Method and apparatus for needle protection provided by a container having opposed ends, with one end permitting the container to be positioned on a receptacle, and the opposite end for the attachment of a fillable member. A needle is positioned within the container, which can be tubular, between the opposed ends. The attachment of a fillable member can be by the attachment of an empty syringe, and the container can be positioned on a receptacle for attaching a serum vial. A needle removably extends within the container near the end where the receptacle is attachable. The empty syringe is removably connected to the needle within the container, and is used to withdraw serum from the vial. After the filled syringe is withdrawn, the serum is dispensed, and the empty syringe, with the needle is returned to the container, which is disposed of.
SAFETY SHIELD NEEDLE PROTECTOR

DETAILED DESCRIPTION

[0001] This invention relates to a safety shield for protecting users of medical needles in performing medical procedures, such as the injection of a serum by a syringe into a patient.

BACKGROUND OF THE INVENTION

[0002] Because of the presence of highly infectious diseases, syringes, scalpels and other sharp devices have caused numerous injuries to the medical personnel. Many states have enacted legislation seeking to protect medical personnel from “needle stick” injuries.

[0003] Unfortunately, many of the devices and protective techniques that have been proposed are not only complicated and expensive, but have not been able to provide the desired degree of protection.

[0004] For example, in the use of a syringe with a needle, a practitioner unsheathes the needle, inserts into a vial of medication, removes the syringe and inserts the needles into a patient. After the needle has been unsheathed, before being inserted, it presents a hazard to the user. Typically, two hands are used to prepare a patient for an injection. One hand is used to clean the area to be injected, while the other hand is used to inject the needle into the tissue. After removing the needle from the patient, the nurse must press the site of injection and hold a syringe in place with the other hand. A needle stick safety syringe includes a outer tubular protective cover or sleeve for the inner syringe body where a concentric coil spring is compressed against the normal flange of the inner syringe body and retained there by a stop which is cantilevered from a collar affixed to the distal end of the inner syringe body. This cantilevered stop also includes a convenient button which may be easily depressed by a finger of one hand holding the outer tubular body to allow the sleeve to slide over the needle under the bias of the spring. The cantilevered button and stop rides in a groove in the inner diameter of the tubular outer protective body and is captured by a slot which effectively prevents reuse, which is a very cumbersome releasable retaining device to retract the needle syringe where it will not cause harm.

[0005] Accordingly, it is the principal object of the invention to provide a non-cumbersome, releasable retaining device for needle syringes to avoid harm to the user.

[0006] In U.S. Pat. No. 6,322,540 issued Nov. 27, 2001 to Grabis, et al. for “Safe-Shield Needle Protector” a needle stick safety syringe includes a outer tubular protective cover or sleeve for the inner syringe body where a concentric coil spring is compressed against the normal flange of the inner syringe body and retained by a stop which is cantilevered from a collar affixed to the distal end of the inner syringe body. This cantilevered stop also includes a button which may be depressed by a finger of one hand holding the outer tubular body to allow the sleeve to slide over the needle under the bias of the spring. The cantilevered button and stop rides in a groove in the inner diameter of the tubular outer protective body and is captured by a slot to prevent reuse.

[0007] The invention avoids the complexity of this kind of device.

[0008] In U.S. Pat. Nos. 6,146,362 and 5,833,674, issued to Turnbull, et al., Nov. 14, 2000 and Nov. 10, 1998, for “Needleless IV Medical Delivery System”, an injection site and drug transfer site are used for facilitating coupling a syringe to a fluid line. The injection site has a housing and septum comprised of two parts. The drug transfer site has a positive locking member for restricting retraction from the injection site once it is inserted for injecting a medicament. The positive locking member preferably comprises an annular ridge defined about the shaft of the drug transfer site. The septum includes a pair of axially aligned, oppositely oriented conical recesses with adjacent apices either separated by a thin membrane or intersecting at the time of manufacture. The housing has an inlet for receiving the septum and comprises a plurality of fingers with inwardly extending tabs for constraining the septum therewithin. The septum is ideally adapted to be applied to injection sites, Y-connectors, vial adapters, single or multi-dose vials and blood collection tubes. When the drug transfer site is made to penetrate the septum, the walls of the septum or the inwardly extending tabs tightly engage the shaft of the spike to preclude inadvertent withdrawal. The invention avoids the complexity of this kind of device.

[0009] In U.S. Pat. No. 5,899,886, issued to Cosme, May 4, 1999, for “Puncture Safe Needle Assembly”, a needle sleeve encloses a needle holder and is manually extendable and retractable in a telescopic manner to enclose or expose respectively the distal sharp portion of a needle without the aid of a spring or spring-like device. An interlocking member that clamps or slips into the needle holder locks or releases the needle sleeve from the needle holder. In this assembly, the needle is attached to a protruding body to prevent movement of the needle during use. At the proximal end of the needle assembly is a connector for communicating the needle assembly to a hypodermic syringe or other fluid delivery device.

[0010] In U.S. Pat. No. 5,685,860, issued to Chang, et al., Nov. 11, 1997, for “Self-Capping Needle Assembly”, the self-capping needle assembly is used in combination with skin puncture apparatus and contains a pleated sleeve made from any natural or synthetic fiber material. The fiber materials employed as the pleated sleeve may be treated with a suitable agent that provides the fiber material with a hydrophobic coating and prevents fluids such as blood from seeping therefrom.

[0011] In U.S. Pat. No. 5,685,259, issued to Pearson, et al., Aug. 19, 1997, for “Dental Cartridge Assembly Auto-Injector With Protective Needle Cover”, an injection device includes a generally tubular outer body and a medicament cartridge assembly carried within the outer body. The cartridge assembly includes a glass container, a charge medicament disposed within the glass container, iii) a plunger member rearwardly confining the medicament, and iv) seal for sealing the forward portion of the glass container. A needle has a rearward end disposed proximate the seal, with the seal and needle being movable with respect to one another. A rigid needle cover member is maintained in an inoperative position and is movable relative to the tubular body to a protective position wherein the needle cover member extends forwardly to cover the forward end of the
needle. A releasable spring responds to a predetermined actuating procedure to drive a collet member forwardly within the outer body and enable i) the cartridge assembly to move relative to the needle so that the rearward end of the needle pierces the seal to establish communication with the medicament, ii) the needle to move with respect to the body so that the needle projects outwardly from the forward end of the body, and iii) the needle cover to move relative to the body from the inoperative position to the protective position so that the needle cover member extends beyond the forward end of the needle.

In U.S. Pat. No. 5,601,536, issued to Crawford, et al., Feb. 11, 1997, for “Needle Tip Cover”, there is a cover having a needle having an elongate shank and a tip with a sharpened point. The cover is coaxially associated with the elongate shank for movement therealong toward the tip and includes a part for extending beyond the sharpened point when the cover is positioned near the tip. A lock associated with the needle and cover cooperates with and holds the cover to prevent axial movement relative to the needle tip after positioning the cover near the tip. A retaining member on the adapter, and on the cover, releasably attach the cover and adapter, while on the elongate shank of the needle, allowing the needle and cover to be disengaged from the catheter and adapter after placement.

In U.S. Pat. No. 5,591,138, issued to Vaillancourt, et al., Jan. 7, 1997, for “Protected Needle Assembly”, a V-shaped slot is provided at the rear of a guide slot so that a retractable sheath can be locked in a retracted position. In another embodiment, a cam surface at the front of the guide slot directs the projection on the sheath into a position to lock the sheath in an extended position. An additional inclined guide portion may be provided at the forward end of the guide slot for intramuscular injection use. The movable sheath may also be mounted on a syringe without need for a resilient bias or may incorporate a coiled spring or rubber strip to bias the sheath into an extended position.

In U.S. Pat. No. 5,472,430, issued to Vaillancourt, et al., Dec. 5, 1995, for “Protected Needle Assembly”, a retractable sheath can be moved from an unextended protected position over a hollow needle to a retracted position exposing the hollow needle. A projection carried on the sheath is disposed in a guide slot having a circumferentially directed portion for receiving the projection. In addition, a spring or resilient sleeve is provided between the movable sheath and the housing to bias the sheath longitudinally of the hollow needle and also circumferentially. In order to release the sheath, the needle assembly is brought into contact with a patient’s skin or a septum and twisted. Thereafter, an axial force on the needle assembly causes the sheath to be retracted while the hollow needle penetrates through the skin or septum. Other embodiments are provided wherein a blunt needle can be moved within a hollow needle from an extended position protecting the hollow needle and a retracted position permitting exposure of the hollow needle.

In U.S. Pat. No. 5,462,533, issued to Daugherty, Oct. 31, 1995, for “Self-Contained Needle And Shield”, a surgical needle is made up of two concentric tubes. The inner tube has a sharp tip like a conventional hypodermic or intravenous needle. The inner tube can be retracted into the outer tube after use. In one embodiment, the needle forms part of a catheter assembly. A catheter is mounted coaxially around the both tubes. The inner tube has a latching member attached to the end without the sharp tip. The latching member engages detents on a housing to hold the sharp tip in an extended position or a retracted position. The latching member is provided with a porous plug to assist in venting gases during catheter introduction.

In U.S. Pat. Nos. 5,312,366 and 5,290,254, issued to Vaillancourt, May 17, 1994 and Mar. 1, 1994, for “Shielded Needle Assembly”, a tubular sheath of latex rubber is mounted over the needle of the assembly. The shield includes a resilient collapsible tubular portion which is able to collapse in an accordion-like manner when a longitudinal force is imposed. The shield also has a cap at the distal end which seals off a chamber in which the needle is contained in a sterile manner. The cap includes a transverse wall which may be pierced by the needle when the needle is passed into a vial of medication or into a connector of an administration set.

In U.S. Pat. No. 4,982,842, issued to Hollister, Jan. 8, 1991, for “Safety Needle Container”, a safety adapter is usable with different types of needles and syringes, with integral first and second sections and a housing flexibly connected to one of the sections. The first section is adaptable to be mated with the hub of a needle assembly, with the housing flexibly connected thereto by a living hinge. The needle assembly is threadedly mated with an internally threaded annular collar surrounding a protrusion which is coupled to the hub of the needle assembly. The second section of the safety adapter includes a female luer that is adaptable to be mated with different types of syringes, such as a luer slip syringe or a luer lock syringe. Once the needle assembly has been threadedly mated to the first section of the safety adapter, to ensure that the needle of the needle assembly is not exposed so as to preclude accidental pricking by the needle, the housing is pivoted to a position where it completely envelops the needle. One integral retainer mechanism in the housing prevents relative movement between the needle and the housing once the housing has been pivoted to envelop the needle. The dead space volume at the junction where the needle is connected to the syringe can be reduced by an embodiment of the safety adapter which includes a male extension within the female luer.

In U.S. Pat. No. 4,892,525, issued to Hermann, Jr., et al., Jan. 9, 1990, for “Hypodermic Needle Protective Barrel and Cap Packaging”, improvements are made in conventional protection barrel and cap packagings for hypodermic needles by a structural guard that encourages a user’s fingers to locate directly behind the guard, and around the outer surface of an opening into the protected barrel. A person inserting a needle into a barrel automatically seeks to grasp the barrel proximate its open end, to avoid yanking of the barrel during the manipulative process. A laterally expanded barrel opening defines a transition ramp surface into the barrel open end and towards the barrel closed end, even if the needle insertion step included an initial lateral misalignment, off the axial centerline of the barrel cap which extends the guard protections of the barrel needle barrel protector, through a cap which forms an extending boss from the exterior surface of the cap, so that both needles will be guided away from accidental, manipulative stabbing. A protective barrel and extended cap packaging for enclosing a hypodermic needle and syringe assembly also is provided,
wherein a disposable axially extending housing can be discarded, leaving a protective needle barrel when reinserting only the barrel onto the needle.

In U.S. Pat. No. 4,838,863, issued to Allard, et al., Jun. 13, 1989, for “Safe Needle System for Collecting Fluids”, a hypodermic syringe having a cylindrical outer body is adapted to accept a smaller fluid storage vial within its inner walls. A removable cap on one end of the cylinder provides access in order to insert and remove the vial with a spring-loaded, double-headed needle assembly integrated into the other end, and held in place by a retainer until the storage has been punctured by one end of the needle, the vial filled and removed and the needle assembly retracted into the space vacated by the vial.

In U.S. Pat. No. 4,725,267, issued to Vaillancourt, Feb. 16, 1988, for “Post Injection Needle Sheath”, the sheath encloses the sharpened end of a needle used with a syringe, without spring actuation. The sheath is initially in a compact and secured condition on the needle hub and has a substantial portion exposed for insertion into a patient or vial. Some embodiments employ a compression spring, and other embodiments avoid a spring, but have a corrugated portion and a flange that are manipulated by an attendant to urge the sheath forward to enclose the sharpened end of needle. In all embodiments, the forward end includes a transverse wall with an aperture that is slightly larger than the shank of the needle. Protection to the exposed needle before use is provided by a conventional shield which is removed at time of use. After withdrawal of the needle from the patient, the sheath, with the cap or end portion, is moved forward to enclose the sharpened needle.

In U.S. Pat. No. 4,592,744, issued to Jagger, et al., Jun. 3, 1986, “Self-Resheathing Needle Assembly”, a sheath has a case with a small closed end and a large open end. A needle assembly within the case has the needle projecting through the small closed end. A hub is connected to the needle assembly inside the case and a connector on the hub cooperates with a receiver in the small end to hold the needle assembly in case. A flange on the hub cooperates with an inward projection in the case spaced from the small end to prevent movement of the needle out of the case when the needle is withdrawn from the opening in the small end. The nozzle of a syringe pushed into the hub withdraws the needle when the syringe is withdrawn. A rubber stopper on a vacuum tube withdraws the needle after the rubber stopper turns the flange to release the connector from the receiver.

In U.S. Pat. No. 4,240,427, issued to Akhavi, Dec. 23, 1980, for “Needle With Protector”, an intermittent rib structure on a hypodermic needle and its protector have beveled ends to rotationally shift the needle and protector into proper alignment during high speed assembly.

In U.S. Pat. No. 3,934,722, issued to Goldberg, Jan. 27, 1976, for “Sterile Needle Package”, a sterile needle package includes a rigid cartridge supporting a hypodermic needle for aseptic removal. After the cartridge is opened, the needle is removed by tipping the cartridge body and spilling the loosely-supported needle onto a sterile surface. When sealed within the cartridge, the needle and its tip are protected against damage and contamination despite the loose fit between the parts. The cartridge includes a cover with an integral lever which is lifted to pry the cover free of the body, without contaminating of either the needle or the mouth of the cartridge, when removal of the needle is desired.

In U.S. Pat. No. 3,206,290, issued to H. S. Weltman, Feb. 28, 1967, for “Automatically Retractable Needle Syringe”, hypodermic syringes of the type employed by dentists and physicians for injecting drugs, and other fluids into body tissues employ disposable capsules to inject a local anesthetic.

In U.S. Pat. No. 3,021,942, issued to Donald A. Hamilton, Feb. 20, 1962, for “Needle Package”, a container protects the needle and can be used to put the needle on a syringe and to remove it.

Accordingly, it is a further object of this invention to provide an improved safety shield device for needle syringes which device is an improvement over the foregoing prior art devices.

SUMMARY OF THE INVENTION

In accomplishing the foregoing and related objects, the invention provides a safety shield formed by a container having opposed ends, with means at one end for permitting the container to be positioned on a receptacle, and means at the opposite end for the attachment of a tamable container. A needle is positioned within the container between the opposed ends.

In accordance with one aspect of the invention, the container is tubular, and the means for attachment of a fillable container is of an empty syringe. The means for permitting the container to be positioned on a receptacle is by attaching a serum vial to the container. A needle extends near the end of the container where the receptacle is attachable, and needle is removably connectable to the end where the fillable container is attachable.

The serum vial may have a tamper-evident cap which is removed and discarded before the vial is attached to the container and penetrated by the needle. The empty syringe is removably connected to the needle within the container. The empty syringe is returnable connectable, with the needle, into the container to prevent exposure to the needle after its use. The container, including the needle, can be placed in a sealed package before being used to attach a vial at one end, and a syringe at the opposite end.

In a method of the invention for providing a safety shield for a needle, steps include (a) positioning a needle within a container having opposed ends; (b) providing means at one end of the container for permitting it to be positioned on a receptacle; and (c) providing means at the opposite end of the container for the attachment of a fillable vial.

The method further includes the step of providing the container as a tubular member, and the step providing means for the attachment of a fillable container to the tubular member.

The method also includes the step of providing for the attachment of an empty syringe to the tubular member.

A safety shield to protect users of medications dispensable by needles includes the steps of (a) positioning
an empty syringe at one end of a tubular member containing a needle; and (b) positioning a serum vial at another end of the tubular member.

The method further includes the step of depressing the serum vial into the tubular member until the vial is penetrated by the needle. The method also further includes the step of withdrawing serum from the vial by the syringe. The step of withdrawing the syringe from the tubular member with the needle attached.

A further step is repositioning the needle in the tubular member to protect users of the needle from injury. Another step is sealing the tubular member with the needle in a sterile package.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A is a diagram of a needle and protector cap in a sterile package in accordance with the prior art.

FIG. 1B is diagram of the needle and protector cap removed from the sterile package of FIG. 1A.

FIG. 1C is diagram of an empty syringe for use with the needle removed from the sterile package of FIG. 1A.

FIG. 2A is a diagram of the needle and protector cap of FIG. 1B attached to an empty syringe in accordance with the prior art.

FIG. 2B is a diagram showing the protector cap of FIG. 2A removed for discard, exposing in FIG. 2C a sharp needle attached to the empty syringe.

FIG. 3A is a serum vial with a tamper evident cap in accordance with the prior art.

FIG. 3B is a diagram showing the serum vial of FIG. 3A with its tamper-evident cap removed to expose the septum of the vial in preparation for penetration by the needle of a syringe in FIG. 3C after a disinfectant is used prior to the entrance of the needle.

FIG. 4A is a diagram showing the penetration of the septum vial of FIG. 3B, by the needle of the syringe of FIG. 3C, for transfer of serum from the vial into the syringe.

FIG. 4B is a diagram showing the removed needle after extraction of serum from the vial, which is discarded, and the syringe with its exposed sharp needle is ready for patient injection, following which the syringe with its exposed sharp needle will be discarded, causing potential injury to the user by virtue of the exposure of the sharp needle at the end of the syringe.

FIG. 5A is a diagram of a needle and safety shield protector of the invention in a sterile package.

FIG. 5B is diagram of the needle and safety shield protector of the invention removed from the sterile package of FIG. 5A.

FIG. 5C is diagram of an empty syringe for use with the needle and safety shield protector of FIG. 5B.

FIG. 6A is a diagram of the needle and safety shield protector of FIG. 5B attached to an empty syringe in accordance with the invention.

FIG. 6B is a diagram showing the needle and safety shield protector, with attached empty syringe positioned for receiving a serum vial.

FIG. 6C is a diagram showing the serum vial inserted into the safety shield protector of FIG. 6B.

FIG. 7A is a diagram showing the syringe of FIG. 6C removed from its safety shield protector.

FIG. 7B is a diagram showing the syringe of FIG. 6C returned to the safety shield protector after use with a patient and ready for proper disposal.

FIG. 8A is a cross-sectional view of the needle cap protector 20 of the invention with its needle removed.

FIG. 8B is a distal end view of the fill sectional needle cap protector 20 of FIG. 8A.

FIG. 8C is a proximal end view of the full sectional needle cap protector 20 of FIG. 5A.

FIG. 9A is a cross-sectional view of the needle cap protector 20 of the invention with an included needle, taken along the line A-A of FIG. 5B.

FIG. 9B is a partial cross-sectional view of a standard vial for insertion into the needle cap protector 20 of FIG. 9A.

FIG. 9C is a partial view, partially in cross-section showing a syringe for connection to the protected needle in the cap protector of FIG. 9A.

FIG. 9D is a composite view showing the standard vial of FIG. 9B and the syringe of FIG. 9C connected to the protector of FIG. 10A.

FIG. 10A is a full scale drawing of the needle cap protector 20 of the invention.

FIG. 10B is an end view of the needle cap protector 20 of FIG. 10A.

FIG. 10C is side view of the needle, partially in section, removed from the needle cap protector 20 of FIG. 10A.

FIG. 11A is an enlarged view of the needle cap protector 20 of the invention with the needle removed.

FIG. 11B is an end view of the needle cap protector 20 of FIG. 11A taken along the lines B-B.

FIG. 11C is an end view of the needle cap protector 20 of FIG. 11A taken along the lines C-C.

FIG. 12A is a sectional view of the needle cap protector 20 of FIG. 11A.

FIG. 12B is a full sectional view taken along the lines B-B of FIG. 12A.

FIG. 12C is a full section view taken along the lines C-C of FIG. 12A.

DETAILED DESCRIPTION

With reference to FIG. 1A, a sterile package 10, in accordance with the prior art, contains a needle 11 and a protector cap 12. Access to the needle 11, shown within its
protector cap 12, as pictured in FIG. 1B, is obtained by tearing the tab T of the package 10, and removing the assemblage of FIG. 1B.

[0070] A typical, empty commercial syringe 13 of the “TB” type, with a 3 cc capacity and a tubular body 14 is shown in FIG. 1C with a plunger 15 that slides within the tubular body 14 and operates in standard fashion. The empty syringe 13 is for use with the needle 11 that has been removed from the sterile package 10 of FIG. 1A.

[0071] The empty syringe 13 of FIG. 1C is attached to the needle 11 within the protector cap 12 in accordance with the prior art as shown in FIG. 2A. In order to use the syringe 13, the protector cap 12 of FIG. 2B is removed for discard, exposing the sharp needle 11 attached to the empty syringe as shown in FIG. 2C. At this stage of the procedure, the exposure of the sharp needle 11 exposes the user to inadvertent needle sticks.

[0072] Once the protector cap 12 is removed, the empty syringe 13 can be used with a serum vial 16 of FIG. 3A, which has a tamper evident cap 17, in accordance with the prior art.

[0073] In FIG. 3B, the serum vial 16 of FIG. 3A has its tamper-evident cap 17 removed to expose the septum 18 of the vial 16 in preparation for penetration by the needle 11 of the syringe 13, shown in FIG. 3C, after a disinfectant is used on the septum 18 prior to the entrance of the needle 11 through the septum 18 into the vial 16 to obtain access to the serum within the vial 16, as illustrated in FIG. 4A.

[0074] In order to transfer serum into the syringe 13, the plunger 15 is extended, withdrawing serum into the syringe 13 in accordance with extent to which the plunger 15 is extended.

[0075] After the serum is withdrawn from the vial 16, the syringe 13, now containing the serum transferred from the vial 16, is withdrawn as shown in FIG. 4B, exposing the sharp needle 11, which is ready for injection of the serum into a patient. After extraction of serum from the vial 16, the vial is discarded. Once again the act of discarding the vial 16 can result in inadvertent needle sticks.

[0076] In order to eliminate the possibility of inadvertent needle sticks at the time the syringe 13 is to be used to withdraw serum from the vial 16, the invention provides a safety shield protector 20 containing a needle 11 within a sterile package 21 shown in FIG. 5A.

[0077] As shown in FIG. 5B, the needle 11 and safety shield protector 20 of the invention have been removed from the sterile package 21 of FIG. 5A, and the needle 11 and protector 20 are attached to an empty syringe 13 shown in FIG. 5C, in standard fashion.

[0078] In preparation for further usage of the assemblage of FIG. 6A, the tamper evident cap 17 of a serum vial 16, as shown in FIG. 3A is removed, and the vial 16 shown in FIG. 3B is positioned, as shown in FIG. 6B, for placement within the safety shield protector 20.

[0079] After the serum vial 16 is inserted into the protector 20, the needle 11 within the protector 20 penetrates the septum 18, with the result shown in FIG. 6C. The contents of the serum vial 16 can then be extracted by withdrawing the plunger 15 of the syringe 13 and then removing the syringe 13 with the extended plunger 15, as shown in FIG. 7A in preparation for injection of the serum into a patient, following which the syringe 13 is returned to the safety shield protector 20, as shown in FIG. 7B.

[0080] A further view of the safety shield protector 20 of the invention, in section with its needle removed, is shown in FIG. 8A, and a distal view of the full sectional protector 20 is shown in FIG. 8B, while a proximal view is shown in FIG. BC. The protector 20 includes a plurality of flexible fingers 21 of which one finger 21-1 is shown in section, and another finger 21-2 is shown in full in the interior of the protector 20. Each of the fingers 21-1 through 21-3 is shown in FIG. 9B. In addition, the fingers 21-1 through 21-3 include a recessed portion 23 for engaging the collar 16-C of the vial 16, illustrated in FIG. 9B. In addition, the fingers 21-1 through 21-3 include a recessed portion 23 for engaging the collar 16-C of the vial 16 after it has passed the trapezoidal ends 22. Extending from the proximal end 24 of the protector 20, is an internal funnel 25 for housing a needle within the protector 20. The funnel 25 has an extended portion 25-E for encircling that portion of the needle away from its sharpened end to the hub position 25-H, where the hub of a needle is encircled and gripped by fingers 26-1 through 26-4. The entry portion of the funnel 25 extends conically to the hub 25-H to facilitate guidance of a needle to within the protector 20.

[0081] A cross-sectional view of the needle cap protector 20 of the invention with an included needle 11, taken along the lines A-A of FIG. 5B, is shown in FIG. 9A. A partial cross-sectional view of a standard vial 16 for insertion into the safety shield protector 20 of FIG. 9A is shown in FIG. 9B, while FIG. 9C is a partial view, partially in cross-section showing a syringe 13 for connection to the needle in the safety shield protector 20 of FIG. 9A.

[0082] FIG. 9D is a composite view showing the standard vial 16 of FIG. 9B, inserted into the distal end of the protector 20 after the collar 16-C of the vial 16 has passed the trapezoidal ends 22 and the collar 16-C has engaged the recesses 23 of the fingers 21-1 through 21-3, so that the sharpened end of the needle 11 has penetrated the septum 18 of the vial 16 positioned within the protector 20. In addition, as shown in FIG. 9D, the tip 13-T of the syringe 13 has been inserted into the cylindrical opening 11-C of FIG. 9A and the Luer threads 13-L have engaged the disk end 11-D of the needle 11 by a threadable connection. After the syringe 13 has been used to remove serum from the vial 16 in FIG. 9D, the syringe 13 with its attached needle 11, is withdrawn against the function fit of the fingers 26-1 through 26-4 and the serum-loaded syringe 13 is ready for use with a patient following which the syringe 13 and needle 11 are returned to the protector 20 of FIG. 9D, and the syringe 13, the protector 20 with the used needle, as shown in FIG. 9D for disposal without any danger of a needle stick. The disposal may be made with or without the empty serum vial 16 attached to the protector 20.

[0083] Full scale drawings of the safety shield protector 20 of the invention, and its component needle 11, partially in section, are shown in FIGS. 10A through 10C.

[0084] FIG. 11A is an enlarged view of the safety shield protector 20 of the invention with the needle 11 removed. The safety shield protector 20 has flexible tabs 21-1 through 21-3, of which one tab 21-3 is shown in FIG. 11A, for the purpose gripping the vial 16 when inserted into the distal end
of the protector 20. The remaining flexible tabs 21-1 and 21-3 are pictured in FIG. 11 B, which is an end view of the safety shield protector 20 of FIG. 11 A taken along the lines B-B. The proximal end view of the safety shield protector 20 of FIG. 11 A taken along the lines C-C, is shown in FIG. 11 C.

[0085] In FIG. 12 A, which is a sectional view of the safety shield protector 20 of FIG. 11 A, a housing 25 in the form of a funnel is shown extending from the distal end where the needle 11 enters and is held in position so that a syringe 13 can be attached.

[0086] A full sectional view taken along the lines B-B of FIG. 12 A, is shown in FIG. 12 B, and a full section view taken along the lines C-C of FIG. 12 A, is shown in FIG. 12 C.

[0087] It will be understood that the foregoing description is illustrative only and that adaptations and modifications may be made without departing from the spirit and scope of the invention as defined in the claims.

1. A safety shield comprising:
   a container having opposed ends;
   means at one end for permitting said container to be positioned on a receptacle;
   means at the opposite end of said container for the attachment of a fillable container; and
   a needle positioned within said container between said opposed ends.

2. A safety shield as defined in claim 1 wherein said container is tubular.

3. A safety shield as defined in claim 1 wherein said means for the attachment of a fillable container comprises means for attaching an empty syringe thereto.

4. A safety shield as defined in claim 1 wherein said means for permitting said container to be positioned on a receptacle comprises means for attaching a serum vial to said container.

5. A safety shield as defined in claim 1 wherein said needle extends within said container near the end where said receptacle is attachable.

6. A safety shield as defined in claim 1 wherein said needle is removably connectable to said end where a fillable container is attachable.

7. A safety shield as defined in claim 4 wherein said serum vial has a tamper-evident cap which is removed and discarded before said vial is attached to said container and is penetrated by said needle.

8. A safety shield as defined in claim 3 wherein said empty syringe is removably connected to said needle within said container.

9. A safety shield as defined in claim 3 wherein said empty syringe is removably connectable with said needle into said container after removal therefrom; thereby to prevent exposure to said needle after the use thereof.

10. A safety shield as defined in claim 1 wherein said container including said needle is placed in said container before being used to attach a vial at one end and a syringe at the opposite end.

11. A method of providing a safety shield for a needle comprising the steps of:
   (a) positioning a needle within a container having opposed ends;
   (b) providing means at one end of said container for permitting it to be positioned on a receptacle; and
   (c) providing means at the opposite end of said container for the attachment of a fillable container.

12. The method as defined in claim 11 further including the step of providing said container as a tubular member.

13. The method as defined in claim 12 further including the step of providing means for the attachment of a fillable container to said tubular member.

14. The method as defined in claim 12, further including the step of providing means for the attachment of an empty syringe to said tubular member.

15. A method of employing a safety shield to protect users of medications dispensable by needles comprising the steps of
   (a) positioning an empty syringe at one end of a tubular member containing a needle; and
   (b) positioning a serum vial at another end of said tubular member.

16. The method as defined in claim 15 further including the step of depressing said serum vial into said tubular member until said vial is penetrated by said needle.

17. The method as defined in claim 16 further including the step of withdrawing serum from said vial by said syringe.

18. The method as defined in claim 17 further including the step of withdrawing said syringe with said needle attached from said tubular member.

19. The method as defined in claim 18 further including the step of repositioning said needle in said tubular member thereby to protect users of said needle from injury therefrom.

20. The method as defined in claim 15 further including the step of sealing said tubular member with said needle therein in a sterile package.

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