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(12) (19) (CA) **Brevet-Patent**

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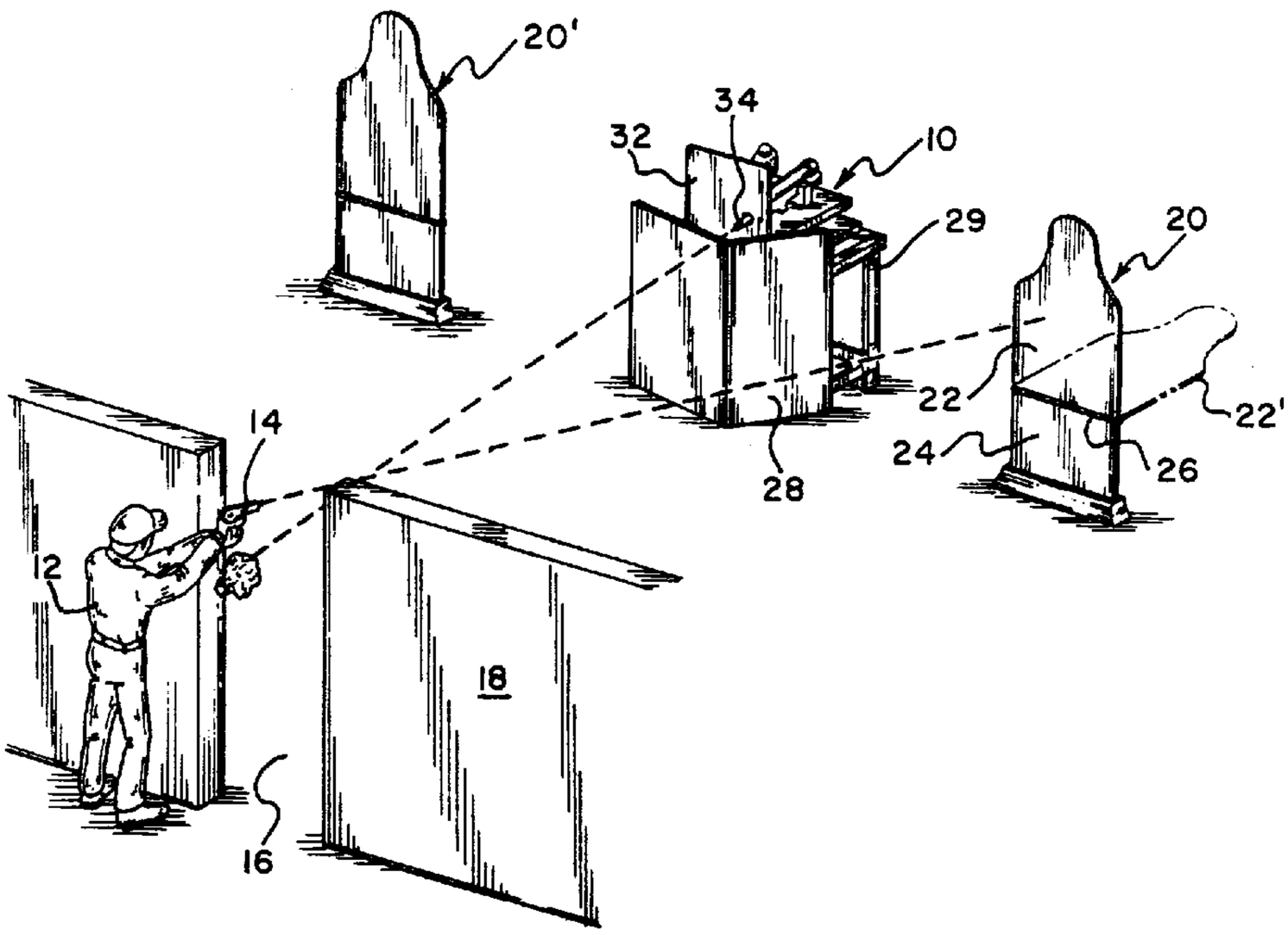
(54) **DISPOSITIF ET METHODE D'ENTRAINEMENT A L'UTILISATION D'ARMES A FEU**

(54) **FIREARM USE TRAINING DEVICE AND METHOD**



(57) Le pistolet à balles de peinture est protégé par un blindage et est équipé de mécanismes de pointage pour qu'il soit possible de le faire pivoter horizontalement, de l'élever ou de l'abaisser au moyen d'actionneurs linéaires obéissant à des dispositifs de commande portatifs placés à distance et se trouvant généralement derrière la personne qui reçoit son instruction au combat avec des armes et qui a pour tâche d'atteindre des cibles situées près du pistolet à balles de peinture tout en évitant d'être touchée par une balle de peinture provenant du pistolet.

(57) A paint ball gun is protected by armor and is equipped with aiming mechanisms to allow the gun to be swiveled horizontally and raised or lowered using linear actuators controlled by hand held controllers distanced from and generally behind a person being trained in armed combat with the task of hitting targets located near the paint gun while avoiding being struck by a paint ball from the gun.

ABSTRACT OF THE DISCLOSURE

A paint ball gun is protected by armor and is equipped with aiming mechanismsto allow the gun to be swiveled horizontally and raised or lowered using linear actuators controlled by hand held controllers distanced from and generally behind a person being trained in armed combat with the task of hitting targets located near the paint gun while avoiding being struck by a paint ball from the gun.

BACKGROUND OF THE INVENTION

This invention involves a training device and method to train a person in a live ammunition fire fight. More specifically, the invention involves a remote controlled projectile firing mechanism wherein the projectiles are harmless but mark the person in training while allowing that person to shoot with live ammunition from a firearm.

In police work and in military situations, hand to hand combat with armed weapons is sometimes necessary. It has long been desirable to train personnel so that they will be ready in case a armed conflict becomes necessary. A number of various training systems have been developed including a special range set up to simulate an actual setting where an armed conflict might occur. The trainee is instructed to move through the simulated scene, such as store fronts or house fronts in the simulated street scene. The trainee who is generally seeking to enter or maintain his or her position on a police force carries a loaded firearm and is instructed to shoot targets which flip up or are exposed as the trainee moves through the "street". Some of the targets are

"friendly" and some of them simulate an immediate threat to life of the trainee, such as brandishing simulated weapons. The trainee is scored as to his or her speed and accuracy in hitting only the threatening targets. Other systems attempt to simulate the scene somewhat like a video game, however the use of a loaded weapon is missing from that type of training. What is needed is a training system and a device that will allow the trainee to use a loaded weapon while learning the skills of avoiding being shot by an armed "bad guy". For the purposes of this patent the term "firearm" is defined as a weapon, such as a small arms weapon, from which a projectile is fired by gun powder or any equivalent weapon that can injure a person from a distance.

A combat training system and apparatus is disclosed in United States Patent No. 4,934,937 to Judd utilizing live ammunition being used by the trainee and simulating enemy fire through the use of a laser connected to the target. In United States Patent No. 4,948,371 to Hall, a system for training and evaluation of security personnel in the use of firearms features a video display with the trainee using an infrared handgun against simulated fire by a person on the scene. In United Stated Patent No. 2,569,594 to Aagesen, a projector is used to provide target reporting information

with pop up targets allowing the trainee to use live ammunition. A target reporting system audibly advising the shooter of the success or failure of hitting the target is described in United States Patent No. 5,095,533; a target indicating a shot scoring system for a firing range is described in United States Patent No. 4,482,325; a miniaturized linear motion and pop-up target training system is described in United States Patent No. 4,340,370; a direct fire weapon simulator using a screen and an illuminator fixed to a screen is described in United States Patent No. 3,889,396; and a training apparatus for firearms use using a motion picture projected onto a screen is described in United States Patent No. 3,849,910.

None of these devices and systems answer the above described need nor attain the objects described herein below.

SUMMARY OF INVENTION

The device and method using the device described herein below allows the use of a firearm with live ammunition in an attempt to hit targets which are close to a remotely operated gun that shoots projectiles that will indicate whether the trainee has been hit, but will not injure the trainee.

It is an object of an aspect of the present invention to provide a device and method which will allow a realistic scenario using the trainees own weapon and ammunition while allowing the trainee to learn how to remain protected and hide from simulated "enemy" fire.

It is an object of an aspect of the present invention to provide a device and method wherein the trainee can be instructed and tested in the use of his or her weapon while under fire including those circumstances where the firearm has a "simulated" jam.

It is an object of an aspect of the present invention to provide a simulated pressure situation wherein there is a simulated

risk to the trainee while he or she is trying to use a firearm with live ammunition, the pressure simulation not being able to be achieved by any other system or device.

A part of the device of this invention is a gun that shoots projectiles that provide an immediate indication of a "hit" on the trainee, but without injuring that trainee. An example of such a device is the well known "paint gun" which shoots round frangible plastic balls filled with paint that break upon impact with little risk to the person being hit. These devices are widely used for war games played by both adults and children. An example of such a gun is described in United States Patent No. 4,936,282 to Gerrold M. Dobbins et al that issued on June 26, 1990 describing a gas powered gun to propel paint containing frangible projectiles. Other patents usable as guns in the present invention are described in United States Patent Numbers 1,854,605, 4,854,294, 1,857,068, 3,345,977, and 5,001,555, and U.K. Patent No. 1,536,672.

An aspect of the invention is a method of training a person in combat that includes arming said person with a

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firearm with live ammunition. The method further includes providing a remotely operated projectile shooting device that includes gun means to shoot harmless projectiles that will mark said person on impact and aiming means to aim the gun means controlled from a remote location. The method also includes providing armor means to protect the remotely operated projectile shooting device from the live ammunition fired from the firearm and locating at least one target proximate the remotely operated projectile shooting device. The method then includes aiming and firing the remotely operated projectile shooting device directing fire of the harmless projectiles at said person and requiring said person to shoot the firearm and hit said target without being hit by a projectile fired from the remotely operated projectile shooting device.

It is preferred that the gun means be a pneumatic powered gun that propels frangible polymeric plastic balls filled with paint. It is preferred that the providing the remotely operated projectile shooting device include providing that the aiming means be to aim the gun means through a horizontal arc. It is also preferred that the providing the remotely operated projectile shooting device

include providing that the aiming means include frame means supporting the gun means, an upper horizontal support panel comprising an upper surface to which the gun means is attached, rotateable means supporting and connecting the upper horizontal support panel to the frame means while allowing the upper horizontal support panel to rotate in a horizontal arc, and first movement means to rotate the upper horizontal support panel in an arc. It is further preferred that the providing remotely operated projectile shooting device include providing that the aiming means include frame means supporting a lower horizontal support panel, an upper horizontal support panel comprising an upper surface to which the gun means is attached, rotateable connection means connecting the upper horizontal support panel to the lower horizontal support panel while allowing the upper horizontal support panel to rotate in a horizontal arc, support means to support the upper horizontal support panel on and allow it to move freely on the lower horizontal support panel, and first movement means to rotate the upper horizontal support panel in arc around the pivot connection means. It is also preferred that the providing the remotely operated projectile shooting device includes providing that the aiming means include frame means supporting a lower horizontal support

panel supporting the gun means, first pivot connection means pivotally connecting a rear end of the lower horizontal support panel on the frame means allowing vertical tilting from horizontal of a front end of the lower horizontal support member, second movement means to raise and lower a front end of the lower horizontal support panel, and second pivot connection means supporting and connecting the second movement means to the front end of the lower horizontal support panel. It is further preferred that the providing the armor means include providing a panel capable of preventing penetration of slugs from the firearm, the panel being connected to the gun means and moveable with the gun means as it is aimed by the aiming means.

Another aspect of this invention is as follows:

A method of training a person in combat comprising:

(A) arming said person with a firearm with live ammunition,

(B) providing a remotely operated projectile shooting device comprising:

(i) a gun that propels harmless frangible polymeric plastic balls filled with paint that will mark said person on impact,

(ii) aiming means to aim the gun means controlled from a remote location comprising:

(a) frame means supporting the gun means,

(b) an upper horizontal support panel comprising an upper surface to which the gun means is attached,

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(c) rotatable means supporting and connecting the upper horizontal support panel to the frame means while allowing the upper horizontal support panel to rotate in a horizontal arc, and

(d) first movement means to rotate the upper horizontal support panel in an arc, and

(iii) feeding means to hold said balls and feed same to said gun,

(c) placing a supply of said balls in said feeding means

Yet another aspect of the invention is a remotely operated gun apparatus that includes gun means to shoot

harmless projectiles that will mark a person on impact and aiming means to aim the gun means. The aiming means includes horizontal control means to adjust a horizontal direction of the aim, vertical control means to adjust a vertical direction of the aim, and remote control means to operate the horizontal control means and the vertical control means from a remote location. The apparatus further includes armor means to protect the gun means, the horizontal control means, and the vertical control means from damage by firearm fire. The armor means includes a panel capable of preventing penetration of slugs fired from a firearm, the panel being connected to the gun means and moveable with the gun means as it is aimed by the aiming means.

It is preferred that the aiming means include frame means supporting the gun means, an upper horizontal support panel comprising an upper surface to which the gun means is attached, rotateable means supporting and connecting the upper horizontal support panel to the frame means while allowing the upper horizontal support panel to rotate in a horizontal arc, and first movement means to rotate the upper horizontal support panel in an arc. It is further preferred that the aiming means include frame means supporting a lower

horizontal support panel, an upper horizontal support panel comprising an upper surface to which the gun means is attached, rotateable connection means connecting the upper horizontal support panel to the lower horizontal support panel while allowing the upper horizontal support panel to rotate in a horizontal arc, support means to support the upper horizontal support panel on and allow it to move freely on the lower horizontal support panel, and first movement means to rotate the upper horizontal support panel in arc around the pivot connection means. It is also preferred that the aiming means include frame means supporting a lower horizontal support panel supporting the gun means, first pivot connection means pivotally connecting a rear end of the lower horizontal support panel on the frame means allowing vertical tilting from horizontal of a front end of the lower horizontal support member, second movement means to raise and lower a front end of the lower horizontal support panel, and second pivot connection means supporting and connecting the second movement means to the front end of the lower horizontal support panel. It is further preferred that the armor means include a panel capable of preventing penetration of slugs fired from a firearm, the armor means being

connected to the gun means and moveable with the gun means as it is aimed by the aiming means.

Yet another aspect of this invention is as follows:

A method of training a person in combat comprising:

(a) arming said person with a firearm with live ammunition,

(b) providing a remotely operated projectile shooting device comprising;

(i) gun means to shoot harmless projectiles, and

(ii) feeding means to hold the projectiles and feed the projectiles to said gun means,

(c) placing a supply of the projectiles in the feeding means,

(d) providing armor means to protect the remotely operated projectile shooting device from the live ammunition fired from the firearm,

(e) locating at least one target proximate the remotely operated projectile shooting device,

(f) aiming and firing the remotely operated projectile shooting device thereby projecting the harmless projectiles, and

(g) requiring the person to shoot the firearm and hit the target without being hit by a projectile fired from the remotely operated projectile shooting device.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view illustrating a method of use of the invention.

FIG. 2 is a front elevational view of an apparatus of the present invention with armor plates 28 and 32 removed.

FIG. 3 is a cross sectional view taken along lines 3-3 of Fig. 2.

FIG. 4 is a perspective view of controllers used therein.

FIG. 5 is a side elevational view thereof with taken along lines **5-5** of Fig. 2.

DESCRIPTION OF PREFERRED EMBODIMENTS

In Fig. 1, apparatus 10 is positioned to have trainee **12** within it's range of fire. Trainee **12** is aiming firearm **14** through opening **16** in wall **18** at target **20**. Target **20** is a standard type of knock down target with upper section **22** hingeably attached along with hinge **26** to lower base section **24**. Upper section **22** has a picture of a person (not shown) exhibiting a life threat to trainee **12**. When upper section **22** is struck with a slug, it is knocked down to the position shown as shadow view **22'** of the upper section. Additional targets may be used, such as target **20'** essentially identical to target **20**, but positioned on an opposite side to device **10**. Apparatus **10** has one quarter inch steel armor plate **28** supported on frame support **29**. A variety of armor plate constructions may be utilized and "V" shaped, 1/2 inch thick armor plate combination **28** rests on the ground to protect apparatus 10 from stray fire. Gun barrel **34** extends through movable armor plate **32** which protects the upper portion of apparatus **10**. The steel of plate **32** can be replaced by a bullet proof vest type of

construction utilizing KEVLAR® fiber composite construction to reduce weight and improve the portability of the device. It is intended that the targets will be easily observeable while the firing device will be positioned slightly behind the target and of a more neutral background color. With appropriate camoflage coating, device apparatus **10** will be virtually invisible so that only wild shots might strike the apparatus. As shown in Figs. 2 and 5 frame support including members **30** and **49** of base frame **31** are of heavy angle iron construction. Table panel **38** is supported at the top of the rear vertical support members **30** connected through rear pivot connection pins to rear horizontal frame member **49**. Eye bolts **52** bolted to two lower ends of members **30** and eye bolts **51** bolted to horizontal member 49 are aligned to receive hinge pins **50**. This pivot connection allows table **38** to tilt up and down from the horizontal thus aiming gun **46** vertically. The front of table panel **38** is supported by piston **54** extending vertically from Warner Electric linear actuator **56**. An upper end of piston **54** of actuator **56** is connected through pivot connection **58** to eye member **52** extending from table **38**. The base of actuator **56** is connected to the base frame **31** section of the frame support. Linear actuator **56** is electrically connected through wire

connections **60** to vertical switch box **62** and is powered by twelve volt battery **64** connected through wires **65**. Switch box **62** contains heavy duty "winch type" electronic switches which are electrically connected through wires **66** to hand held remote controller **72** as shown in Figs. 2 and 4. Likewise controller wires **68** connect horizontal switch box **70** to hand controller **72** equipped with vertical switch **73** and horizontal switch **71** and direction switches **74** and **76**. When vertical switch **73** is depressed and button **76** is depressed, piston **54** is moved vertically upward by actuator **56** to incline panel **38** at a chosen angle to aim barrel **34** in the proper vertical direction. Likewise, depressing button **74** while holding down switch **73** will tilt panel **38** downwardly. Similarly, depressing horizontal switch **71** will move barrel **34** horizontally left when button **74** is depressed and horizontally right when button **76** is depressed. Linear actuator **80** is electrically connected through wires **81** to switch box **70**, which is controlled through wires **68** by controller **72**. This latter movement is accomplished by providing gun **46** held by bracket **104** on upper support panel **40** supported on wheels **42** which run on the upper surface of panel **38** as shown in Fig. 2. Wheels **42** are connected through wheel bracket **44** to the bottom surface of upper support panel

40. The horizontal movement of gun **46** is accomplished by rotating panel **40** in a 15 degree arc to the left and a 15 degree arc to the right pivoting on central pivot pin connection **78** which connects panel **40** with table panel **38** allowing panel **40** to rotate on wheels **42**. The movement is accomplished by linear actuator **80** which is identical to unit **56**. The rear end of actuator **80** is connected through pivot connection **84** to upper side edge of frame member **36** which supports panel **38** and also tilts upwardly and downwardly by movement of actuator **56**. Piston **82** of actuator **80** is connected through a pivot connection hidden in this view to the underside of panel **40** about 2 to 5 inches away from pivot pin **78** with a connection mechanism similar to pivot connection **84**. Thus, as shown in Fig. 2, movement outwardly of piston **82** by actuator **80** moves barrel **34** to the left while movement of piston **82** by actuator **80** moves barrel **34** to the right. Gun **46** has magazine **48** which provides a continuous supply of paint balls. Gun **46** is a slightly modified Model 68 Special from Tippmann Pneumatic, Inc. of Fort Wayne, Indiana powered through pressure line **108** from cardon dioxide pressure cylinder **106**. As shown in Figs. 3 and 5 the trigger guard has been removed allowing rubber head **86** of solenoid **88** to strike trigger **90** when actuated by

current supplied through wires **96** connected into a 110 volt AC source to transformer **94** and wires **92**. Trigger remote controller **100** is connected through wires **98** which momentarily provides current from series capacitors **110** to solenoid **88** pushing trigger **90** to fire gun **46**. The return spring of trigger **90** easily returns head **86** of the solenoid against stop **102** since the current to the solenoid is only momentary. The solenoid is a twenty-four volt fifty OHM unit from Guardian Electronics.

Although the system shown is all hard wired, it should be clear that the remote controller may utilize electronic signals to direct movement of the gun and fire the gun. Controllers used for toy cars and the like may be utilized.

While this invention has been described with reference to specific embodiments disclosed herein, it is not confined to the details set forth and the patent is intended to include modifications and changes which may come within and extend from the following claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A method of training a person in combat comprising:

(a) arming said person with a firearm with live ammunition,

(b) providing a remotely operated projectile shooting device comprising:

(i) gun means to shoot harmless projectiles that will mark said person on impact,

(ii) aiming means to aim the gun means controlled from a remote location, and

(iii) feeding means to hold said projectiles and feed same to said gun means,

(c) placing a supply of said projectiles in said feeding means,

(d) providing armor means to protect the remotely operated projectile shooting device from the live ammunition fired from the firearm,

(e) locating at least one target proximate the remotely operated projectile shooting device,

(f) aiming and firing the remotely operated projectile shooting device directing fire of the harmless projectiles at said person, and

(g) requiring said person to shoot the firearm and hit said target without being hit by a projectile fired from the remotely operated projectile shooting device.

2. The method of claim 1 wherein providing the remotely operated projectile shooting device further comprises providing that the gun means be a pneumatic powered gun that propels frangible polymeric plastic balls filled with paint.

3. The method of claim 1 wherein providing the remotely operated projectile shooting device further comprises providing that the aiming means be to aim the gun means through a horizontal arc.

4. The method of claim 1 wherein providing the remotely operated projectile shooting device further comprises providing that the aiming means comprises:

(a) frame means supporting the gun means,

(b) an upper horizontal support panel comprising an upper surface to which the gun means is attached,

(c) rotateable means supporting and connecting the upper horizontal support panel to the frame means while allowing the upper horizontal support panel to rotate in a horizontal arc, and

(d) first movement means to rotate the upper horizontal support panel in an arc.

5. The method of claim 1 wherein providing the remotely operated projectile shooting device further comprises providing that the aiming means comprises:

(a) frame means supporting a lower horizontal support panel,

(b) an upper horizontal support panel comprising an upper surface to which the gun means is attached,

(c) rotateable connection means connecting the upper horizontal support panel to the lower horizontal support panel while allowing the upper horizontal support panel to rotate in a horizontal arc,

(d) support means to support the upper horizontal support panel on and allow it to move freely on the lower horizontal support panel, and

(e) first movement means to rotate the upper horizontal support panel in arc around the pivot connection means.

6. The method of claim 1 wherein providing the remotely operated projectile shooting device further comprises providing that the aiming means comprises:

(a) frame means supporting a lower horizontal support panel supporting the gun means,

(b) first pivot connection means pivotally connecting a rear end of the lower horizontal support panel on the frame means allowing vertical tilting from horizontal of a front end of the lower horizontal support member,

(d) second movement means to raise and lower a front end of the lower horizontal support panel, and

(e) second pivot connection means supporting and connecting the second movement means to the front end of the lower horizontal support panel.

7. The method of claim 1 wherein providing the armor means further comprises providing a panel capable of preventing penetration of slugs from the firearm, the panel being connected to the gun means and moveable with the gun means as it is aimed by the aiming means.

8. A method of training a person in combat comprising:

(A) arming said person with a firearm with live ammunition,

(B) providing a remotely operated projectile shooting device comprising:

(i) a gun that propels harmless frangible polymeric plastic balls filled with paint that will mark said person on impact,

(ii) aiming means to aim the gun means controlled from a remote location comprising:

(a) frame means supporting the gun means,

(b) an upper horizontal support panel comprising an upper surface to which the gun means is attached,

(c) rotatable means supporting and connecting the upper horizontal support panel to the frame means while allowing the upper horizontal support panel to rotate in a horizontal arc, and

(d) first movement means to rotate the upper horizontal support panel in an arc, and

(iii) feeding means to hold said balls and feed same to said gun,

(c) placing a supply of said balls in said feeding means,

(D) providing armor means to protect the remotely operated projectile shooting device from the live ammunition fired from the firearm, the armor means comprising a panel capable of preventing penetration of slugs fired from the firearm, the panel being connected to the gun means and moveable with the gun means as it is aimed by the aiming means,

(E) locating at least one target proximate the remotely operated projectile shooting device,

(F) aiming and firing the remotely operated projectile shooting device directing fire of the harmless projectiles at said person, and

(G) requiring said person to shoot the firearm and hit said target without being hit by a projectile fired from the remotely operated projectile shooting device.

9. A remotely operated gun apparatus comprising:

(a) gun means to shoot harmless projectiles that will mark a person on impact,

(b) aiming means to aim the gun means comprising:

(i) horizontal control means to adjust a horizontal direction of the aim,

(ii) vertical control means to adjust a vertical direction of the aim, and

(iii) remote control means to operate the horizontal control means and the vertical control means from a remote location, and

(c) armor means to protect the gun means, the horizontal control means, and the vertical control means from damage by firearm fire,

wherein the armor means comprises a panel capable of preventing penetration of slugs fired from a firearm, the panel being connected to the gun means and moveable with the gun means as it is aimed by the aiming means.

10. The apparatus of claim 9 wherein the gun means comprises a pneumatic powered gun that propels frangible polymeric plastic balls filled with paint.

11. The apparatus of claim 9 wherein the aiming means further comprises:

(a) frame means supporting the gun means,

(b) an upper horizontal support panel comprising an upper surface to which the gun means is attached,

(c) rotateable means supporting and connecting the upper horizontal support panel to the frame means while allowing the upper horizontal support panel to rotate in a horizontal arc, and

(d) first movement means to rotate the upper horizontal support panel in an arc.

12. The apparatus of claim 9 wherein the aiming means further comprises:

(a) frame means supporting a lower horizontal support panel,

(b) an upper horizontal support panel comprising an upper surface to which the gun means is attached,

(c) rotateable connection means connecting the upper horizontal support panel to the lower horizontal support panel while allowing the upper horizontal support panel to rotate in a horizontal arc,

(d) support means to support the upper horizontal support panel on and allow it to move freely on the lower horizontal support panel, and

(e) first movement means to rotate the upper horizontal support panel in arc around the pivot connection means.

13. The apparatus of Claim 9 wherein the aiming means further comprises:

(a) frame means supporting a lower horizontal support panel supporting the gun means,

(b) first pivot connection means pivotally connecting a rear end of the lower horizontal support panel on the frame means allowing vertical tilting from horizontal of a front end of the lower horizontal support member,

(c) second movement means to raise and lower a front end of the lower horizontal support panel, and

(d) second pivot connection means supporting and connecting the second movement means to the front end of the lower horizontal support panel.

14. A method of training a person in combat comprising:

(a) arming said person with a firearm with live ammunition,

(b) providing a remotely operated projectile shooting device comprising;

(i) gun means to shoot harmless projectiles, and

(ii) feeding means to hold the projectiles and feed the projectiles to said gun means,

(c) placing a supply of the projectiles in the feeding means,

(d) providing armor means to protect the remotely operated projectile shooting device from the live ammunition fired from the firearm,

(e) locating at least one target proximate the remotely operated projectile shooting device,

(f) aiming and firing the remotely operated projectile shooting device thereby projecting the harmless projectiles, and

(g) requiring the person to shoot the firearm and hit the target without being hit by a projectile fired from the remotely operated projectile shooting device.

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Fig. 1

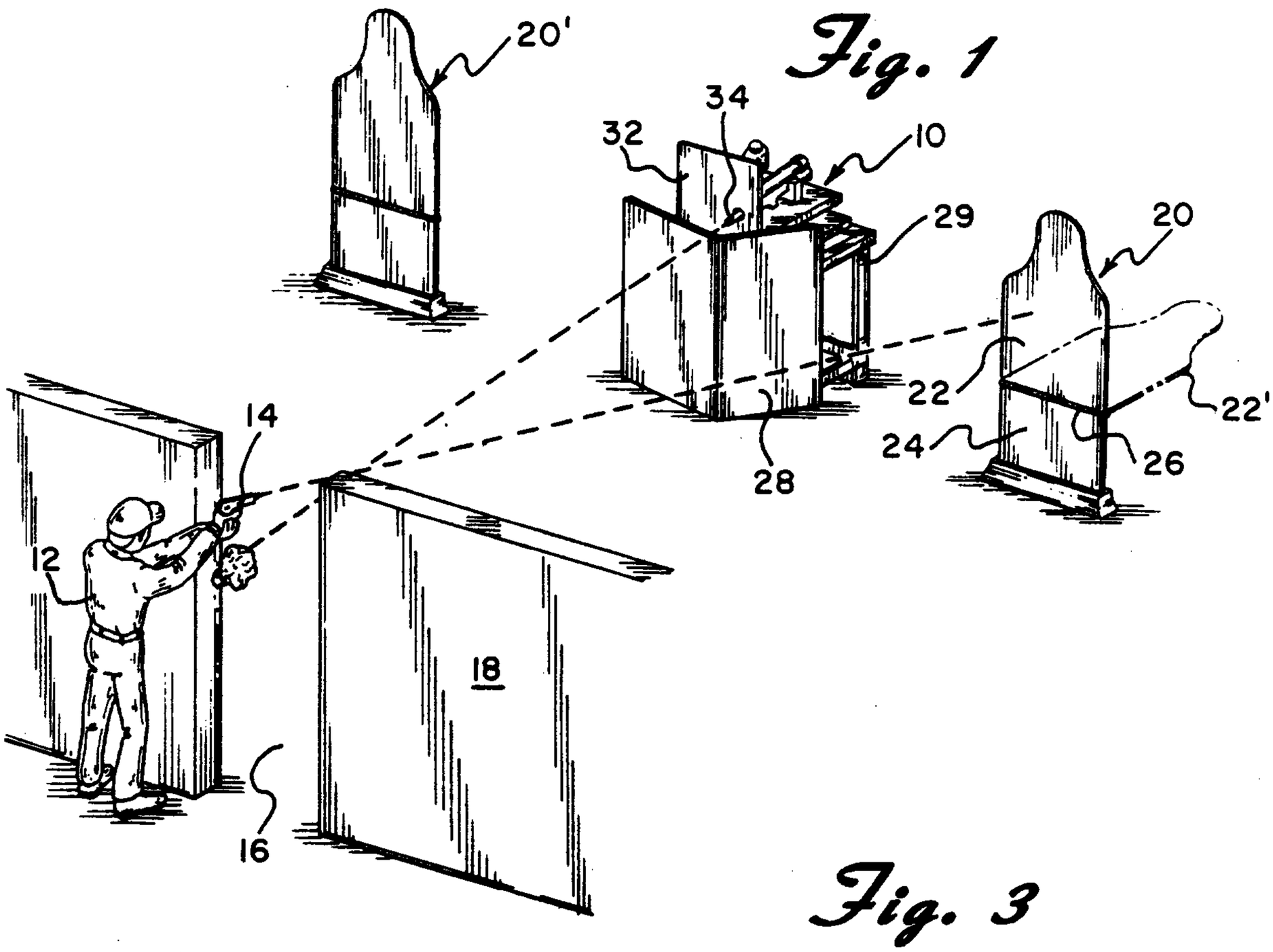
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Fig. 3

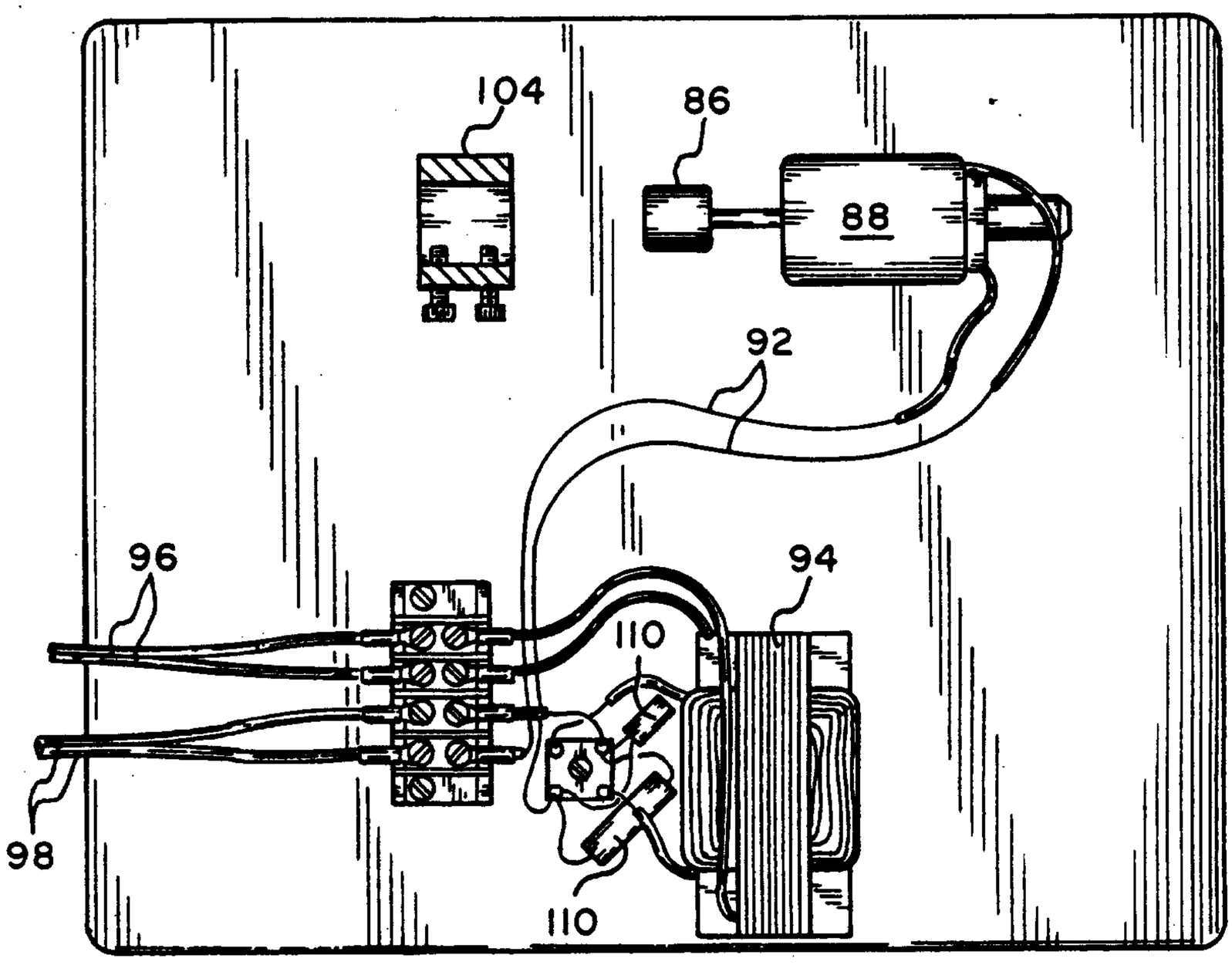
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Fig. 2

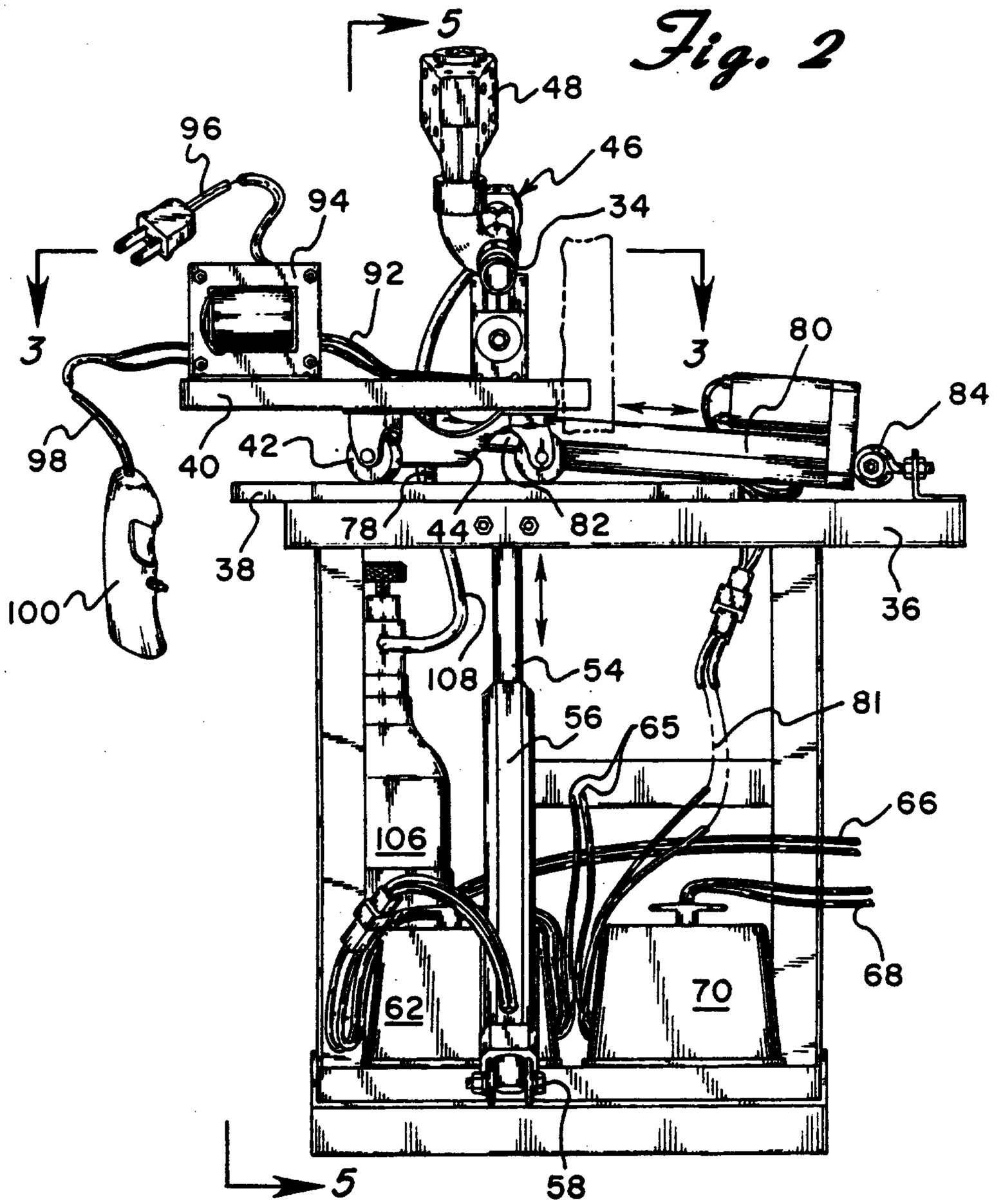
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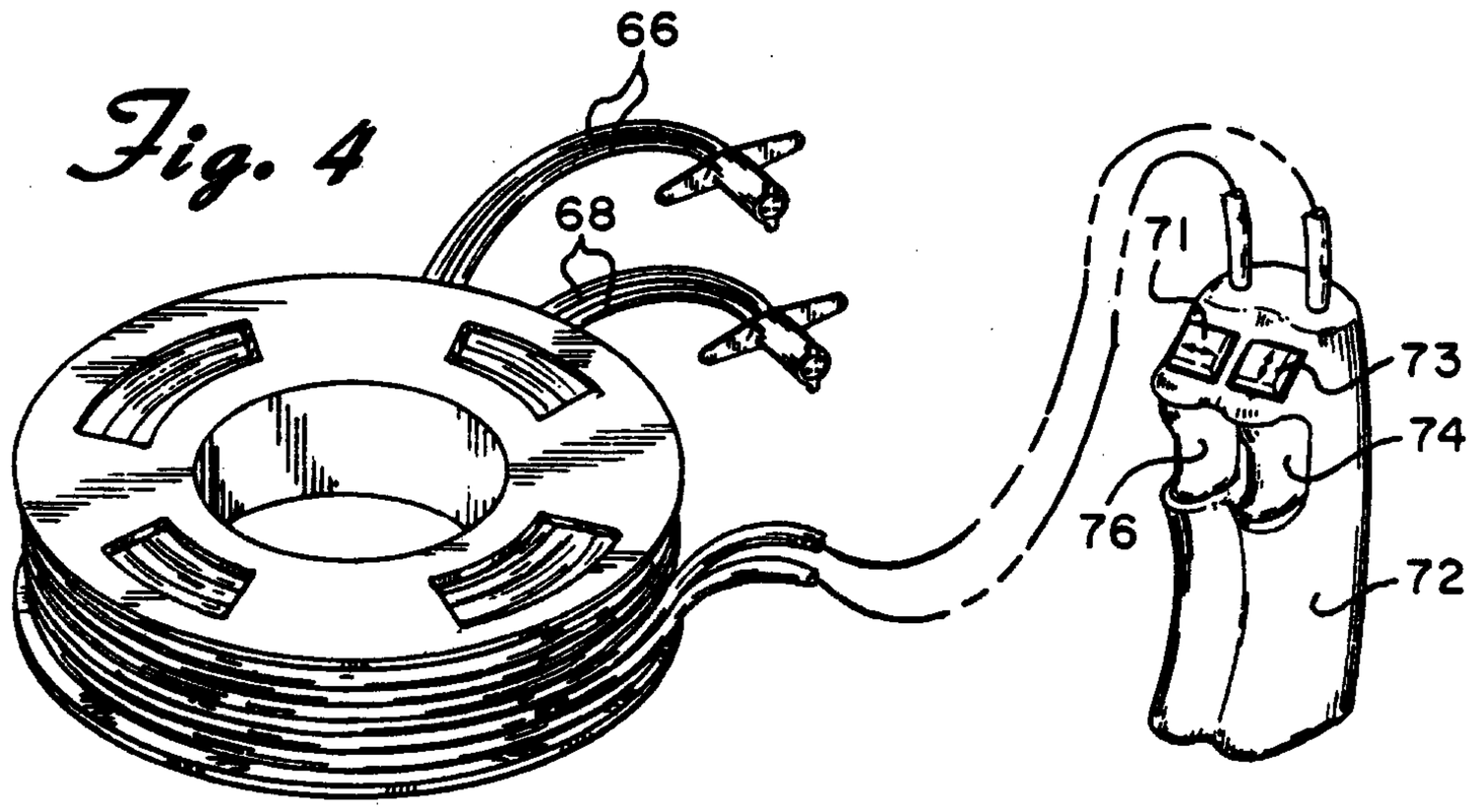
Fig. 4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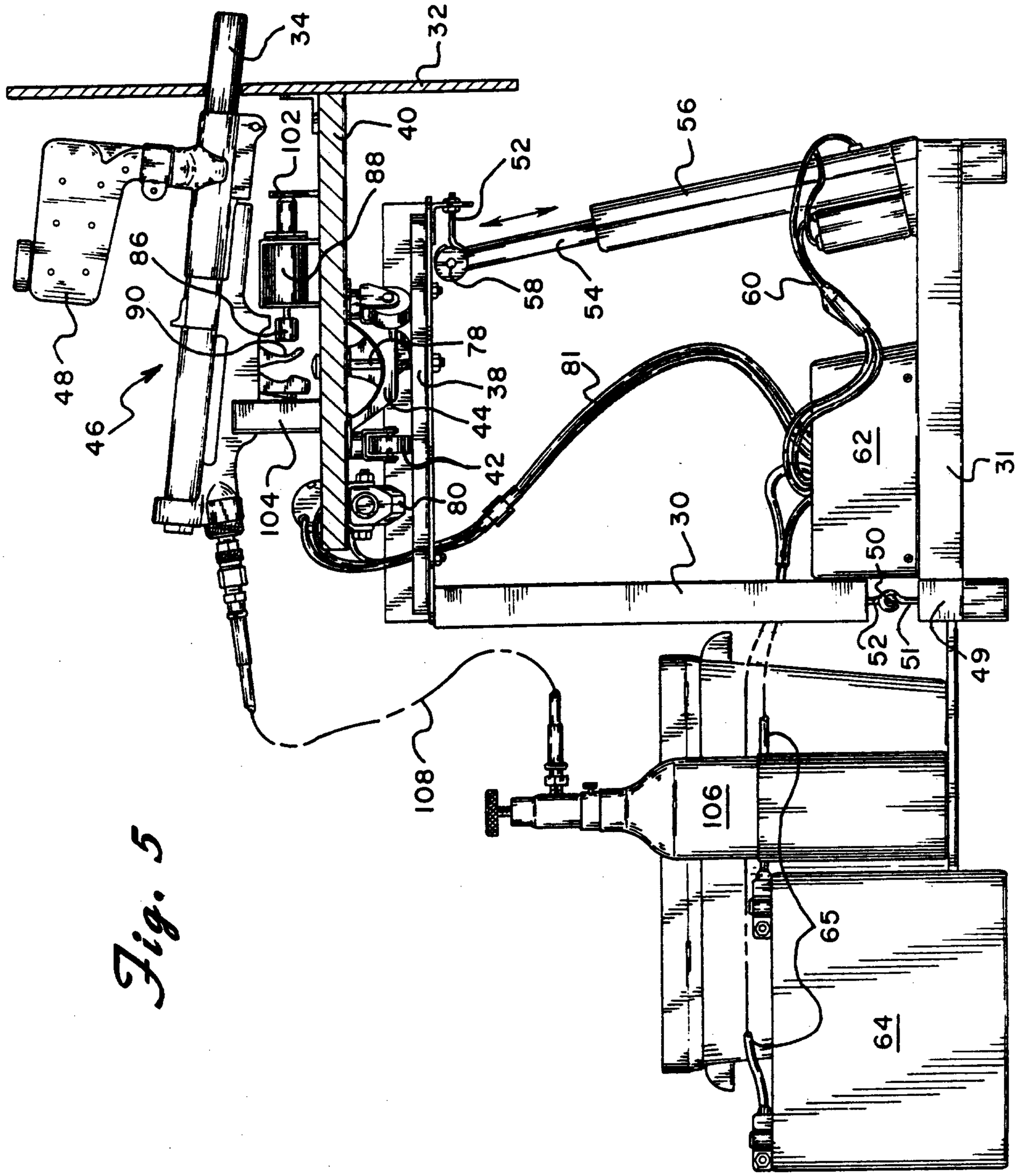
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Fig. 5