

Sept. 16, 1969

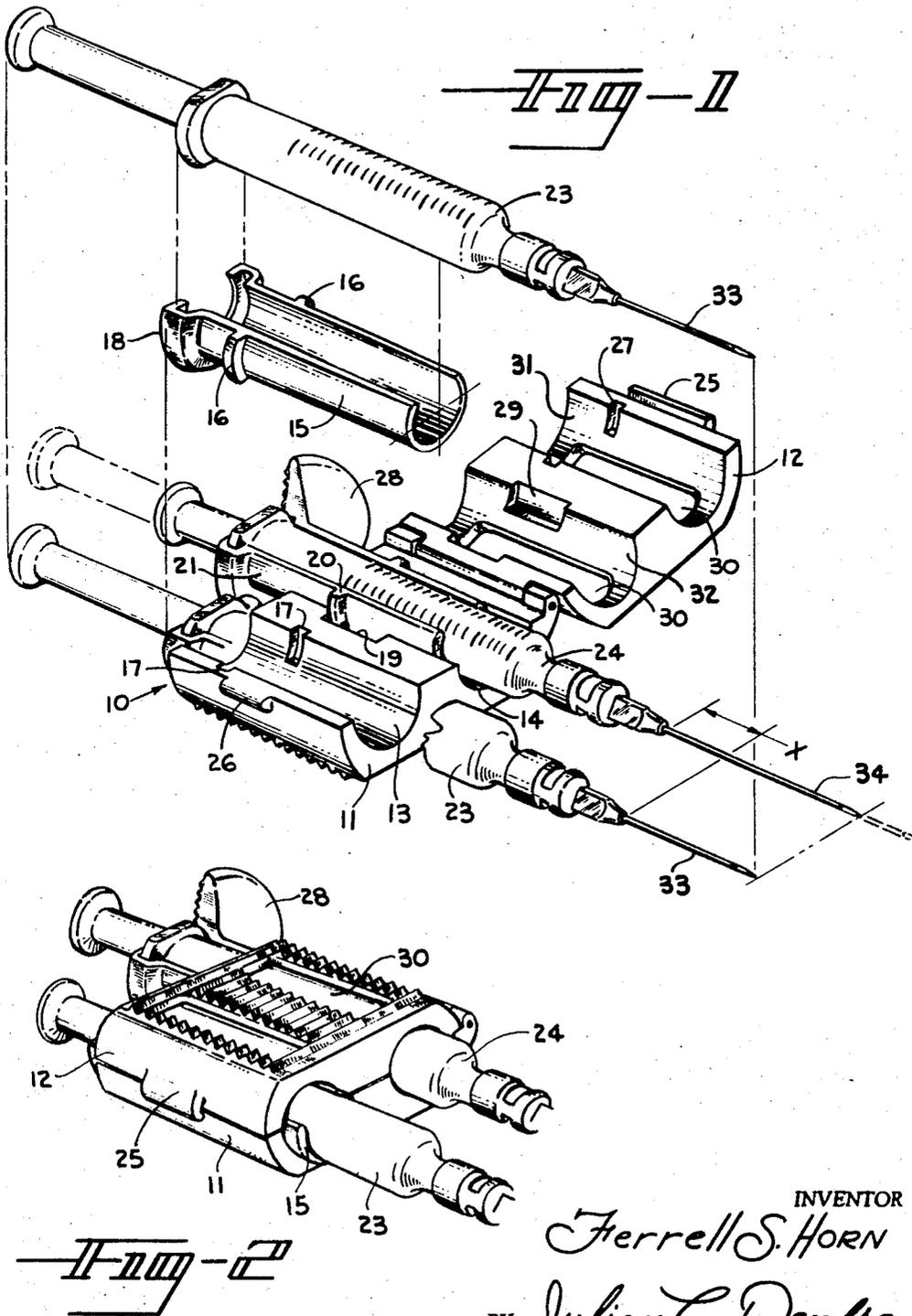
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3,467,096

MULTIPLE HYPODERMIC SYRINGE ARRANGEMENT

Filed April 12, 1966

3 Sheets-Sheet 1



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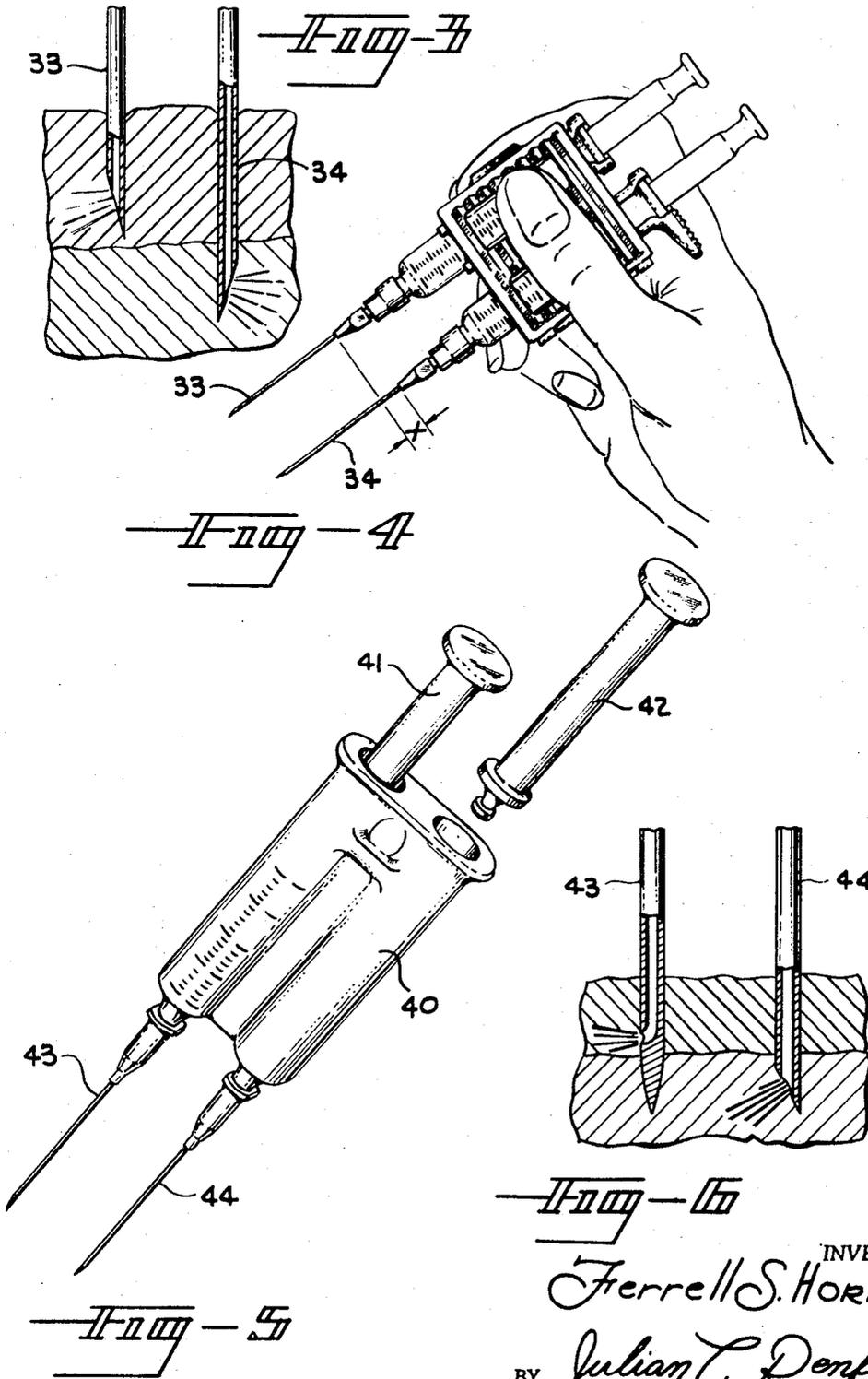
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MULTIPLE HYPODERMIC SYRINGE ARRANGEMENT

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3 Sheets-Sheet 2



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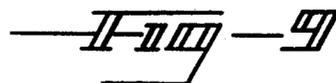
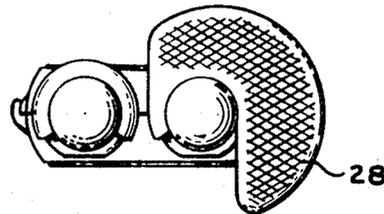
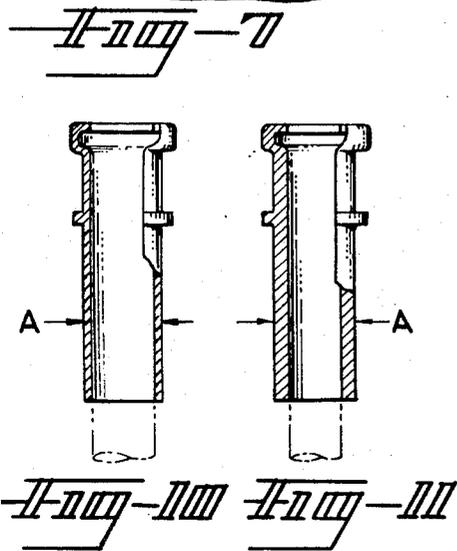
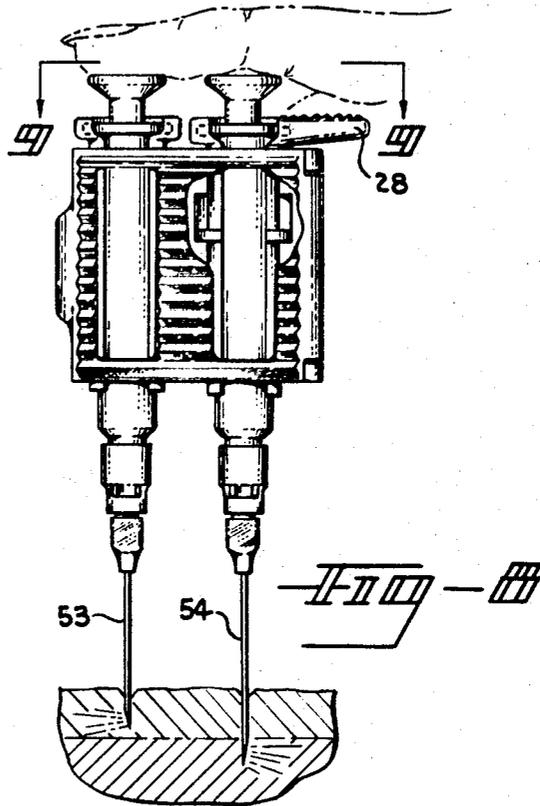
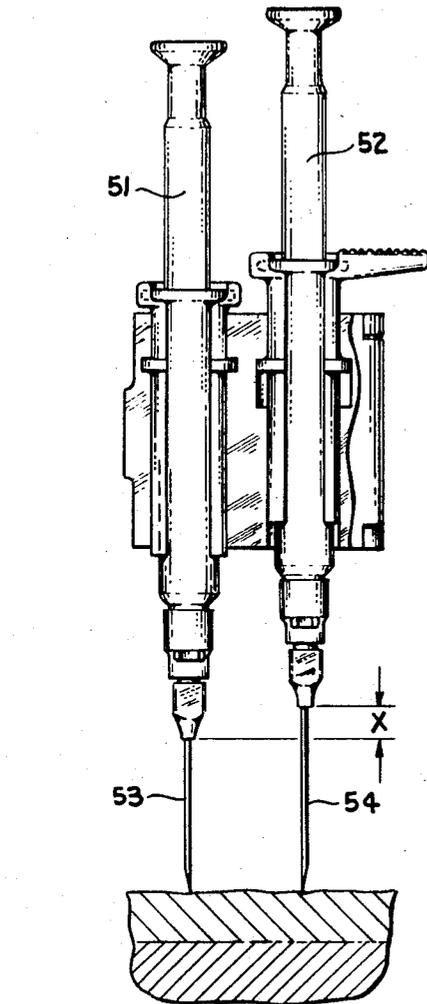
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MULTIPLE HYPODERMIC SYRINGE ARRANGEMENT

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3 Sheets-Sheet 3



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3,467,096  
**MULTIPLE HYPODERMIC SYRINGE  
 ARRANGEMENT**

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 Filed Apr. 12, 1966, Ser. No. 541,995  
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U.S. Cl. 128—218

4 Claims

**ABSTRACT OF THE DISCLOSURE**

A hand held hypodermic syringe arrangement utilizing at least two needles disposed close together and pointing in a common direction so that two or more separate but simultaneous injections can be administered to a patient without involving more than a single sensation of pain. Means are provided whereby, immediately following the initial penetration, one of the needles may be caused to be injected more deeply in the flesh than the other if such be desired.

This invention relates to a multiple hypodermic syringe arrangement, and more particularly to a syringe concept enabling at least two injections to be given to a patient simultaneously, with only a single sensation of pain.

As is well known, hypodermic syringes are in wide use in all parts of the world, being used for the injection of many different types of drugs and medications, as well as for the extraction on occasion of body fluids, such as in injured areas. The needle size utilized in a given instance depends for example upon the age and condition of the patient, and the type liquid to be injected, or the sample of body fluid to be removed. Typically, a comparatively short needle is used if the patient is to receive a subcutaneous injection, whereas a considerably longer needle is usually involved if the patient is to receive an intramuscular injection.

Many patients have an innate dread of receiving injections and the situation involved in such instances is always compounded if the patient is to receive two different drugs that are not compatible if mixed prior to injection, or if one drug is to be injected subcutaneously and the other intramuscularly. In instances of this general type, it has not been at all uncommon for a patient to receive injections in say both arms, and almost invariably in such instances the patient is made more uncomfortable than if only a single injection were in order.

In accordance with this invention, I provide a novel, double needle syringe configuration enabling the nurse or doctor to give two or more injections contemporaneously, with only a single injection ordeal on the part of the patient, and a single sensation of pain being involved.

This invention is grounded on the phenomena known as the two point threshold of pain or pressure, which may be defined as the distance at which the surface pain sensors of the human body cannot distinguish between single and multiple locations of pain. This is to say, depending at the location on the body, a person cannot ascertain if he or she is receiving one needle or a plurality of needles if these needles are disposed comparatively close together. Although the tongue can distinguish between one sharp point and two sharp points unless the two points are approximately 1 mm. apart, in some parts of the back, thigh, and upper arm, the two point threshold of pain often involves a distance of 68 mm. (Experimental Psychology by Woolworth and Schlosberg; Henry Holt & Co., New York). By taking cognizance of the pressure and pain receptor characteristics of the planned injection area, with the use of my invention the

nurse or doctor can, when the circumstances warrant, give two or possibly more injections to a patient in one application.

My invention is not limited to any one particular configuration of hypodermic syringe, for as will be seen hereinafter, I provide a unique fixture by the use of which syringes of different sizes may be utilized. Other embodiments of my invention involve the use of a more complicated fixture enabling the injection of two different types of drugs, such as one drug that needs to be injected subdurally or subcutaneously while the other drug is injected intramuscularly. This latter circumstance of course obtains when the two drugs being injected are not compatible with each other and are to be injected into the flesh separately yet concurrently at two different locations depthwise.

Still another embodiment of my invention involves a low cost syringe arrangement, which may or may not be comparable to the single use syringes currently on the market, which syringe may be made from one piece of plastic and arranged to receive two closely disposed needles and separate plunger arrangements.

It is therefore an object of my invention to make possible a multiple injection technique enabling injections to be given with minimum anguish being involved on the part of the patient and minimum time required on the part of the nurse or doctor.

It is another object of my invention to provide a novel fixture by the use of which a medically trained person can inject the needles of two syringes simultaneously into an injection area of the body yet cause the recipient only a single sensation of pain.

It is another object of my invention to provide a multiple syringe fixture having provision for the movement of one syringe with respect to the other syringe so that after simultaneous penetration of the needles has taken place, the doctor or nurse can thereafter cause the needle of one syringe to penetrate more deeply and thereby achieve an intramuscular injection or at least bring about a depthwise spacing of the drugs being administered.

My invention may also have great value in instances in which large amounts of fluid or drugs are required to be administered, for by the use of my invention, a massive dose may be divided into two smaller doses that can be dispersed into a comparatively large area of tissue, thus reducing the possibility of the formation of abscesses which tend to form as a result of an overconcentration of fluids in one area.

These and other objects, features and advantages will be more apparent from a study of the appended drawings in which:

FIGURE 1 is an exploded view of a primary embodiment of my invention in which the relationships of a pair of syringes to each other and to an adjustable type housing or fixture are depicted;

FIGURE 2 is a perspective view generally relatable to FIGURE 1, but with the fixture components secured in syringe-retaining positions;

FIGURE 3 is a cross-sectional view illustrating in a simplified manner and to a larger scale how the needles of a pair of needles can be caused to penetrate to varying skin levels in the patient;

FIGURE 4 is a perspective view of my fixture as it is grasped in a preferred manner preparatory to injecting fluids into a patient, with it being understood that provision is made for causing one of the needles to penetrate to a greater depth than the other; if necessary;

FIGURE 5 is a perspective view of a low-cost, one-piece embodiment of my invention;

FIGURE 6 is a cross-sectional view in the general nature of FIGURE 3 showing how by the use of two dif-

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ferent types of needles, two different drugs can be administered at different levels in the body although the depthwise penetration of the two needles is identical;

FIGURE 7 is a front elevational view, partly in section to reveal how in accordance with this invention the person administering injections can dispose the pair of syringes in the fixture in such a manner that the needles engage the surface of the skin simultaneously, and thereafter the longer needle be caused to enter more deeply;

FIGURE 8 is a view related to FIGURE 7 but showing the syringes with their plungers in the depressed positions and the needles of the syringes at different depth locations in the patient;

FIGURE 9 is a top elevational view taken in the direction of arrows 9—9 in FIGURE 8;

FIGURE 10 is a fragmentary view of one type of adapter usable in a fixture of the type shown in FIGURE 1; and

FIGURE 11 is a slightly different type of adapter.

Turning now to FIGURE 1, the fixture or housing there shown involves a lower, syringe-receiving portion 11, and a cover-portion 12 hinged thereto. As is apparent, the lower portion 11 has a pair of grooves or recesses 13 and 14 disposed essentially parallel therein, which are sized to receive syringes. As is known, standard syringes come in several different sizes, so although I can construct my fixture to have grooves or recesses 13 and 14 to directly receive a certain size of syringe for example, I prefer to use adapters 15 and 21 in the grooves, which adapters in turn receive the syringes. As will be more apparent hereinafter, a given fixture 10 in accordance with my invention by virtue of the adapter arrangement may be utilized with any of a number of different size syringes, or even two different size syringes used for giving contemporaneous injections. The spacing between the grooves can vary, depending somewhat of course on the size syringes involved, but in all instances the centerlines of the grooves are less than 68 mm. apart.

As will be noted, a pair of shoulders 16 may be provided adjacent one end of adapter 15, with similarly located cut-out portions or slots being provided in the sides of grooves 13 and 14 for the desired type interfit with the shoulders 16. More specifically, groove 13 may be provided with a pair of slots 17 which rather closely receive the shoulders 16. Inasmuch as the upper end of the adapter is configured to closely receive the enlarged upper end of the barrel portion of the syringe, upon a syringe and its adapter being placed in groove 13, it is rather rigidly positioned. This is to say, the needle 33 associated with this syringe is to maintain a fixed depthwise relation to the fixture 10 at all times.

In contrast, the groove 14 is configured to have an enlarged slot 19 therein so that the shoulder portions 20 of the adapter 21 used in groove 14 may desirably travel lengthwise for some distance in the fixture 10.

The foregoing construction is reflected by the configuration of the inner portion of the hinged cover 12, for as will be noted, suitable grooves 31 and 32 are provided in the cover, which will be brought into alignment with grooves 13 and 14 of portion 11 to form syringe-receiving recesses when the cover is closed. Slots 27 and 29 are provided in the cover to be in agreement with slots 17 and 19, respectively, of the lower portion. It should be noted that when the cover is closed, or in other words brought into the position illustrated in FIGURE 2, the syringe disposed in the cylindrically-shaped recess formed by grooves 14, 32 is still relatively movable in a desirable manner at the behest of the nurse or doctor giving injections. Appropriate latch means 25, 26 are provided so that when the cover is closed, it will be retained in that position.

The adapter 21 to be used in groove 14 is typically of a different configuration than the adapter that is non-movable during the injection, in that a finger contacting member 28 may be provided at the upper end of such type

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of adapter so that the shoulder portion 20 can be moved from the upper end of slots 19—29 to the lower end thereof at an appropriate time in the injection procedure. The distance traveled by the syringe in such circumstance is indicated in FIGURE 1 by the X and the dotted line adjacent the point of needle 34.

I prefer to use either plastic or metal in the construction of my fixture or housing 10, with the adapters preferably being of plastic because of its low cost. The adapters are slotted as seen in FIGURE 1 so as to represent only slightly more than a half circle in cross section, this principally being done to enable rapid insertion and removal of a syringe therefrom. By virtue of the natural springiness of the plastic, it grasps the barrel portion of the syringe in a desirable fashion. Another reason for the adapter configuration described herein is that it is desirable for the nurse or doctor utilizing apparatus in accordance with this invention to be able to view the contents of the syringes at all times during the injection procedure. By virtue of the fact that the adapters in effect form hemicylinders, the calibrations or other markings on the syringes will be visible through the slotted portions of the adapters as well as through windows 30 of the cover member 12.

Turning to FIGURE 3, it is revealed how the needles 33 and 34 may be disposed in the flesh of the patient at such time as the movable syringe portion has been moved so as to cause needle 34 to be injected more deeply in accordance with this invention, it typically being the case that the flat portions of the needles are oppositely oriented as shown in FIGURE 3 so that the drugs being administered will flow in generally opposite directions in tissues of the patient.

FIGURE 4 reveals the typical manner in which the fixture is grasped at the time of injection, and the preferred depthwise alignment of the needles. As previously explained, a longer needle may be used in conjunction with the movable syringe, which is moved after penetration into a deeper position in the flesh of the patient than the other needle. The additional depth is indicated by the X. However, I am not to be limited to a fixture 10 that permits one of the syringes to be moved therein, for obviously I may employ narrow slots such as 17, 27 in both pairs of syringe-receiving grooves if such be desired, in which case both adapters and their respective syringes would be firmly held, with relative motion not being possible.

Referring to FIGURE 5, it will be noted that discrete syringes are not used in this embodiment and no clamping fixture is involved. Rather, the syringe bodies are formed from a common piece 40 of plastic or glass, with the bodies thereafter being drilled to form barrel portions that receive the plungers 41 and 42. The opposite ends of the syringes are configured to receive needles 43 and 44, which of course are injected to a fixed depth, without one needle being able to moved deeper as was the case in the previous embodiment. FIGURE 6 however shows that by using two different types of needles, this seeming limitation can be overcome and drugs nevertheless injected on different levels of the flesh of the patient.

Turning to FIGURES 7 and 8, the operation of my device is made more apparent in that in FIGURE 7 it is made clear that the syringe in the movable environment may be equipped with a needle 54 that is longer than the other needle, needle 53. The needle points are brought into alignment for injection, but before the plungers 51 and 52 are depressed, the movable syringe is moved so as to cause needle 54 to pierce the flesh more deeply as shown in FIGURE 8. Thereafter, the plungers 51 and 52 are depressed, typically simultaneously as shown in FIGURE 8 so as to administer the drugs on the levels dictated by the depth of the needles.

FIGURE 9 illustrates a preferred configuration for the finger contacting member 28 of the movable type adapter, so that the manipulation of the movable syringe

can be conveniently brought about by appropriate thumb or finger pressure.

FIGURES 10 and 11 show adapters of different side-wall thicknesses for use in a standard sized housing 10, with it being understood that the adapter of FIGURE 10 is used with a comparatively large syringe, and the adapter of FIGURE 11 used with a comparatively small syringe. As will be apparent, when syringes of longer length are used, longer adapters will be preferred.

As will be apparent to those skilled in the art, the housing 10 is configured differently depending upon the use to which it is being put. As previously mentioned, although the recesses 13 and 14, as well as their complementary recesses can be configured to directly receive the syringe barrels, I prefer to have the recesses slightly larger than would otherwise be the case, thereby to accommodate the adapters with which I prefer to use the syringes. The adapters can use various internal dimensions, but have standard external dimensions so as to enable in a single housing more than one type of syringe to be used. For example, the 1 cc. tuberculin syringe is typically approximately  $\frac{1}{16}$  of an inch smaller in barrel diameter than the 1 cc. insulin syringe, so by having standard adapters whose inner diameters are configured to correspond to those specific syringes, I can use a standard housing with any of a number of 1 cc. and 2 cc. syringes.

Similarly, it is within the contemplation of my invention to use a larger housing for 10 cc. syringes, with adapters of standard external dimension being available for use therewith. However, it is of course to be understood, that by using an adapter having a thicker side-wall, I can for example use a 5 cc. syringe in this larger housing, and even may use a 5 cc. syringe simultaneously with a 10 cc. syringe by virtue of using appropriately sized adapters.

In a similar manner, I can use a still larger housing basically configured for say 30 cc. syringes with adapters being available so that 20 cc. syringes can also be employed therein.

Ordinarily, only two needles are used simultaneously, although it is within the contemplation of my invention to provide means (not shown) whereby two housings 10 could be fastened together so that four needles can be simultaneously inserted into the patient or animal.

As to the sizing of the housing, it is to be understood that the centerlines of the recesses will necessarily have to be further apart as larger size syringes become involved, but as previously mentioned, in all instances the centerlines will be no greater than say 68 mm. apart. The adapters designed for use with a given housing have external diameters, when syringes are disposed therein, such that the adapters have a snug sliding fit in the recesses of the housing.

I claim:

1. A dual hypodermic syringe arrangement comprising a hand held housing from one end of which a pair of needles extend in essentially parallel relationship, a fluid-containing barrel associated with each needle, in each of which barrels an independently operable plunger is disposed, said needles being disposed so as to extend in the same direction and spaced apart less than 68 mm., whereby a pair of injections can be given simultaneously to a patient, involving only a single sensation of pain, and means whereby one barrel is arranged to be slideable relative to the other barrel, thereby to enable one of said needles to be injected more deeply than the other.

2. A dual needle hypodermic syringe arrangement as defined in claim 1 wherein the configuration of said hous-

ing is such as to removably receive a pair of syringes therein, said housing having recesses therein receiving adapters in which said syringes are disposed, and means for moving one of said adapters in the housing relative to the other adapter, thus to bring about the deeper injection by said one needle.

3. A housing of a size and configuration to be held in the hand and arranged to removably receive therein a plurality of independently operable hypodermic syringes each having a needle thereon, said housing employing at least two recesses therein in which said syringes can be disposed, said recesses being in essentially parallel relationship and spaced apart a limited extent so that when syringes are placed therein, the needles of such syringes will extend in the same direction, be disposed in essentially parallel relationship, and be spaced apart less than 68 mm., whereby a double injection can be given while involving only a single sensation of pain, said recesses of said housing receiving generally cylindrically shaped adapters, said adapters each containing a hypodermic syringe, said adapters as well as the housing being configured to enable the calibrations of the syringes to be visible even when disposed in said housing, and means provided for sliding one of said adapters in said housing during an injection, whereby one needle may be caused to penetrate the patient more deeply than the other.

4. A housing of a size and configuration to be held in the hand and arranged to removably receive therein a plurality of independently operable hypodermic syringes each having a needle thereon, said housing employing at least two recesses therein in which said syringes can be disposed, said recesses being in essentially parallel relationship and spaced apart a limited extent so that when syringes are placed therein, the needles of such syringes will extend in the same direction, be disposed in essentially parallel relationship, and be spaced apart less than 68 mm., whereby a double injection can be given while involving only a single sensation of pain, said recesses of said housing receiving generally cylindrically shaped adapters, said adapters each containing a hypodermic syringe, said adapters as well as the housing being configured to enable the calibrations of the syringes to be visible even when disposed in said housing, said housing constituted by upper and lower halves, means functioning in conjunction with one of said recesses to hold its respective adapter against sliding movement in the housing when the plunger of the corresponding syringe is depressed, and means in conjunction with a second of said recesses to permit a limited amount of travel of its adapter and the syringe held by latter adapter, whereby the needle held by a latter adapter, whereby the needle held by latter syringe may be caused to penetrate the flesh of a patient more deeply.

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