modules, such as an ophthalmoscope type module, is illustrated in FIG. 5. This apparatus comprises a contact post 45 journaled in a conductive sleeve or guide 50 which in turn is separated from metal core 23 by an insulative jacket 46. Metal core 23 is threaded to a metal top closure plug 47 of the casing, the plug being retained in position by a plurality of angularly spaced screws one of which also retains pocket clip 48. In the absence of an instrument module, the widened base of contact post 45 is biased into engagement with the underside of conductive guide member 50 by a coil spring separating the base of con-

tact post 45 and a slug 51 which rides in guide member 50. The underside of slug 51 in turn engages a conductive post 53 having its lower end threaded into an upwardly projecting central portion of a metallic cup-like member 54. A tab struck from the underside of cup 54 extends through insulative plate 55 to angularly locate member 54 and the above structure mechanically coupled thereto. Plate 55 in turn is located against an annular abutment within the casing by a series of angularly spaced pins, one of which, 56, is visible in the drawing.

Cup-like member 54 is retained out of contact with casing 11 by an annular rubber ring 58 and is threaded to a hollow metal sleeve 57 which is provided with insulative grommets at either end for supporting conductive post 53 out of engagement therewith. Sleeve 57 is in turn threaded at its upper end to an elongated insulative bushing 59 which extends well into core 23 to support and retain guide member 50. A helical spring 60 inserted between a shoulder of core 23 and a lip of jacket 46 biases the structure above-described in a downward direction into firm engagement with a central contact of insulative plate 55. A wire resistor 61 is wound on an indented portion of bushing 59 and the uppermost coil passes through the bushing to contact metal guide member 50 while the lowermost coil of the resistor makes no electrical contact. A generally U-shaped slide contact 63 is supported by an electrically insulative bracket for movement with slide member 19. One arm of slide contact 63 is movable along wire resistor 61 to a lower extremum contacting bushing 59 while the remaining contact arm follows metal sleeve member 57.

Interposed between the central post and outer walls of cup-like member 54 are the primary and secondary windings of a transformer, these windings being respectively labelled "P" and "S" in the figure. One terminal of primary winding P is electrically coupled to the left sidewall of cup-like member 54 while an adjacent terminal of secondary winding S is coupled to the threaded base of central contact post 53. A pair of remaining primary and secondary terminals are individually supported in an insulative grommet 64 extending through the right sidewall of member 54 and lead to a pair of adjacent contact surfaces on the outer face of the grommet. These contact surfaces are adapted to be shortened by pushbutton 20 when slide member 19 is moved to a longitudinal position such that the pushbutton overlies a circular aperture 66 in the sidewall of casing 11. Pushbutton 20 is both electrically coupled to casing 11 and appropriately guided by a flat spring 67. A helical spring 68 biases a widened shoulder of button 20 into engagement with a cover plate for slide member 19. With slide member 19 in its lowermost position in which button 20 overlies aperture 66, the uppermost arm of contact 63 is moved onto insulative bushing 59 and out of contact with the wire resistor.

The lower end of casing 10 is closed by an internally threaded, centrally apertured cap 12. Threading cap 12 to its closed position locates a base member 70 firmly against an interior annular shoulder of the casing. As shown, base member 70 is provided with a cylindrical bore which is aligned with the aperture in the base of cap 12 and a spring-like contact 71 is located on an enlarged shoulder at the top of the bore. An electrical lead 72 extends from contact 71 to a cap on the top terminal post of battery 16. A helical spring 75 surrounds the central portion of base member 70 and biases a shoulder abutment 76 into engagement with the underside of battery 15. Spring 75 exerts a sufficient force to maintain vertically stacked batteries 15 and 16 in firm engagement, with the cap on the upper terminal post of battery 16 firmly engaging a contact 77 which is centrally seated in electrically insulative plate 55.

An understanding of the electrical circuit aspects of the apparatus of FIG. 5 may best be had by reference to FIG. 6 wherein the schematic representation of the mechanical elements of FIG. 5 bear like reference numerals or letters. A terminal 80 directly coupled to a ground or reference potential is representative of electrical connection to casing 11, as are the

other ground indications in the diagram. As previously stated battery sources 15 and 16 are rechargeable and to that end, there is provided means for charging these batteries from an external source of power. This means is represented schematically in FIG. 6 and lies within dashed block 82. Recharging source 82 comprises a well 83 having an upright central post 84 adapted to be received by the mated bore in handle 10 in conventional fashion. Unit 82 also includes a charging circuit comprising a transformer 85, a rectifier 86 and a resistor 87, the primary of the transformer being adapted to be connected to a suitable wall outlet by means of a conventional line cord and plug (not shown). The rectifier and resistor are connected in series between one lead of the transformer secondary and the metal well 83 while the other lead of the secondary is connected directly to contact post 84. When the battery handle is placed in the well, post 84 engages spring contact 71 and establishes a charging circuit to the batteries, the return side of the circuit being through shoulder 76, handle casing 11 and the metal wall of well 83 which is in contact with the bottom closure 12 of the handle. When the handle is removed from the recharger unit, the charging circuit is open and the current from the battery is only effective to operate an instrument module then connected to the handle.

In operation, an appropriate instrument module, being either the thermoelectric module of FIG. 2, the shock instrument module of FIG. 4 of some other suitable instrument module, is coupled to top closure 22 of casing 10. This is readily and simply done by aligning the slotted base of the selected instrument module with lugs 25a, 25b of top closure 22 of handle 10 and forcing biased collar 23 downward with the instrument module while rotating the module in either a clockwise or counterclockwise direction. The module is mechanically retained in position by the urging of collar 23 against the inwardly projecting lip on the underside of the module base, while an electrical contact is established by yieldably biased contact post 45. Assuming initially that the thermoelectric module represented in FIG. 2 is fitted to the handle and that batteries 15, 16 have been adequately charged from source 82, the instrument is used as follows. Slide adjustable rheostat 61, 63 is adjusted to provide a desired current flow through the thermoelectric device and accordingly to adjust the relative temperatures of the hot and cold side thereof. If desired, casing 11 may bear a scale adjacent slide member 19 to provide at least an approximate indication of the temperature level developed at the respective electrode surfaces. At any rate, in the present state of the art, thermoelectric devices are relatively inefficient and for most applications, slide member 19 will be located in its uppermost position or the zero resistance position of wire resistor 61. This is adequate to establish at least threshold "cold" perception in most individuals. If a more substantial or balanced temperature gradient between electrode surfaces is desired, cover 37 shown in FIG. 3 may be inserted over the thermoelectric module for several moments prior to its use. The heat sink section 39 of the cover is positioned to contact that electrode surface of the module developing a heating effect and the insulative section 38 surrounds that surface developing the cooling effect. Improper positioning of the cover is prevented by key 30 and the slot provided in the cover. The electrode surface developing the heating effect much more readily departs from ambient than the opposite electrode surface, hence, the cover tends to compensate for this condition and provide a more balanced temperature gradient about the ambient temperature condition between the surfaces in addition to preventing excessive energy loss from the cooled electrode surface.

To conserve the life of batteries 15, 16, the invention further provides means whereby the thermoelectric module can be brought to a selected temperature condition independent of the batteries, the batteries only being called on to provide the lesser amount of energy required for maintaining the established gradient at the electrode surfaces. Specifically, it will be observed that seating instrument handle 10, accommodated with thermoelectric instrument module 26 thereon,

in the post and well arrangement of charging source 82 provides a direct current path from contact post 84 of the charging source through spring contact 71, adjustable resistor 61, thermoelectric instrument module 26, and the handle casing to well 83. Thus, the thermoelectric module may be brought to a desired operating condition without taxing batteries 15, 16 by means of direct application of energy from an external power source. After the few moments and substantial energy required to overcome the thermal inertia of the thermoelectric device and establish a desired temperature condition at the electrode faces, the instrument may be withdrawn from the charging-holder mechanism and used in normal fashion. It will be noted that this feature is gained without any sacrifice in portability during actual use.

The primary application of the thermoelectric instrument module of the invention is as an asset to medical examination of a patient and during such examinations one or the other of the contact surfaces is applied to selected areas of the skin of the patient while the patient is queried and observed in regard to his mental perception created via the stimuli. The method by which the instrument is applied, the subjective technique for gauging the patient's response, the determination of patient sensibility, and finally the conclusions to be drawn therefrom, of course, form no part of the present invention and, in fact, are not even fully understood in the art. It is rather an important purpose of the apparatus of the present invention to encourage and facilitate further investigation of these matters by a broader segment of the medical community.

The second instrument module of the invention, as shown in FIG. 4, is interchangeable with thermoelectric module 26 and is useful in testing the response of a patient to an electrical shock stimuli, such stimuli being physiologically identical to more conventional pain stimuli such as pricking, etc. In operation, a shock stimuli is applied to the patient from the batteries through the step-up transformer located within the instrument handle. In this regard, it should be noted that slide rheostat 61, 63 and pushbutton 20 are effectively interlocked, as represented in FIG. 6 by the dashed line interconnecting them, such that the button cannot be depressed and the transformer circuit completed unless contact 63 is moved to its extreme lower position overlying insulative pad 59. Thus, a shunt d.c. path bypassing the transformer may not inadvertently be established. Depression of button 20 applies the indicated ground or reference potential of handle casing 10 to one terminal of each of the primary and secondary windings of the transformer, the ground preferably being applied to the secondary terminal in advance of the primary terminal. A momentary surge current from batteries 15, 16 through the primary winding and casing back to these batteries occurs, thereby inducing a current of lesser magnitude but far greater potential across secondary winding of the transformer. This potential is directly applied to the patient between the concentric electrodes of the instrument module. Preferably, the 6-volt potential of batteries 15, 16 is stepped up to 200 volts or more across the secondary winding and, of course, as applied to the patient. A stimulus of this sort is adequate for the purpose intended, namely to provide the patient of an awareness of its presence, but is not of sufficient energy content to injure or greatly disturb the patient.

Thus, there has been shown a new and improved portable diagnostic instrument especially well suited for use at the clinical level. The instrument permits expedient and satisfactory examination of a patient for cold, heat and pain perception. The inventive device is well integrated into the normal instrument complement of a typical practitioner, the instrument handle readily receiving conventional diagnostic instrument attachments, such as an ophthalmoscope type attachment, in addition to the instrument attachments of the invention.

While particular embodiments of the invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention in its broader aspects, and, there-

fore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of the invention.

I claim:

1. A portable hand-held, hand-operated diagnostic instrument having a self-contained battery supply and adapted to selectively receive individual ones of a plurality of instrument modules for use in the qualitative testing of the responsiveness of a human being to neurological stimuli, comprising:
 - a hollow handle for containing said battery supply;
 - a top closure member affixed to said handle and including latching means for individually and releasably latching said instrument modules to said top closure member;
 - an instrument module comprising a support member constructed and arranged for releasable latching to said top closure, a thermoelectric device having a pair of electrode surfaces and responsive to an applied electrical current for developing a cooling effect at one of said electrode surfaces and a heating effect at the other of said electrode surfaces and thermally insulative material coupled to said support member and said thermoelectric device for holding said thermoelectric device in spaced relation to said support member, said one electrode surface of said instrument module adapted for selective contact with the skin of a patient in testing the responsiveness of said patient to sensations of cold;
 - a removable cover means for enclosing said thermoelectric device comprising a first section of thermally insulative material for surrounding said one electrode surface and a second section of thermally conductive material joined to said first section and adapted to intimately contact said second electrode surface and act as a heat sink therefor; and
 - electrical circuit means for establishing an electrical circuit including said battery supply and said thermoelectric device.
2. The combination according to claim 1 in which said second electrode surface is constructed and arranged for selective contact with the skin of said patient in testing said patient's responsiveness to sensations of heat.
3. The combination according to claim 2 in which said electrical circuit means includes a manually operable slide switch located on said handle for alternatively establishing or interrupting said electrical circuit and in which said battery supply is rechargeable.
4. The combination according to claim 3 and further including means for recharging said battery supply and circuit means for concurrently coupling said recharging means to said battery supply and to said thermoelectric device in parallel circuit relation.
5. The combination according to claim 4 and further including an adjustable resistor in said electrical circuit.
6. A power supply and control handle for a diagnostic in-

strument of a type having a self-contained battery supply and adapted to selectively employ different instrument modules, comprising:

- hollow casing means for containing said battery supply;
- a top closure member affixed to said casing and including latching means for individually and releasably latching said instrument modules to said top closure member;
- electrical contact means adapted for effecting an electrical interconnection to an instrument module latched to said top closure member;
- a transformer supported within said hollow casing;
- an adjustable resistance supported within said hollow casing;
- first electrical circuit means including a manually operable slide switch in slidable engagement with said adjustable resistance, said slide switch being located on said casing for selectively completing an electrical circuit comprising said battery supply, said electrical contact means and a portion of said adjustable resistance as determined by the position of said slide switch;
- second electrical circuit means including a pushbutton located on said casing for completing a second electrical circuit comprising said battery supply, said transformer and said electrical contact means; and
- interlock means for precluding completion of said second electrical circuit without interruption of said first electrical circuit.

7. The combination according to claim 6 and including an instrument module comprising a support member constructed and arranged for releasable latching to said top closure for selective electrical connection of said instrument module to one of said first and second electrical circuit means, said instrument module further comprising a pair of conductive electrodes constructed and relatively positioned for simultaneous contact with the skin of a patient in measuring said patient's responsiveness to sensations of pain.

8. The combination of claim 6 and including a first instrument module comprising a support member constructed and arranged for releasable latching to said top closure for selective electrical connection of said first instrument module to one of said first and second electrical circuit means, said first instrument module further comprising a thermoelectric device having a pair of electrode surfaces and responsive to an applied electrical current for developing a cooling effect at one of said electrode surfaces and a heating effect at the other of said electrode surfaces and thermally insulative material coupled to said support member and said thermoelectric device for holding said thermoelectric device in spaced relation to said support member, said one electrode surface of said instrument module adapted for selective contact with the skin of a patient in testing the responsiveness of said patient to sensations of cold.