

[54] **THERAPEUTIC MANIPULATING MACHINE FOR THE HUMAN BODY**

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[51] Int. Cl. **A61h 15/00**

[58] Field of Search **128/33, 51, 52, 57, 58, 128/24.3**

[56] **References Cited**

UNITED STATES PATENTS

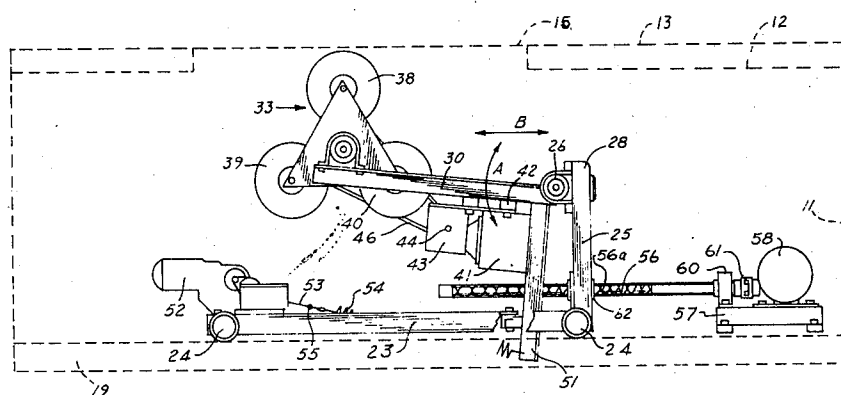
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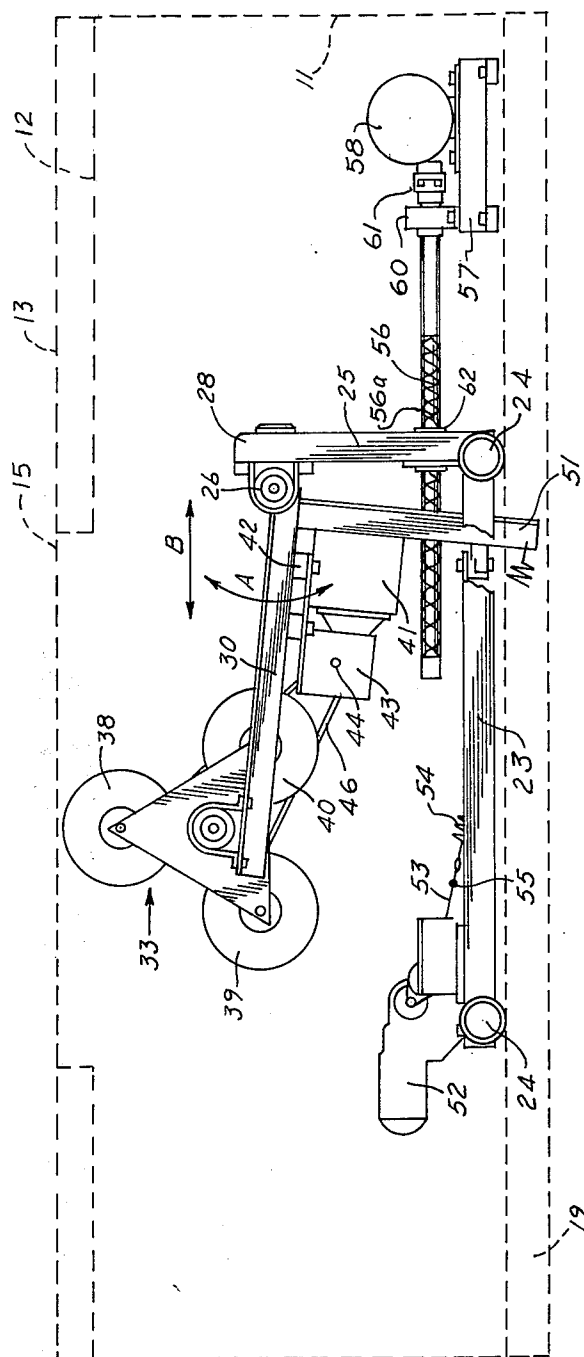
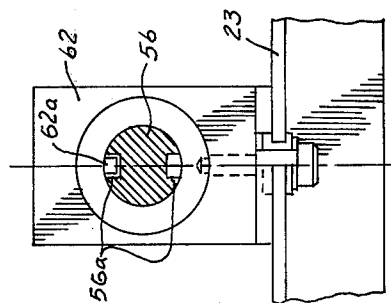
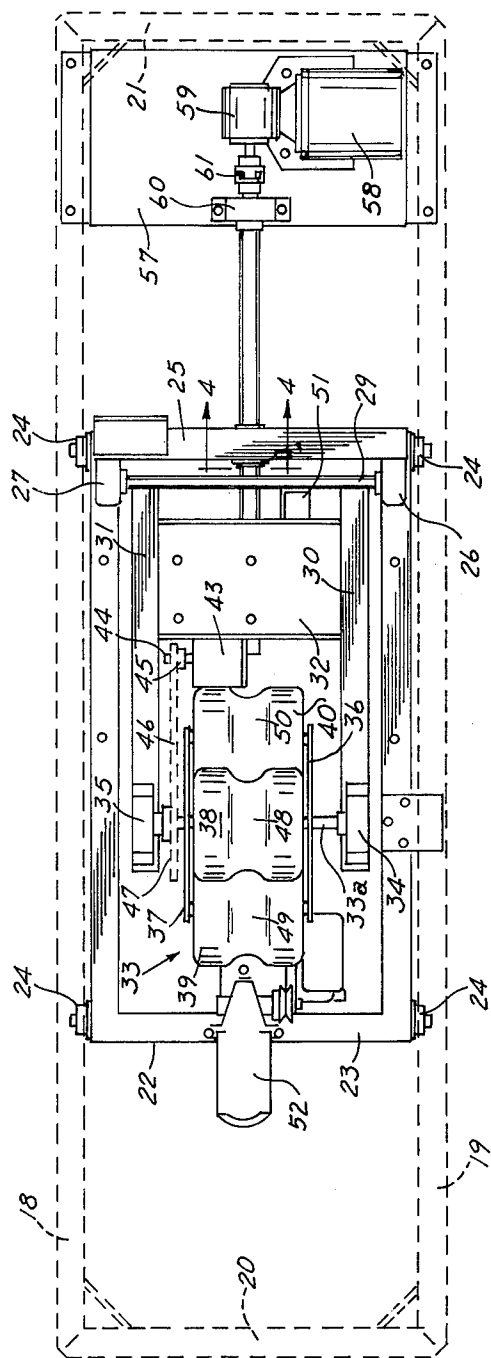
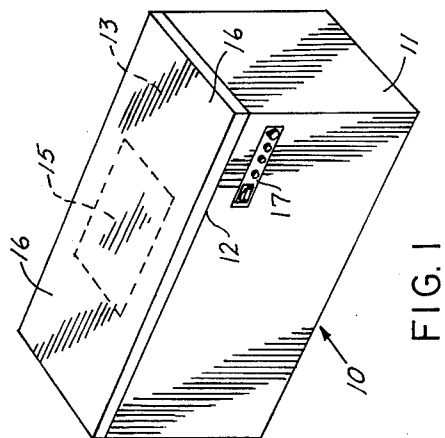
Primary Examiner—Lawrence W. Trapp
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[57] **ABSTRACT**

A therapeutic manipulating machine including a padded patient supporting surface, having a centrally located rectangular opening, and a plurality of relatively rigid rollers in the form of a rotatable drum assembly mounted on a carriage biased upwardly into the rectangular opening to alternately press against portions of the patient's body lying on the table, so as to apply an oscillating massaging and manipulating effect on the body. An arrangement is provided for varying the roller pressure, and each roller has a circumferential central groove provided for straddling the spinal column and applying the massaging and manipulating pressure and microimpacts to the areas on both sides of the spine. Means are arranged to move the carriage and roller drum in a reciprocating motion with respect to the rectangular opening and to maintain a relatively constant massaging and manipulating pressure against the body regardless of the changes in contour of the body.

3 Claims, 4 Drawing Figures





THERAPEUTIC MANIPULATING MACHINE FOR THE HUMAN BODY

This invention is directed to a device for massaging and manipulating a portion of a patient's body. It is more specifically directed to a therapeutic manipulating machine which imparts an undulating or oscillating pressure to the patient's body to release joint fixations and condition muscle tissue.

Massage tables and therapeutic manipulation machines have been well known in the prior art for many years. Many of the machines in this area use devices for rubbing or massaging various parts of the patient's body. Some of these take the form of vibrators and others have been known to use individual rollers which are moved back and forth across the patient's body. In this way, a rolling pressure is applied in a slow reciprocating manner so as to work the body joints and condition the muscles.

One of these machines, which is typical of the prior art, is a spinal column aligning table, U.S. Pat. No. 2,660,999. In this device, a pair of relatively narrow rollers is mounted on a common shaft and is supported on a longitudinally movable carriage to roll across the patient's body and thus uniformly apply pressure to the portion of the body in contact. A pantograph arrangement is provided for varying the stroke of the reciprocating motion of the carriage so as to allow only a small portion of the body to be massaged or to greatly increase the area covered. In this type of device, the roller is moved along the body surface in a continuous and uniform application of pressure. Although the actual pressure can be adjusted, as desired, this type of device fails to apply a systematic oscillating or undulating pressure application to the portion of the body being treated. It has been found that the alternating application and release of the upward pressure causing a microimpact or microthrust on each part of the body obtains a much more desirable massaging effect and obtains a much greater release of the joint fixations. In addition, this type of pressure application or motion produces a greater flow of blood to the muscle tissue resulting in a more efficient relaxation and conditioning of the muscles treated.

Because of the deficiencies of the prior art machines, as described above, it is a primary object of the present invention to provide a therapeutic manipulating machine which applies an undulating or oscillating pressure against the portions of the body being treated.

Another object of the present invention is to provide a therapeutic manipulating machine which maintains a constant and controlled oscillating pressure regardless of the contours of the body part being contacted as the carriage moves and the point of contact on the body changes.

Another object of the present invention is to provide a therapeutic manipulating machine which incorporates a plurality of massaging rollers which are mounted in the form of a rotating drum which is moved in a reciprocating fashion in a back and forth motion across the portion of the body being treated and delivers microthrust bumps along the body as the drum moves.

A still further object of the present invention is to provide a therapeutic manipulating machine in which the massaging and manipulating pressure can be adjusted so as to apply a variable pressure on the body

and maintain the adjusted pressure regardless of the contours of the body part being contacted.

Another object of the present invention is to provide a therapeutic manipulating machine in which the rollers have only a slight amount of resilience so that the contact pressure applied to the body is of a substantial nature and permits microimpacts to be delivered and the body to be alternately raised and lowered.

Another object of the present invention is to provide a therapeutic manipulating machine in which the rollers do not apply pressure to the spine itself, but only contact the muscle sheath on each side of the spine.

A still further object of the present invention is to provide a massaging and manipulating action where the pressure from the rollers is applied directly to the portion of the body being treated.

A still further object of the present invention is to provide a therapeutic manipulating machine which provides efficient and complete treatment to a body area to relieve joint fixations by administering a microthrust or bump to the body and to provide a substantial muscle conditioning effect.

A still further object of the present invention is to provide a therapeutic manipulating machine which is not only simple and easy to operate, but which uses a minimum of parts to reduce the overall cost of the machine.

Other objects of this invention will appear in the following description and appended claims, reference being made to the accompanying drawings forming a part of the specification, while like reference characters designate corresponding parts in the several views.

FIG. 1 is a perspective view of a therapeutic manipulating machine according to this invention, showing the enclosed support cabinet with a padded upper surface upon which the patient lies;

FIG. 2 is a side elevation view showing the massage roller drum and support carriage mounted within the cabinet structure shown in dotted lines;

FIG. 3 is a top plan view of the massage and manipulating roller drum and carriage mechanism mounted within the cabinet structure shown in dotted lines, and

FIG. 4 is a sectional view taken along lines 4—4 of FIG. 3, showing the lead screw and pawl assembly for reciprocatingly moving the carriage.

Turning now more specifically to the attached drawings, FIG. 1 shows a therapeutic manipulating machine 10 which includes an enclosed cabinet 11 and a flat planar upper surface forming a table 12. A layer of padded material 13 is provided on the table surface 12. An elongated, rectangular opening 15 is centrally located in said table surface 12 and the padded material 13. Flexible cover material 16, such as synthetic vinyl plastic, is arranged to overlay the padded material 13 and the opening 15 to completely cover the table surface 12. A control panel 17 is provided on the front surface of the cabinet 11 to control the various functions of the machine 10. In operation, the patient lies on the padded upper surface of the table 12 with the portion of the body to be treated, such as the spine, positioned over the rectangular opening 15. If desired, a padded insert (not shown) which is the size of opening 15 can be mounted in the underside of the opening to temporarily convert the table 12 for examination of the patient.

Within the enclosed cabinet 11 is a rectangular base framework composed of side angle members 18, 19

and end angle members 20, 21. Upwardly extending column members, not shown, are provided at the corners of the base framework for supporting the table 12 at a suitable height above the floor surface. If desired, the column members may be omitted and the table 12 can be supported solely on the sidewall members of the cabinet 11.

The carriage assembly 22 includes a rectangular framework 23 formed from angle members. Wheels 24 are positioned along each side of the frame 23 and support the carriage 22 on the flat upper surface of the side angle members 18, 19 which form guide rails for the longitudinal movement of the carriage assembly 22. The wheels 24 can be guided by flanges provided on the wheels or suitable bumper rails may be provided longitudinally along the upper surface of the sides 18, 19.

An upwardly extending frame assembly 25 is arranged at one end of the carriage base frame 23. The perpendicular frame 25 can be supported by angle braces (not shown) to provide additional rigidity if desired. Bearings 26 and 27 are mounted at the upper end 28 of the vertical frame 25. A shaft 29 is suitably mounted between the bearings 26, 27 for rotational movement with respect to the frame 25. Outwardly extending pivot arms 30, 31 are attached to the shaft 29 and include a cross support plate 32. Aligned bearings 34, 35 are mounted to the upper surface of the arms 30, 31 respectively and are arranged near the end of the arms opposite the pivotal shaft 29.

A massage and manipulation roller drum assembly 33, having individual massage and manipulation rollers 38, 39, 40 suitably mounted for free rotational movement around individual shafts, is mounted between parallel plates 36, 37. The parallel plates 36, 37 are in turn fixedly attached at their centers to shaft 33a which is mounted for rotational movement in bearings 34, 35. The parallel plates 36, 37 are centrally positioned on the shaft 33a so that the rollers 38, 39, 40 are aligned with the rectangular opening 15 in the table surface 12. These plates can have any shape desired such as a circular or polygonal configuration. As shown in FIG. 2, the plates are formed as equilateral triangles. The rollers 38, 39, 40 are mounted at the apexes of the plates to form the roller drum arrangement. It is to be understood that in general, the configuration of the plates is determined by the number of rollers to be incorporated such that the apexes of the plates equal the number of rollers to be used. The mounting of the plates 36, 37 is to be arranged so that the shafts for the rollers 38, 39 and 40 are positioned so as to be an equal distance or radius from the shaft 33a. In addition, the rollers 38, 39 and 40 are of equal diameter and length.

A drive motor 41, including a speed reducer gear box 43, having an output shaft 44, is mounted by vibration mounts 42 so as to be suspended under the cross support plate 32. The output shaft 44 is connected by means of a sprocket 45 and chain 46 to a sprocket 47 mounted on the shaft 33a. Thus, the motor 41, through the speed reducer 43, rotates the roller drum assembly 33 so that the rollers 38, 39 and 40 sequentially press against and deliver a microthrust bump so as to raise and lower a portion of the body positioned above the opening 15. In this way, an efficient undulating or oscillating massaging and manipulating effect is applied to the body.

The rollers 38, 39 and 40 are fabricated from a relatively stiff material such as polyurethane to apply a substantial pressing force against the body. It has been found that a more rigid material produces a much more satisfactory massaging and manipulating effect than a soft, pliable, resilient material which is commonly used.

Each of the rollers has a circumferential groove 48, 49 and 50 centrally positioned around the rollers 38, 39, 40 respectively. In this way, when the patient is lying on his back in order to massage and manipulate the spinal column, the rollers actually contact only the muscle sheath on each side of the spine preventing the actual application of pressure to the spinal column itself.

In order to vary the pressure with which the rollers contact the body member, the elevational position of the roller drum assembly 33 is pivotally adjusted with respect to the rectangular opening 15. The pivotal position of the support arms 30, 31 is controlled by the downwardly extending fulcrum arm 51 permanently affixed to the cross support plate 32. An electric, motor-driven winch 52, mounted on the carriage end member 23, has a cable 53 connected to a spring 54. The opposite end of the spring 54 is attached to the end of the arm 51. Thus, the pivotal elevation of the roller drum assembly 33 can be raised by tightening the cable 53 so as to increase the tension in the spring 54. By tightening or loosening the cable 53, the arms 30, 31 are pivotally moved in the direction of the arrow A so as to increase or decrease the amount of pressure applied by the rollers 38, 39, 40 to the patient's body. Stops 55 are attached to the cable 53 and are arranged to contact a limit switch (not shown) to limit the upper and lower elevational position of the roller drum assembly during operation. A tensiometer (not shown) can be inserted between the cable 53 and the end of the spring 54 to provide an electrical signal which is indicative of the force being applied to the patient's body by the rollers.

A reciprocating motion is applied to the carriage assembly 22 so that the roller drum assembly 33 is moved longitudinally along the length of the rectangular opening 15. A base plate 57 is mounted between the side rails 18, 19 of the cabinet framework and a motor 58 and right angle gear reduction box 59 is mounted on the base plate 57. One end of a jack screw 56 is mounted in a resiliently mounted bearing 60 and is attached to the output shaft of the gear box 59 by means of a flexible coupling 61. The other end of the jack-screw 56 passes through a pawl 62 mounted on the carriage framework 23. The jackscrew has a double lead thread 56a provided along its length with corresponds with the length of the rectangular, slotted opening 15. Thus, the pawl 62 which has a slightly elongated thread follower 62a engages the threads 56a on the jackscrew 56 and causes the carriage 22 to move back and forth in a reciprocating motion in the direction shown by arrow B. Because of the double lead configuration of the thread 56a the carriage travel automatically reverses when it reaches either end of the threads on the jackscrew. Thus, as the roller drum or massaging and manipulation assembly 33 rotates, the assembly is moved back and forth across the surface of the body providing the desired massaging and manipulating effect.

Because the tension spring 54 creates a relatively constant upward force on the roller drum assembly 33,

a distinct microthrust or bump is felt by the patient when the rollers initially contact the body. Thus the desired massaging effect produces a constant, controlled intermittent massaging pressure regardless of the contours of the spine or other body parts accompanied by intermittent microimpacts which create microadjustments between joint segments.

In the embodiment shown in FIG. 2, the roller drum assembly rotates at a speed of approximately 6 to 7 rpm while the lineal movement of the assembly is approximately 19 inches and makes one complete cycle approximately every minute. The diameter of the roller drum assembly is approximately 13 inches in the present embodiment and the elevational positioning or adjusting capability of the drum is approximately 3½ inches. In this way, the upward constant force on the patient's body can be varied from zero to a maximum of approximately 50 pounds.

The control panel 17 mounted on the cabinet 11 includes an electrical meter connected to the tensiometer mentioned above for providing a relative indication of the massaging and manipulating force applied to the patient's body. In addition separate control switches are provided for each of the motors 41, 52 and 58. These motors are intended to be of the reversible type and the switches can provide forward, reverse or off operation for the individual motors and their operational function. A timer can be provided in the main electrical power circuit to the machine 10 to time the operation of the machine and shut the operation down or sound a signal such as a buzzer when the desired time period for treatment has been completed.

While a therapeutic manipulating machine has been shown and described in detail, it is obvious that this invention is not to be considered to be limited to the exact form disclosed and that changes in detail and construction may be made therein within the scope of the invention without departing from the spirit thereof.

What is claimed is:

1. A therapeutic manipulating machine for massaging and manipulating portions of a patient's body, such as the spinal column, to release joint fixations and condition muscles, the machine comprising:

- a. a table means having a flat, planar, upper surface and a centrally located, elongated rectangular opening therein, said table means being supported above a floor surface by a suitable framework means,
- b. a carriage means disposed below said table means and mounted on parallel, longitudinal guide rail means positioned along each side of said framework means for longitudinal movement with respect to said rectangular opening,
- c. massaging and manipulating means rotatably mounted on said carriage means and arranged to extend upwardly through said opening to massage and manipulate a portion of a patient's body lying on said table means, said massaging and manipulating means includes a first power means for rotating said massaging and manipulating means during operation, said massaging and manipulating means includes at least about three parallel rollers having a length generally corresponding to the width of said rectangular opening and mounting means supporting said rollers in a polygonal drum-like configuration with their axes aligned with said rectangular opening so that, as the mounting means is ro-

tated, each of said rollers will freely rotate and sequentially rotate through said rectangular opening and press against said body portion so as to provide an oscillating pressing action against said body portion,

- d. means for adjusting the upward force with which said massaging and manipulating means presses against said body portion, so as to vary the massaging and manipulating action, and
- e. reciprocating means for moving said massaging and manipulating means continuously in a back and forth motion longitudinally along said opening to massage and manipulate a large area of the body.

2. A therapeutic manipulating machine for massaging and manipulating portions of a patient's body, such as the spinal column, to release joint fixations and condition muscles, the machine comprising:

- a. a table means having a flat, planar, upper surface and a centrally located, elongated rectangular opening therein, said table means being supported above a floor surface by a suitable framework means,
- b. a carriage means disposed below said table means and mounted on parallel, longitudinal guide rail means positioned along each side of said framework means for longitudinal movement with respect to said rectangular opening,
- c. massaging and manipulating means rotatably mounted on bracket means pivotally connected at one end to said carriage means and arranged to be adjustably biased in an upward direction by a spring means to extend upwardly into the opening to massage and manipulate a patient's body lying on said table means; said spring means includes means for variably tensioning said spring means so as to permit adjustment of the upward pivotal movement of the massaging and manipulating means with respect to said table means whereby the force pressing the massaging and manipulating means against the person's body can maintain a substantially constant pressure regardless of the contours of the body part being contacted as the carriage means moves, said massaging and manipulating means includes a first power means for rotating said massaging and manipulating means during operation,

- d. said variable tension adjusting means including a cable attached to a motor driven, reversible winch which can vary the spring tension by drawing in or releasing said cable, and
- e. reciprocating means for moving said massaging and manipulating means continuously in a back and forth motion longitudinally along said opening to massage and manipulate a large area of the body.

3. A therapeutic manipulating machine for massaging and manipulating portions of a patient's body, such as the spinal column, to release joint fixations and condition muscles, the machine comprising:

- a. a table means having a flat, planar, upper surface and a centrally located, elongated rectangular opening therein, said table means being supported above a floor surface by a suitable framework means,
- b. a carriage means disposed below said table means and mounted on parallel, longitudinal guide rail

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means positioned along each side of said frame-
work means for longitudinal movement with re-
spect to said rectangular opening,
c. massaging and manipulating means rotatably
mounted on said carriage means and arranged to
extend upwardly through said opening to massage
and manipulate a portion of a patient's body lying
on said table means, said massaging and manipulat-
ing means includes a first power means for rotating
said massaging and manipulating means during op-
eration, said massaging and manipulating means
includes three parallel rollers mounted between a
pair of parallel plates, each of said plates having an
equilateral triangular configuration and being
aligned with each other, said rollers being mounted
for free rotation around their individual axes at the
apexes of said triangular plates, said triangular
plates being mounted for rotation around a com-

mon axis parallel to said rollers, whereby the axes
of said rollers are an equal distance from said com-
mon axis, said triangular plates being rotated by
said first power means so that the individual rollers
will alternately contact the person's body in an os-
cillating fashion so as to massage and manipulate
the area of the body as the carriage means is recip-
rocally moved with respect to said opening,
d. means for adjusting the upward force with which
said massaging and manipulating means presses
against said body portion, so as to vary the massag-
ing and manipulating action, and
e. reciprocating means for moving said massaging
and manipulating means continuously in a back
and forth motion longitudinally along said opening
to massage and manipulate a large area of the
body.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 3,882,856

DATED : May 13, 1975

INVENTOR(S) : Gordon D. Heuser and Rolla J. Pennell

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, line 40, change "38, 38, 40" to --38, 39, 40--.

Signed and Sealed this
twenty-second Day of July 1975

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks