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3,366,105

MASSAGING VIBRATOR WITH MEANS FOR APPLYING AIR
AND LIGHT RAYS TO A LIMB OF THE BODY

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2 Sheets-Sheet 1

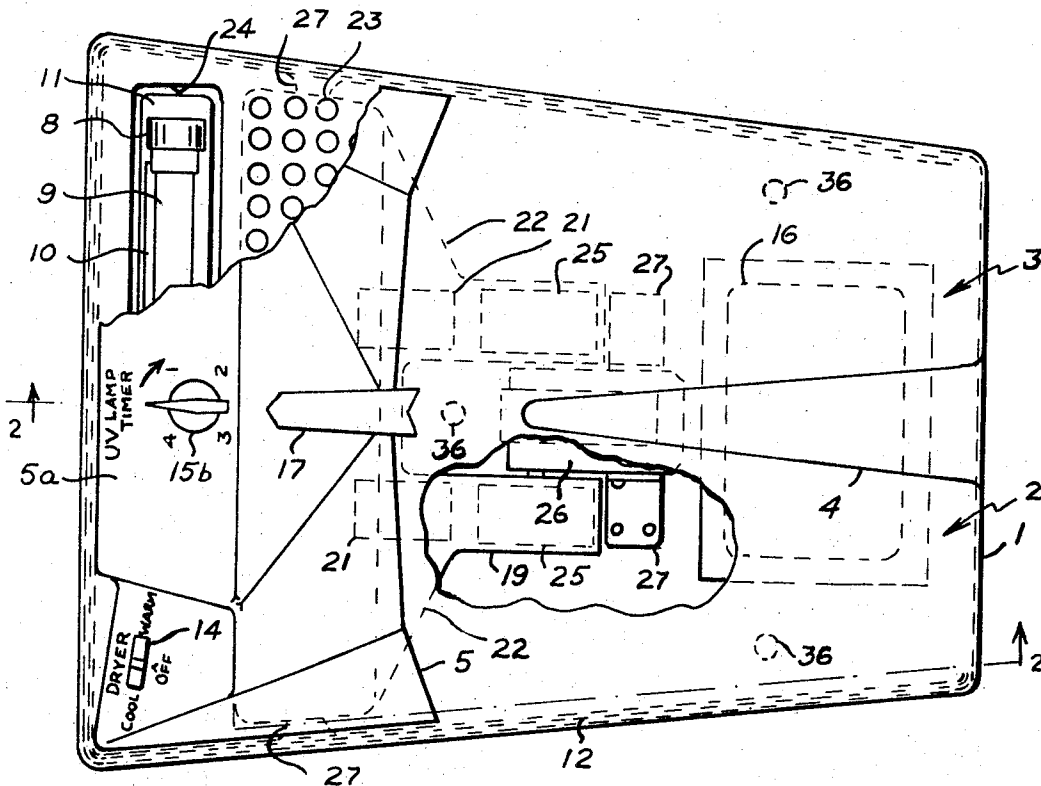


FIG 1

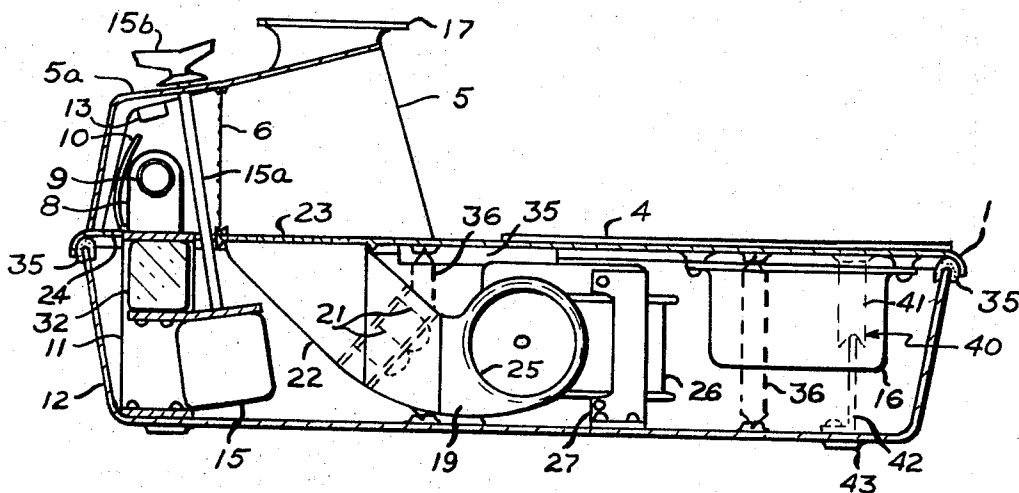


FIG 2

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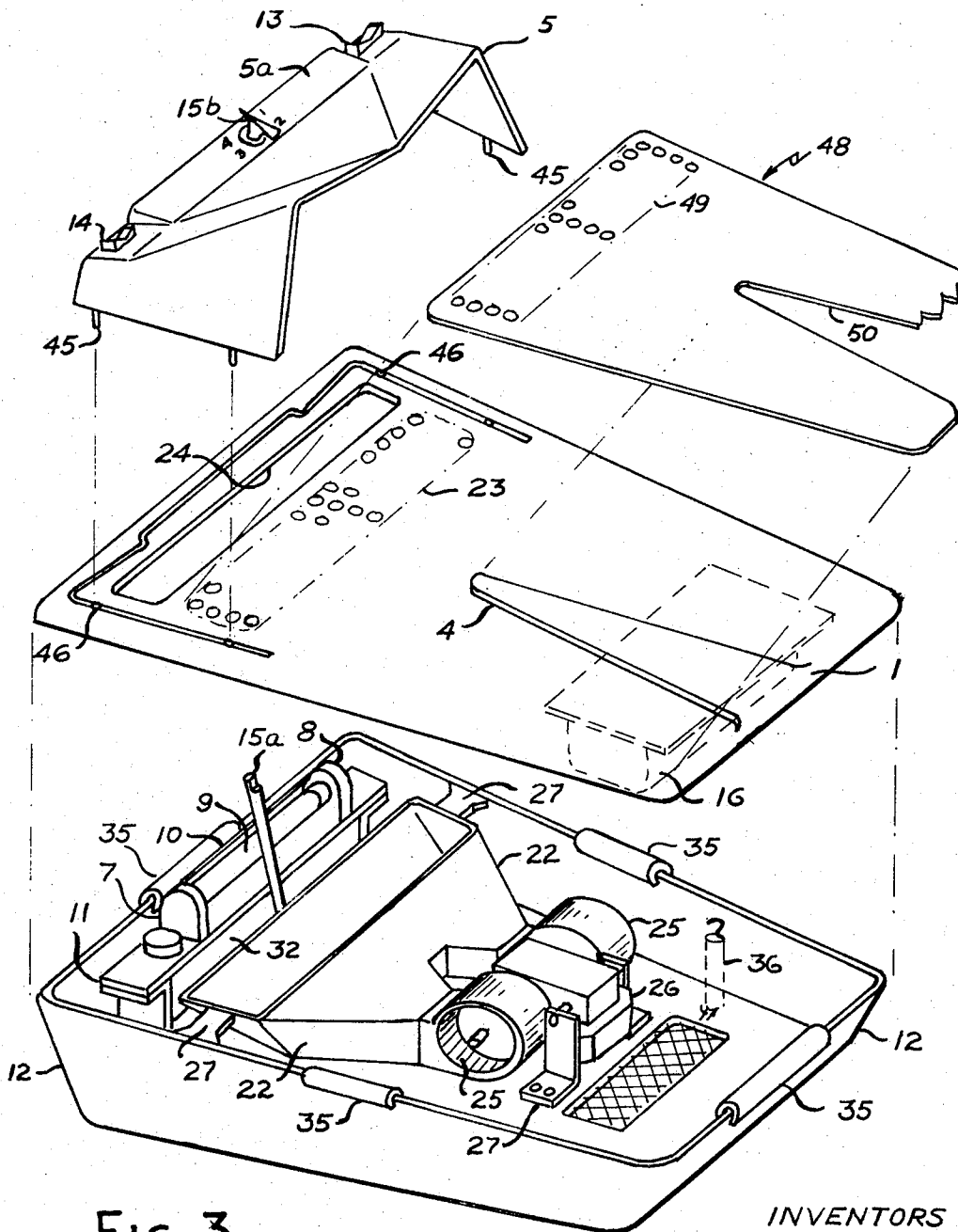


FIG 3

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3,366,105

MASSAGING VIBRATOR WITH MEANS FOR APPLYING AIR AND LIGHT RAYS TO A LIMB OF THE BODY

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ABSTRACT OF THE DISCLOSURE

Therapeutic apparatus is provided into which a human limb is placed and simple controls on the apparatus are set whereupon the apparatus simultaneously circulates air at controlled temperature about the limb, irradiates portions of the limb with germicidal ultraviolet radiation and administers vibrational energy to the limb which aids and stimulates circulation. When the foot is placed in the apparatus, the heated air circulates particularly about the toes and the ultraviolet radiation is directed particularly to the toes and areas between the toes so that the combination of these is effective to combat certain diseases of the foot such as athlete's foot.

This invention relates to therapeutic apparatus for treating parts of the human body with radiation, circulating air and vibrational energy and more particularly to compact apparatus in which the foot or hand is placed and which simultaneously irradiates the limb, circulates air at controlled temperature about the limb and administers vibrational energy to the limb, generally to combat skin disease and stimulate circulation in the limb.

Heretofore, therapeutic apparatus has been provided for irradiating the human foot or hand with ultraviolet rays for the purpose of combating diseases of the skin, such as athlete's foot. Such apparatus usually includes a chamber having ports through which the foot is inserted into the chamber so that radiation in the chamber is directed to the foot. Frequently, during prolonged use, the interior of the chamber becomes hot and uncomfortable. Furthermore, if the foot is fatigued, then the necessity of maintaining the foot stationary during the treatment increases discomfort.

It is one object of the present invention to provide therapeutic apparatus which administers germicidal ultraviolet radiation to the foot and which includes additional facility whereby the above mentioned discomforts incurred with prior apparatus are substantially avoided.

It is another object of the present invention to provide a relatively lightweight compact portable device for administering a multitude of therapeutic actions to the human limb which generally combat certain types of skin disease and relieve fatigue in the limb.

It is another object of the present invention to provide a portable relatively compact therapeutic apparatus for administering vibrational energy to human limbs such as the foot and simultaneously dry and irradiate the interdigital areas thereof which are frequently subject to certain types of skin diseases, such as athlete's foot.

The invention consists of a novel combination and arrangement of parts which provides a portable therapeutic device in which the foot or hand is placed. A portion of the device encloses the interdigital parts of the foot or hand and ultraviolet radiation and temperature controlled circulating air are directed to the interdigital parts of the limb. Simultaneously, vibrational energy is administered to the limb through a platform upon which the limb is placed. This platform carries an enclosure por-

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tion and is resiliently mounted to a housing which contains a germicidal lamp and apparatus for heating, circulating and directing air to openings in the platform directly below the interdigital parts of the limb. Vibration producing apparatus is mounted on the opposite side of the platform opposite the limb.

Other features and objects of the invention will be apparent from the following specific description taken in conjunction with the figures in which:

FIGURE 1 is a plan view of portable therapeutic apparatus incorporating features of the invention;

FIGURE 2 is a cut away side view of the apparatus; and

FIGURE 3 is an isometric exploded view of the apparatus showing the platform removed from the bottom housing and a disposable sanitary pad placed on the platform before use.

Turning first to FIGURES 1 and 2 there are three views of portable therapeutic apparatus including a platform 1 providing left and right sections 2 and 3 separated by a divider 4 and upon which the human limbs such as the feet or hands are placed during treatment. The interdigital parts of the foot or hand are enclosed by a drying chamber 5 which is substantially open on one side so that the limb can be easily inserted or removed from the drying chamber.

An ultraviolet transmitting screen 6 is provided inside the drying chamber to prevent the limb from coming in contact with the ultraviolet lamp. The drying chamber extends to the control panel 5a which encloses the mounting sockets 7 and 8 for the ultraviolet lamp 9. A reflector 10 behind the lamp directs radiation therefrom through the screen 6 toward the interdigital parts of the limb. The sockets 7 and 8 and reflector 10 are all mounted to bracket 11 which is attached to the bottom of the base housing 12. The control panel 5a carries 2 three-position control switches 13 and 14.

A timer switch 15 located in the base housing 12 and supported by bracket 10 controls the interval that the ultraviolet lamp is on. For example, a five minute time interval will protect most subjects from overexposure to the lamp radiation. The timer control shaft 15a extends from the control panel 5a and has a control knob 15b attached thereto for setting the exposure time (up to five minutes) marked on the panel.

The switch 13 controls a vibrator 16 mounted directly to the bottom of the platform 1, preferably directly opposite at least a portion of the limb such as the foot shown in FIGURE 2. The timer switch 14 controls the ultraviolet lamp 9 and the three position switch 15 serves to turn on and off the flow of circulating air and controls the temperature of the circulating air. A handle 17 may be attached to the top of the drying chamber to facilitate carrying the apparatus.

The platform 1 is resiliently mounted on top of the housing 18. The housing contains a dual centrifugal blower assembly 19, the blower duct 20 with electrical heating element 21 and the blower plenum chamber 22 which directs the heated air through baffles 23 in the platform 1 located beneath the toes of the foot. Adjacent and forward of the baffles is an opening 24 in the platform 1 through which the lamp 9 and reflector 10 project beneath the control panel 5a. The blower assembly 19 includes a dual centrifugal blower 25 and an electric motor drive 26 located between the blowers. The duct 20 leading from the centrifugal blowers 25 and the plenum chamber 22 are all rigidly connected together and mounted to the bottom of base housing 12 by support bracket 27. Lateral ridges such as 29 and 30 may be provided along the bottom of the platform 1 to overlap the edges

of the plenum chamber 22 to guide air from the chamber through the baffles 23 beneath the toes of the foot.

The ultraviolet lamp 9, the vibrator 16 and the blower motor 26 are all electrically driven from a 60 Hz., 110-volt power source. The electrical wiring is not shown in any of the figures, but is installed in a well-known manner as there is sufficient room in the base housing 12 and beneath control panel 5a to make suitable connections and mount the wires. Accordingly, only the power line 31 is shown in the figures.

The vibrator 16 is preferably operable at two or more frequencies and so the switch 13 is a three position switch, the positions being off, high frequency setting and low frequency setting. The timer switch 15 for controlling the ultraviolet lamp 9 is of conventional design and feeds 110-volt AC power from the line 31 to the ultraviolet lamp ballast coil 32 which is mounted to the bottom of bracket 10. The three position switch 14 includes cool, off and warm positions and feeds 110-volt AC power to the motor 26 when at the cool and warm positions and feeds power to the heating element 21 in the duct 20 when at the warm position. The element heats the air flowing through duct 20 which is circulated up through the baffles 23 beneath the toes.

Quite obviously, any one of the therapeutic applications of the apparatus can be administered at one time or all three can be administered simultaneously. For example, the apparatus can be used only as a drier or can be used only to irradiate the toes with ultraviolet or it can be used only to administer vibrational energy to the foot, or any combination of these therapeutic treatments can be administered simultaneously to the feet.

As mentioned above, the platform 1 is resiliently mounted to the bottom housing 12. This resilient mounting is preferably sufficient to hold the platform to the bottom housing 12 and yet not cause excessive damping of the vibrational energy flow from the vibrator 16 through the platform 1 and into the foot. The vibrator 16, as mentioned, is mounted directly to the platform 1, preferably directly opposite the foot resting on the platform. The vibrator does not contact the bottom base housing 12 and so the vibrator is not grounded in a mechanical sense; it is floating in a mechanical sense. The resilient mounting mentioned is preferably sufficient so that the vibrational energy flowing to the platform is not transmitted via the resilient mounting to the base housing 12. Accordingly, the resilient mounting substantially attenuates transmission of this vibrational energy from the platform 1 to the base housing 12, but does not attenuate the flow of vibrational energy from the vibrator 16 through the platform 1 and into the foot.

Structure for resiliently connecting the platform 1 to the housing 12 to provide the above functions of resilient mounting includes a resilient gasket 35 between the platform 1 and the housing 12 which so engages both the platform and the housing that lateral and fore and aft motion of the one relative to the other are substantially prevented, but vertical motion is permitted. Springs 36 located as shown in the figures urge the platform 1 and base housing 12 together against the resilient gaskets. It is necessary that there be some damping of lateral and fore and aft vibrations of the platform 1 relative to the housing 12, because even though the vibrator 16 is specifically selected and mounted so that it delivers substantially only vertically directed vibrations to the platform 1, there will be some lateral and fore and aft vibrations which could be conducted to the housing and thence to the floor. Thus, the resilient gaskets should be such as to substantially attenuate transmission of lateral and fore and aft vibrations from the platform 1 to the housing 12 as well as the vertical vibrations. For this purpose, the gaskets 35 are located between the platform and housing 12 along the front, rear and side edges thereof and about the inside of the downward extending lip 37 along the edge of platform 1.

FIGURE 2 illustrates another structure for resiliently mounting the platform 1 to the bottom base housing 12 whereby the mentioned functions of resilient mounting are accomplished. This mounting is illustrated by phantom lines and includes four pairs such as pair 40 of position and support hangers and a number of springs such as 36. Each pair of position and support hangers such as pair 40 shown in FIGURE 2 includes a top hanger 41 mounted to the platform 1 and a bottom hanger 42 mounted to the base housing 12 opposite a glider boss such as 43 on the bottom of the housing. The ends of the top and bottom hangers which engage each other are notched and the top and bottom hangers are oriented so that the engaging notches are transverse. These hangers are preferably made of substantially rigid material and the engaging parts are heavily coated with resilient material such as rubber. Thus, the platform 1 is supported at four points (the engaging notches of hanger pairs) by resilient connection with four points on the base housing 12 and this connection is secured by springs 39 which connect to the bottom of the platform 1 and to the housing 12 urging them together against the resilient support points.

The transverse engaging notches resiliently connect the platform 1 to the housing 12 so that motion of the platform relative to the housing 12 in the direction of these hangers is relatively undamped, but lateral motion or fore and aft motion of the platform 1 relative to the housing 12 is highly damped.

FIGURE 3 is an exploded view showing the platform removed from the base housing to illustrate the various parts which have been discussed and their relative locations. The springs urge the platform toward the housing so that, in effect, there is but one degree of motion allowed the platform relative to the housing and this is in the vertical direction. The vibrator 16 preferably delivers vibrational energy to the platform 1 in this same vertical direction. This is preferred because lateral and fore and aft vibrations delivered to the platform are heavily damped by the resilient gaskets 35 and such vibrations encounter the full inertia of the whole apparatus rather than just the inertia of the platform. The vertical vibrations on the other hand encounter only the inertia of the platform and the limb which is resting thereon. This construction permits the use of a mechanically floating vibrator and avoids transmission of vibrations through the housing to the floor or table upon which the housing rests.

The drying chamber 5 and control panel 5a assemble to the platform 1. For this purpose, pins 45 extending from the bottom of the chamber engage holes 46 in the platform. Next, the resilient gasket sections 35 are placed as shown along the top edges of the base housing 12 and the springs 36 are engaged to the platform and the housing. The timer switch control shaft 15a extends through the opening 24 in the platform, in front of the lamp 9 and through an opening in the control panel at the center thereof. The control knob 15b attaches to the projecting shaft.

An air intake opening 47 is provided in the bottom of the base housing 12 just to the rear of the blower assembly.

Before use, a disposable sanitary absorbent pad 48 which is perforated at one end 49 to provide openings in registry with the baffles 23 in the platform 1 is placed upon the platform so that the slot 50 in the pad engages the divider 4 on the platform. Next, the limbs to be treated such as the feet are rested upon this pad with the toes overlaying the perforations and then the various apparatus are turned on by operating the switches on the control panel 5a. When the switch 14 is set at "warm," warm air flows up through the baffles between the toes accomplishing a therapeutic effect. When timer switch 15 controlling the ultraviolet lamp is turned on and set, ultraviolet radiation irradiates the toes applying its therapeutic effect and when switch 13 is turned on, the

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vibrator is energized and vibrational energy is administered through the platform 1 to the feet administering this therapeutic effect. The ultraviolet radiation and drying air tend to combat certain foot diseases such as athlete's foot and the combination of warm air and vibrations tend to relax the fatigued feet and generally increase circulation therein, all of which yields a feeling of comfort and well being to the operator.

In order to insure that the ultraviolet radiation and the circulating air do circulate between the toes and accomplish their therapeutic effects, an additional device may be provided. This may consist of toe spreader apparatus made of Lucite material which transmits ultraviolet radiation. The toe spreaders are individual pieces of molded plastic which transmits ultraviolet light and are placed between the toes prior to the radiation treatment. Use of the toe spreader insures proper circulation about the toes and insures that ultraviolet radiation is directed to the areas between the toes where skin disease is most likely to occur.

This completes description of a number of embodiments of the present invention of a therapeutic device including in combination and providing compact portable electrically energized apparatus for irradiating the human limbs with ultraviolet rays, circulating thermally controlled air about certain portions of the limbs and administering vibrational energy to the limbs simultaneously or in any combination to combat certain skin diseases such as athlete's foot and generally increase circulation in the limb. The embodiments described herein and the details relating thereto are made by way of example and are not intended to limit the spirit and scope of the invention as set forth in the accompanying claims.

What is claimed is:

1. Apparatus for administering therapeutic treatments to limbs such as the hands and feet comprising in combination,
 - a platform upon which the limb is placed,
 - a housing for supporting said platform,
 - means for resiliently mounting said platform to said housing,
 - means connected to said platform for imparting vibrational energy thereto,
 - means mounted to said housing for irradiating at least the interdigital parts of said limb with beneficial rays, and
 - means mounted to said housing for circulating air at least about the interdigital parts of said limbs.
2. Apparatus as in claim 1 and in which, said resilient mounting means substantially attenuates any of said vibrational energy delivered thereto, whereby said vibrational energy is not conducted to said housing.
3. Apparatus as in claim 2 and in which, said resilient mounting means imposes substantially more restraint of movement in response to said vibrational energy upon said platform in some de-

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grees of translational freedom of movement thereof than in others.

4. Apparatus as in claim 3 and in which, the vertical movement of said platform in response to said vibrational energy is substantially more free than translational movement thereof in other directions and rotational movement.
5. Apparatus as in claim 4 and in which, said resilient mounting means is formed of a multiple of pairs of hangers, one hanger of each pair being rigidly connected to said platform and the other being rigidly connected to said housing, the free ends of said hangers in each pair being resiliently connected, permitting substantially only vertical motion of one of said hangers with respect to the other hanger, and springs interconnect said platform and housing urging said free ends of said hangers together.
6. Apparatus as in claim 5 and in which, said free ends of said hangers of a pair are notched and coated with resilient material, and said coated notches are engaged transversely.
7. Apparatus as in claim 2 and in which, said resilient mounting means consists of a resilient gasket between said platform and said housing and springs interconnect said platform and housing urging said platform and housing together against said gasket.
8. Apparatus as in claim 1 and in which, said means for imparting vibrational energy to said platform includes an electrically energized vibrator which the mechanically reactive parts of which do not connect rigidly to said housing.
9. Apparatus as in claim 1 and in which, said means for circulating air includes, an electrically energized blower assembly, an air plenum chamber, and a duct connecting said assembly and said plenum chamber, and means are provided in said platform for conducting air from said plenum chamber to the interdigital parts of said limbs.
10. Apparatus as in claim 1 and in which, an electrically energized air heating element is provided in the path of said air for controlling the temperature of air circulated about said interdigital parts.

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