

[72] Inventor **Reginald E. Greene**
Chamblee, Georgia
 [21] Appl. No. **529,685**
 [22] Filed **Feb. 24, 1966**
 [45] Patented **Aug. 25, 1970**
 [73] Assignee **Lockheed Aircraft Corporation**
Burbank, California

3,294,084	12/1966	Schuler	128/2.06
397,437	2/1889	Mudge & Wasson.....	2/102
720,019	2/1903	Grendon	2/102
3,055,133	9/1962	Anderson	2/102

FOREIGN PATENTS

91,896	4/1958	Norway	2/102
--------	--------	--------------	-------

Primary Examiner— Richard A. Gaudet

Assistant Examiner— John B. Mitchell

Attorney— George C. Sullivan

[54] **SURGICAL GARMENT PRESCRIPTION METHOD AND APPARATUS**
 7 Claims, 2 Drawing Figs.

[52] U.S. Cl. 128/2.06,
 2/102

[51] Int. Cl. A61b 5/04,
 A41d 1/04

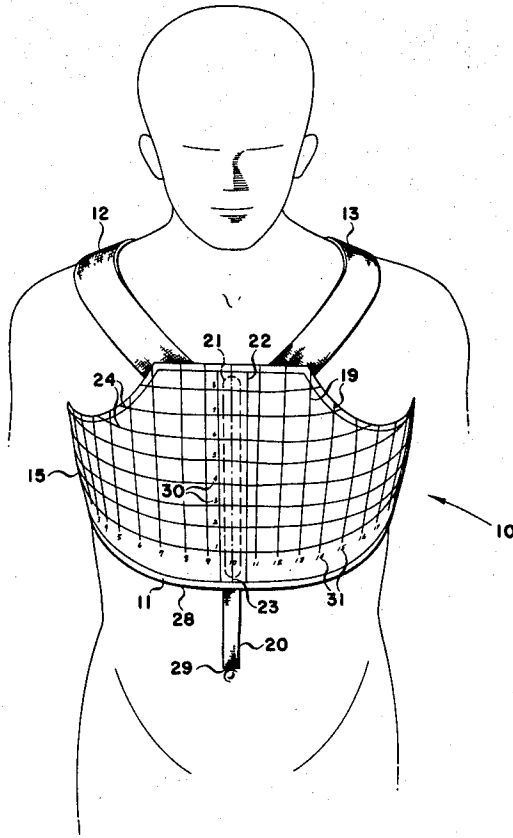
[50] Field of Search..... 128/1, 2,
 2.06, 379, 402, 388; 33/1, 1CC, 17, 17A, 17XR;
 283/1; 33/14, 15, 175; 2/(Inquired), 102

[56] References Cited

UNITED STATES PATENTS

1,693,734	12/1928	Waggoner	128/2.06UX
2,403,676	7/1946	Modlinski.....	2/94
3,258,006	6/1966	Vishnevsky	128/2

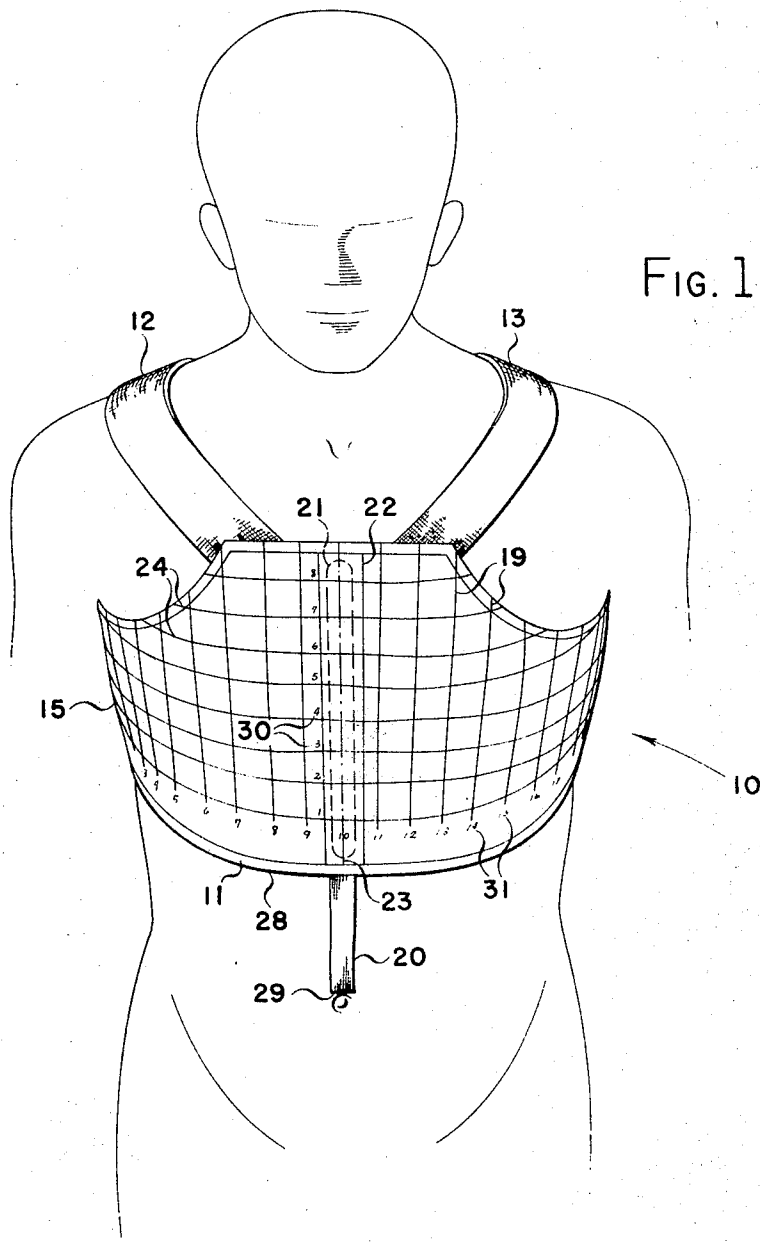
ABSTRACT: Method and apparatus for prescribing the location on a vest-like garment of articles such as cardiological electrodes to facilitate fitting such articles onto a vest-like garment which supports and positions the articles with respect to the body of a wearer. A fitting garment is provided having a grid-like pattern over at least a portion of its outer surface. The fitting garment is worn by a prescriber and the grid coordinates of the desired electrode locations are noted. This grid location information is used to locate the point of attachment of electrodes on the vest provided for a user. A depending element is attached to the fitting garment so that this garment can be positioned with respect to the navel of the wearer to provide repeatability of measurement.



Patented Aug. 25, 1970

3,525,330

Sheet 1 of 2



INVENTOR.
REGINALD E. GREENE
BY *George C. Sullivan*
Agent

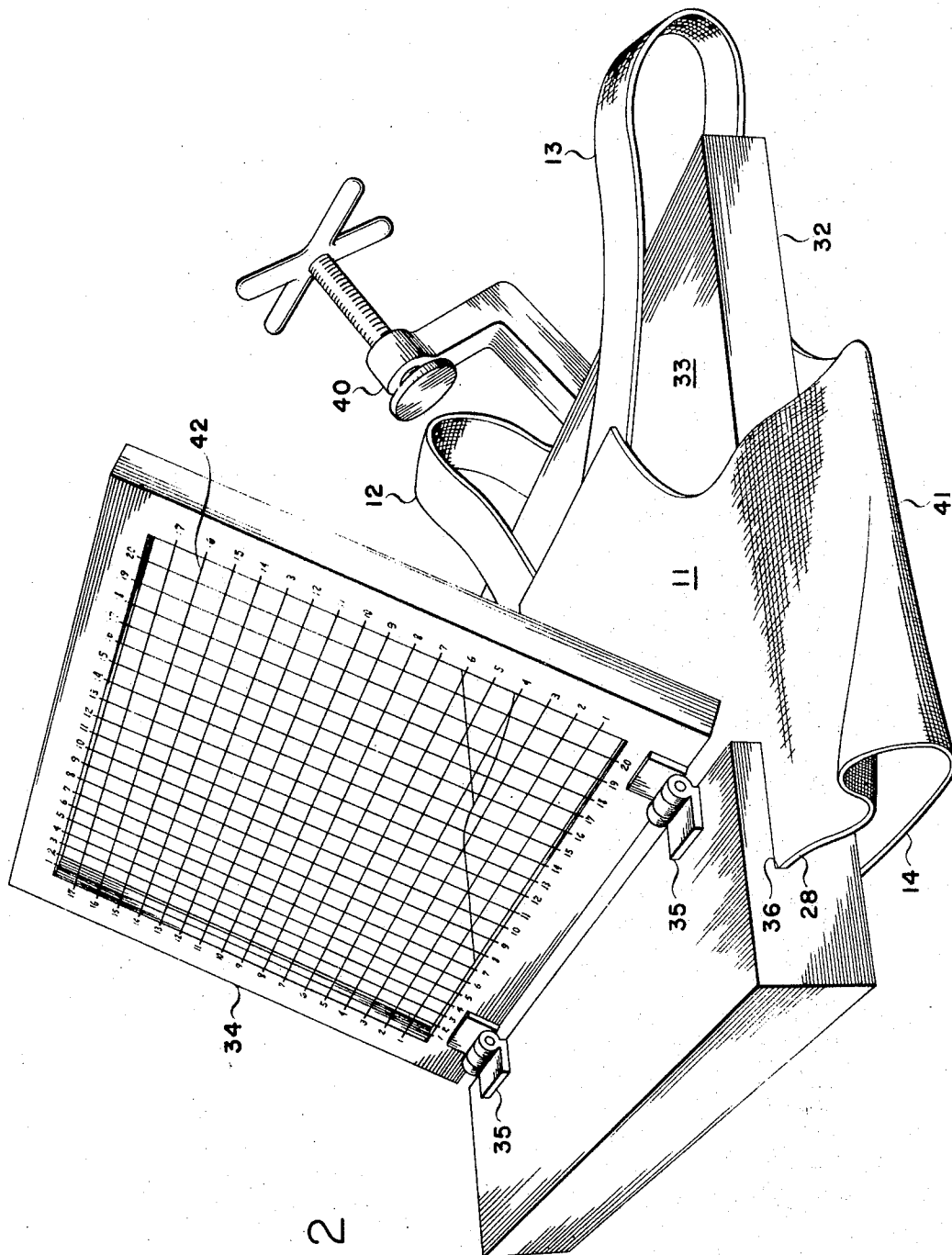


FIG. 2

INVENTOR.
REGINALD E. GREENE
BY *George Sullivan*
Agent

SURGICAL GARMENT PRESCRIPTION METHOD AND APPARATUS

This invention relates in general to a method and apparatus for prescribing surgical garments to be worn by human beings and in particular to a method and apparatus for prescribing surgical garments having thereon at least one electrode or other appliance whose location relative to the body of the wearer is critical.

In diagnosing and treating ailments of the human body it frequently is desired to measure the electrical potentials produced by the functioning of various body organs. For example, in the field of cardiology a record commonly known as an "electrocardiogram" or "cardiogram" frequently is made, this being a recording of the electrical potentials produced by the operation of the heart and occurring at various places on the exterior of the human body. To sense these potentials for measurement, suitable electrodes are applied to the body at appropriate locations known to those skilled in the art.

Since a complete cardiogram requires that a number of electrodes be positioned at various locations on the subject, at least one apparatus has been devised whereby the several electrodes can be simultaneously positioned on the subject by causing the subject to don a vestlike garment containing the desired electrodes, so that these electrodes are firmly and accurately positioned on the body when the garment is being worn. Such a vestlike garment is described more fully in the U.S. patent application of Ernest W. Fuller, Ser. No. 509,941, filed Nov. 26, 1965, entitled "Body Electrode Support Garment" and assigned to the same assignee as the present invention. Reference to the aforementioned application shows a vestlike garment made of a resilient material and having a number of electrodes positioned on vest regions corresponding to the chest area of a wearer. Additional electrodes are contained on a pair of armbands, on a legband, and may be positioned on the back of the vest. The electrodes attached to this vest may be selected from the electrodes of the prior art or may be of the type shown in the pending patent application of John P. Bunn, Ser. No. 526,425, filed Feb. 10, 1966, entitled "Body Electrode" and assigned to the same assignee as the present invention.

Although a vestlike garment of the aforementioned type enables cardiological electrodes to be applied quickly and accurately to the body of a person, these electrodes first must be properly positioned on and secured to the vestlike garment. Because the human physique varies not only as to the sizes of different individuals but also as to the relative body proportions of individuals, it is not generally feasible for a manufacturer or supplier of such vestlike garments to stock a supply of such garments with electrodes attached for use by potential customers. Instead, it has been found practical to supply the vestlike garments, less electrodes, in a number of standard sizes and to position and attach the electrodes to the garments upon the direction of a physician or other person trained in cardiological electrode placement, with the placement of electrodes on a particular vestlike garment being personalized to a particular individual for whom the garment is being fitted.

Since these vestlike garments generally are obtained from a medical supply house or from some other commercial source and are not usually furnished directly by a prescribing physician, the problem of getting the electrodes properly positioned on the garment may require the person being fitted to make not only one or more trips to his physician for this purpose but also one or more trips to the garment supplier so that the electrodes can be properly positioned by means of trial and error. Such trial and error positioning may also mean that the appearance and commercial value of the garment may be impaired or destroyed because of extraneous holes or other fabric damage evidencing removal of improperly positioned electrodes. Clearly some technique is required whereby the location of the electrodes on the vestlike garment can be easily and quickly determined without resort to trial and error positioning of electrodes thereon and multiple fittings of the patient.

This problem is overcome according to the present invention, wherein is set forth a method and apparatus for identifying and locating on such garments the exact position whereat one or more electrodes or other appliances are to be attached.

Accordingly, it is an object of this invention to provide an improved body appliance prescription method and apparatus.

Another object of this invention is to provide a prescription method and apparatus for fitting a body electrode to a body electrode support garment.

A further object of this invention is to provide a locating method and apparatus for defining the location of a body electrode on the body of a wearer.

Still another object of this invention is to provide a locating method and apparatus for defining the location of a body electrode with respect to a datum point on the body of a wearer.

A still further object of this invention is to provide a prescription method and apparatus for fitting a body electrode to a vestlike garment which enables the prescribing party to define the location of such an electrode so as to permit the electrode to be properly located and mounted on a garment in the absence of the person for whom the prescription is written.

The exact nature of this invention as well as other objects and advantages thereof will be readily apparent from consideration of the following specification relating to the annexed drawing in which:

FIG. 1 shows a front pictorial view of a fitting garment according to an embodiment of this invention; and

FIG. 2 shows a pictorial view of an embodiment of a measurement instrument useful for determining electrode locations according to an embodiment of this invention.

Stated generally, the technique of this invention comprehends the use of a fitting garment similar in all material respects to the body electrode support garment which is to receive one or more electrodes and which ultimately will be worn by the person obtaining the fitting prescription. The fitting garment additionally bears a grid-like arrangement of location lines applied to the exterior thereof so that the coordinates of these locating lines can be used to determine and identify a particular location on the fitting garment. Suitable measuring apparatus is provided to enable these coordinates to be located on the vestlike garment to which electrodes are to be attached, and both the fitting garment and the actual electrode-bearing garment contain a reference point which may be used to position the respective garments with respect to the navel of the wearer so as to provide a fixed datum or reference from which the coordinate measurements may be taken.

Stated more particularly and with reference to FIG. 1 thereof, there is shown generally at 10 a vestlike fitting garment similar to the fabric portion of the body electrode support garment in the aforementioned application Serial No. 509,941. This garment includes a front panel 11 and a pair of supporting shoulder straps 12 and 13 connecting the front panel with rear panel 14. The garment, which may be fabricated from resilient material such as elastic cloth or the like, has a parting region 15 at one side thereof with suitable securement devices so that the garment may be readily be donned and doffed by a wearer.

The vestlike fitting garment 10 is substantially similar in material characteristics of size and fit to the vestlike garment which is to be fitted with one or more electrodes for the use of a particular individual. In addition to this similarity the fitting garment 10 includes the added features of a grid-like arrangement 19 of transverse lines and a datum member 20, the function of which is described below. Although the particular disposition of grid-like arrangement 19 with respect to front panel 11 is not critical, it can be noted that the fitting garment 10, as well as the garment to which the electrodes are to be applied, has one or more stay members 21 contained within a tunnel 22 made of cloth or the like and extending substantially down the vertical center line of front panel 11. Accordingly, the grid-like arrangement 19 may be conveniently positioned such that one of the vertical lines 23 comprising the grid is

positioned on and corresponds to this vertical center line. The other vertical grid lines are spaced equally outwardly from vertical center line 23, and a corresponding arrangement of equispaced horizontal lines 24 make up the remainder of the grid-like arrangement 19.

The horizontal and vertical interline spacing of the grid lines is not critical and may be chosen to the convenience of the user of this technique. In one application of this invention, the vertical and horizontal grid lines each were spaced one inch from the next adjacent line; this spacing provided the required degree of locational accuracy for electrode placement and also yielded a spacing unit which is easily subdivided and with which many persons are familiar. Of course, any conventional unit of measurement, such as the centimeter, also could be used.

Attached to the bottom edge 28 of front panel 11 as by stitching or another suitable technique is the aforementioned datum member 20. In the use of this fitting technique it has been found that a vestlike garment of a given size, when disposed on a person, does not necessarily automatically assume a given position or location on this person. This results not only from the existence of different types of physiques but also from the fact that the physical builds of different persons having a given type of physique may differ materially. To ensure an accurate location of electrode positions notwithstanding this fact, after the fitting garment 10 has been donned by a person this garment then is moved or adjusted on the body of the person until the lower end 29 of datum member 20 is located adjacent the navel of the person. This defines the location of garment 10 at a particular datum with respect to the body of that person and enables the location of the electrodes to be accurately determined with respect to that datum.

With the fitting garment of this invention accurately positioned on a person, the physician or other person prescribing the electrode placement then determines the exact location on the body where these electrodes must be positioned. Having done this, the prescribing person next notes the horizontal and vertical grid coordinate positions corresponding to this electrode position or positions. For the convenience of the user both the horizontal and the vertical grid lines are designated by appropriate numerals or other identification as shown at 30 and 31, respectively. For the convenience of the prescribing person, a suitable electrode coordinate prescription sheet may be provided for noting the horizontal and vertical coordinates of each electrode.

After the necessary grid coordinates have been obtained in the above manner, the fitting garment is removed from the person being fitted and these coordinates are used to define the proper electrode locations on the garment to receive the electrodes. It should be pointed out that the fitting garment containing the aforementioned coordinate lines and datum member may also be the garment which is to receive the electrodes, although it seems at least equally likely that the physician or other prescribing person will keep a supply of fitting garments of various sizes, to be used for fitting purposes only, and that the location coordinates derived from the fitting process will be transmitted to the manufacturer or supplier of the garment to be worn by the patient so that the electrodes can be mounted thereon.

If this latter alternative is followed, apparatus such as depicted in FIG. 2 conveniently may be utilized to transfer the grid coordinate to a vest which does not contain the grid-like arrangement 19. By utilizing such apparatus the trouble and expense of applying the grid-like arrangement 19 to every vestlike garment of this type irrespective of whether or not the garment is to be used for prescription fitting purposes is eliminated.

The apparatus shown in FIG. 2 and intended for holding a vest to be marked for electrode application includes a base member 32 having a recessed region 33 in which a garment to be marked is received and including a grid plate 34 attached as by hinges 35 to base member 32. The grid plate 34 swings upwardly to allow the garment to be disposed in recessed re-

gion 33, there being a datum line or abutment 36 contained on the recessed region for alignment with the bottom edge 28 or another suitable reference location on the garment. A suitable clamp member 40 is provided on base member 32 for clamping the grid plate 34 into engaging relationship with a garment received in recessed region 33 so that this garment is now immovably held for marking purposes. Grid plate 34 has a grid made up of horizontal and vertical parallel members such as wires or the like having a spacing either the same as the spacing of the grid-like arrangement 19 on the fitting garment or a submultiple of such spacing. For example, if the spacing of grid-like arrangement 19 is one inch the interline spacing of the grid-like arrangement 42 might be one-half inch.

Once a garment 41 to be marked has been properly positioned in recessed region 33 of base member 32 and has been fixed in place by lowering grid plate 34 and locking the plate with clamp member 40, the operator next proceeds to identify those locations on grid-like arrangement 42 corresponding with the electrode position coordinates obtained during the aforementioned steps of electrode fitting with the vestlike fitting garment. As each such position on the garment 41 is located with the aid of grid-like arrangement 42, the position can be marked on the underlying garment with any suitable device such as a grease pencil or the like. After all such locations have been marked clamp 40 is released, grid plate 34 is raised, and the garment 41 is removed from the apparatus.

There remains only the mechanical operation of attaching the electrodes to the garment in the positions marked as above and since the location of these positions on the garment corresponds to the location on the fitting garment of the proper places for the electrodes, there is obtained a garment having electrodes accurately positioned thereon without requiring the presence of the person being fitted with the garment at the location and at the time the electrodes actually are applied to the garment. Since the physician or other person doing the prescribing is not concerned with the actual application of the electrodes to the garment his time is conserved for more professional efforts or for additional patients, and since the person actually applying the electrodes to the garment is not concerned with the exercise of judgment in mounting the electrodes his operation also is rendered more efficient.

It should be understood of course that the foregoing relates to only a preferred embodiment of the invention and that numerous modifications or alterations may be made therein without departing from the spirit and the scope of the invention as set forth in the appended claims.

I claim:

1. A method of prescribing a garment having thereon at least one body-associative appliance whose location with respect to the body of the prescriber is critical, comprising the steps of:

applying to at least a portion of a fitting garment similar in characteristics of size and fit to the garment to which an appliance is to be applied a system of indicia capable of defining locations on the fitting garment;

disposing this fitting garment on the body of a prescriber;

determining a position on the fitting garment as worn by the prescriber corresponding to the location on the body of the prescriber whereagainst a body-associative appliance is to be disposed; and

recording the indicia designation defining said appliance location position on the fitting garment.

2. The method as in claim 1, further comprising the step of: positioning the fitting garment on the body of the prescriber in a predetermined relationship with respect to a known reference location on this body, prior to said step of determining a position on the fitting garment.

3. The method as in claim 1, further comprising the steps of: attaching to the fitting garment a locating member of predetermined position relative to the remainder of the fitting garment; and

positioning the fitting garment on the body of the prescriber so that said locating member is positioned in a known

5

relationship with respect to a certain body location prior to said step of determining a position on the fitting garment.

4. The method as in claim 3, wherein said certain body location in the last-named step of positioning the fitting garment is the navel of the prescriber.

5. The method as in claim 3, further comprising the steps of: applying said system of indicia at least temporarily in location defining cooperation with an appliance support garment to which an appliance is to be applied; positioning said appliance support garment relative to said applied system of indicia according to a predetermined reference index correlated with said locating member of said fitting garment;

locating on said applied system of indicia the appliance location position defined by said indicia designation; and applying a body-associative appliance to said appliance support garment at the position thereon corresponding to said appliance location position located on the system of indicia applied thereto.

6. The method as in claim 1, further comprising the steps of: applying said system of indicia at least temporarily in location defining cooperation with an appliance support garment to which an appliance is to be applied;

locating on said applied system of indicia the appliance location position defined by said indicia designation; and

6

marking said appliance support garment at the position thereon corresponding to said appliance location position located on said applied system of indicia.

7. A garment useful for fitting or wearing purposes comprising:

a garment configured to fit over and snugly engage a portion of the human body, said garment being generally in the shape of a vest and being fabricated from a flexible material;

indicia disposed on at least a portion of said garment for unambiguously defining any location within said portion of said garment, said indicia including an arrangement of markings comprising a grid pattern on at least the front of the exterior of said vest-like garment;

identification means associated with said grid pattern said identification means and said grid pattern coacting such that any location in said indicia-bearing portion of said garment is uniquely defined by said identification means; and

a locating member attached to said garment and forming a depending part thereof;

said depending locating member dimensioned to be in juxtaposition with the navel of a wearer of said garment when said garment is properly positioned thereon.

30

35

40

45

50

55

60

65

70

75