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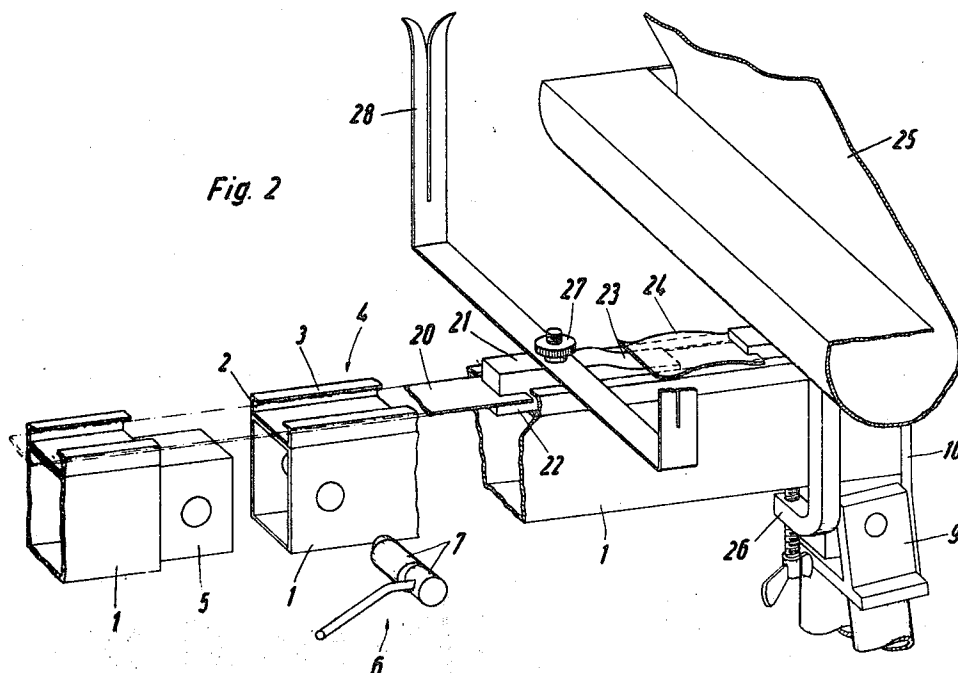
[54] **TRANSPORTABLE TARGET CARRIER**
 6 Claims, 6 Drawing Figs.

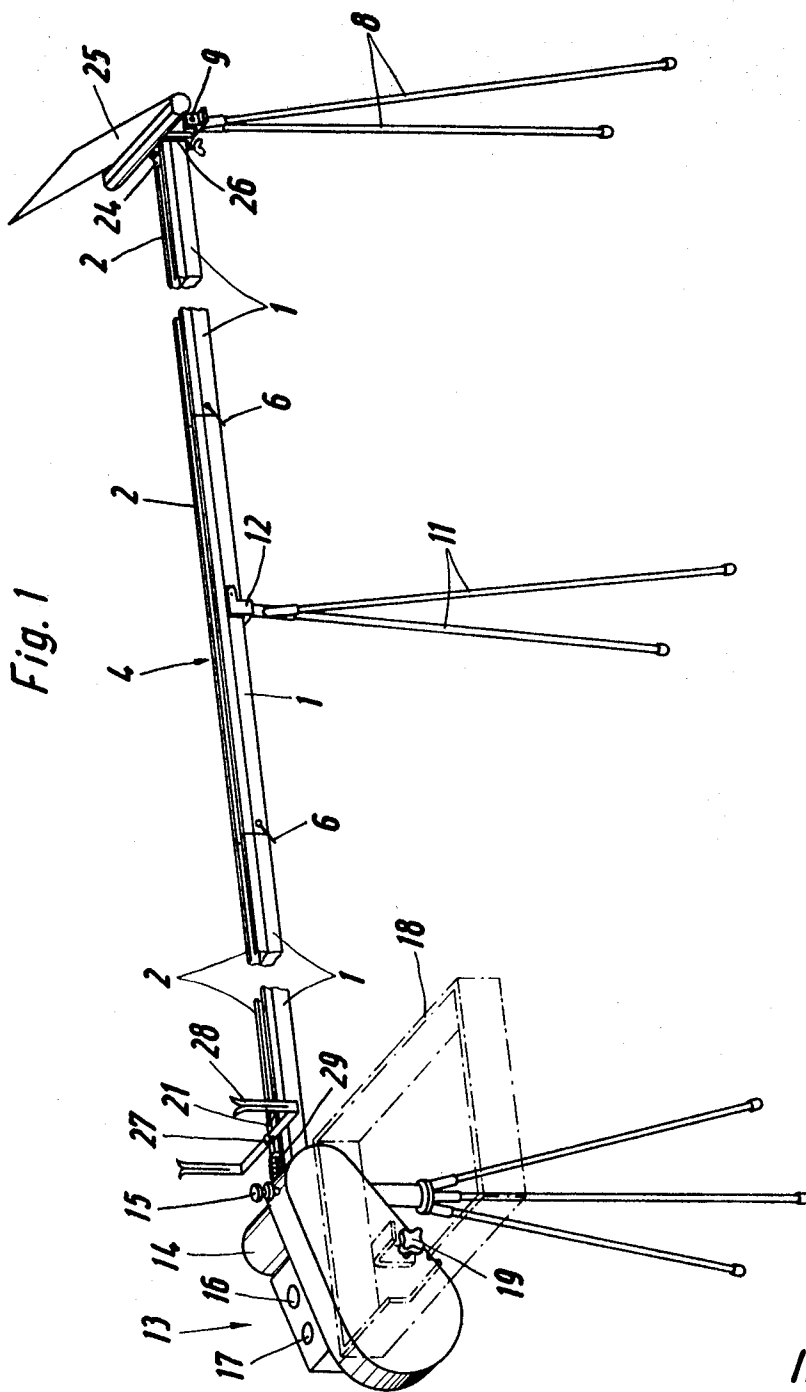
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[56] **References Cited**
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ABSTRACT: A target-shooting installation wherein the shooter in a shooting station shoots at a target in a target station. A rail extends between the stations and a carriage moveable on the rail supports the target. A drive arrangement at the shooting station end of the rail is connected with the carriage by a flexible element extending along the rail so the shooter can move the target from the target station to the shooting station and vice versa.





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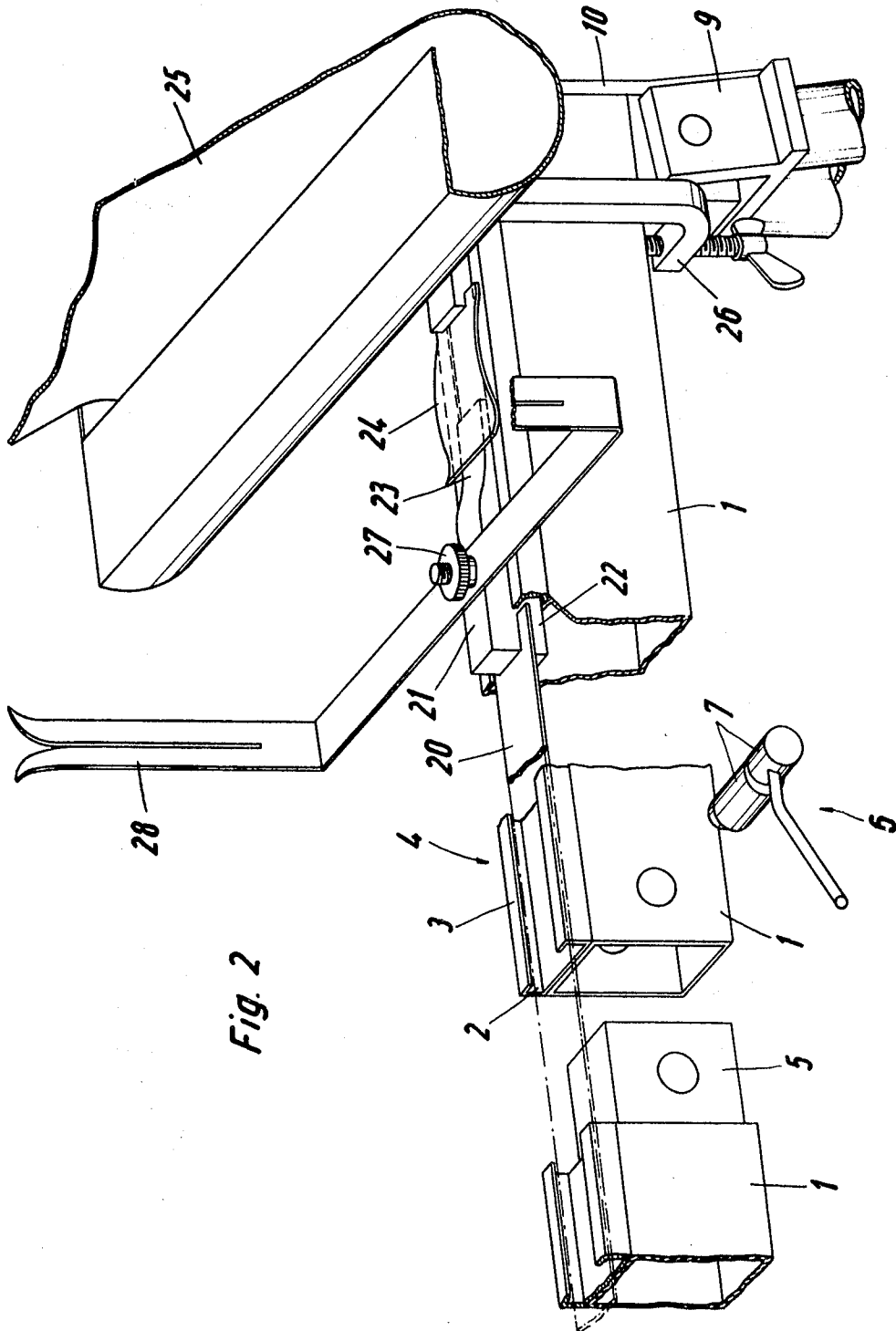


Fig. 2

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Fig. 3

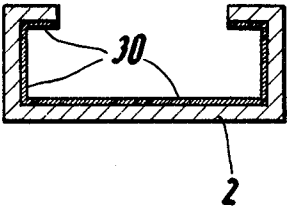


Fig. 4

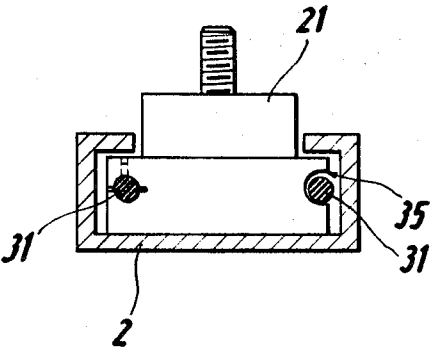


Fig. 5

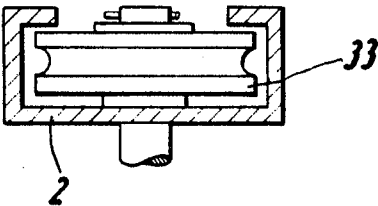
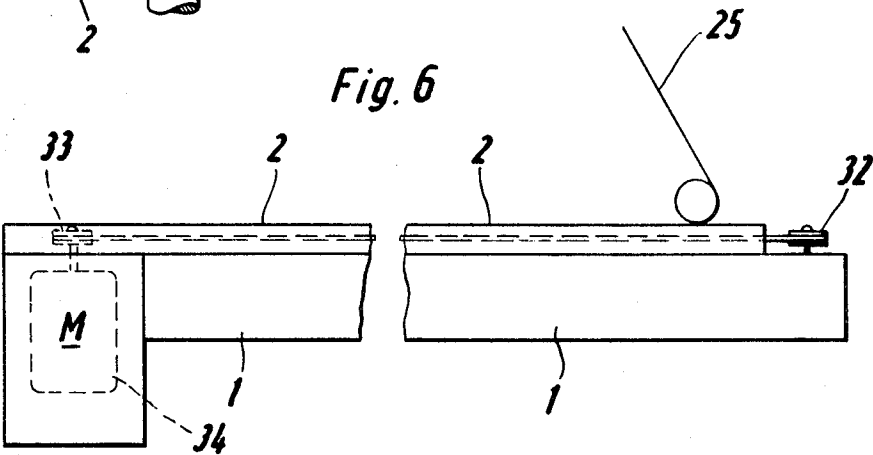


Fig. 6



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TRANSPORTABLE TARGET CARRIER

The present invention relates to a transportable target installation which comprises a target carrier movable between the desired target location and the firing stand. Customarily, for purposes of moving the target carrier between the desired target location and the firing stand, supporting cables are strung on which a cable carriage can be displaced by means of an endless cable extending from the firing stand to the target location. The supporting cables carrying the cable carriage with target disc will have to be highly taut in order to assure that the arrangement will function at the customary high driving speeds of the cable carriage and also in windy weather on the outside. In order to be able to absorb such strong cable pulling stresses, with stationary installations, the frame structure supporting the supporting cables is anchored in heavy armed concrete. Inasmuch as such frame structure will then no longer yield, resilient members have to be inserted into the supporting cables so that changes in length brought about by temperature variations will not cause too high tensioning tolerances. The entire installation will thus be relatively heavy so that in general it cannot be disassembled. The sensitive steel cables with their spring links thus are continuously exposed to wind and weather and consequently require frequent servicing.

Transportable target-pulling installations are known for instance for placing the same in recreation halls or other large rooms in which instance the supports for the supporting cables have to be fastened to parts of the building for instance to the wall or the bottom of the building. Such fastening is not only rather cumbersome and time consuming but is frequently not possible at all inasmuch as the connecting points in view of the high cable-pulling stresses have to be made very stable and as a rule such cable-receiving members cannot be connected to the wall or the bottom of the building without damaging the same. Furthermore, the mounting of such transportable target pulling installations, even if prepared connecting elements are available, is always rather difficult because the high cable-pulling stresses require not only heavy structural members but also bring about a rather difficult assembly in view of the additional mounting of tensioning elements etc. In this connection, it should also be taken into consideration that the supporting cables as well as the pulling cable extend to a different extent so that each time the installation is mounted at a different place, a new adjustment is to be effected.

With shooting installations for short distances for instance when shooting by an air rifle, it is known to do entirely away with the supporting cables and to arrange the target discs on an endless pulling rope. At the location of the target or at the firing stand, the discs have their lower side engage a ramp whereby they are arrested. It is a matter of course that to such pulling rope, the same remarks apply as set forth above for the supporting cables of larger shooting installations. In order to be able properly to support the target carrier and to lead the same to the ramps, the pulling cable has to be relatively strongly tensioned so that approximately the same difficulties apply to the assembly and disassembly of the installation as are encountered with larger installations.

It is furthermore known to avoid the drawbacks inherent to the stable anchoring of the supporting cables by equipping the frame parts which carry the supporting cables or ropes, at both ends of the cable or rope with claw-shaped feet extending in the direction of the cable or rope. The turning point of the frames displaced further ahead will permit a slight anchoring of the framework and, more specifically, a slight anchoring toward the rear in the ground or on the bottom of a building; however, also these improved frameworks require expensive connecting means. The various cables are again and again to be postadjusted in order to assure a proper functioning.

It is an object of the present invention to provide a transportable shooting installation which will overcome the above-mentioned drawbacks.

This object and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 shows an isometric view of the entire arrangement with the profile rail broken at several places.

FIG. 2 is an exploded view of the target-receiving device.

FIG. 3 illustrates a cross section through a profile rail.

FIG. 4 is a cross section of the profile rail near the front edge of the carriage.

FIG. 5 illustrates a cross section through the profile rail near a pull cable driving sheave.

FIG. 6 illustrates the starting and end point of the installation with pull cable displacement of the carriage.

The above-outlined drawbacks inherent to heretofore known shooting installations have been overcome by the transportable shooting installation according to the invention which comprises a target-disc carrier movable between the intended target location and the firing stand, said shooting installation according to the invention being characterized primarily in that the target-disc carrier is formed by a displaceable carriage which is guided in a profile rail and is operable from the firing stand.

The guiding of the target carrier thus is no longer brought about by supporting cables or the like but by a profile rail extending from the firing stand to the target stand. The length of the profile rail is for practical purposes established with sufficient precision. Changes in the length caused by temperature variations are merely a few thousandths of the total length so that from a purely logistic standpoint they are completely without significance.

The profile rail is advantageously formed of a box-shaped light metal profile and of a profiled rail adapted to be mounted on said light metal profile. The box profile serves as supporting structural element, whereas the profiled rail serves as guiding element. Both profile shapes are obtainable commercially so that this core member of the firing installation according to the invention can be produced at relatively low costs.

Particularly for larger distances between the firing stand and the target location, it is important to hold the friction between the profile rail and the carriage or the element to be displaced relatively low. It is also feasible to equip the carriage with ball-journalled rollers so that between the displacing element and the inner surface of the profile rail a sliding friction will occur. In order to keep this sliding friction as small as possible, it is advantageous to provide the sliding surfaces of the profile with a sliding cover, for instance, of synthetic material such as polytetrafluorethylene.

The displacement of the carriage may be effected for instance by means of a flexible steel band guided in the profile rail. The steel band will be displaced by means of a winch to be advanced or retracted. Such winch may be actuated manually or by electric motor. At any rate, it is advantageous to drive said winch by means of a self-locking transmission in order to prevent an undesired displacement of the carriage in the profile rail. When using an electric motor as drive, between the drive shaft of the motor and the drive shaft for the winch there may be inserted a torque-limiting slip clutch which prevents an overload of the motor according to the invention after the carriage has moved into its end position. In view of the self-locking transmission, the carriage will stop at the abutment while tensioning the steel band, whereby further steps for holding or mounting the target carrier will become superfluous. Inasmuch as the target carrier is by means of the carriage always exactly guided on the profile rail, the ramps which are necessary under all circumstances in connection with disc-pulling installations will be superfluous. In this connection, it may be mentioned that the carriage is pushed from the firing stand to the target location, changes in the length of the individual parts are entirely irrelevant with regard to the function of the shooting installation according to the invention. The target carrier is by means of the steel band moved toward the target location until it hits an abutment at said target location. Changes in the length of the profile rail or the

steel band are in this way entirely eliminated. Similar remarks also apply to the return movement of the guiding disc carrier while the carriage is retracted by the steel band until it abuts the firing stand. In order also with a worn-out transmission to avoid a slipping back of the transmission to the target area, the front side of the carriage may be provided with a clamping surface which at the target location is introduced into a clamping support. This clamping support may in conformity with the present invention be connected to a butt and may be inserted at any desired area into the profile rail.

A further possibility of displacing the carriage in conformity with the present invention consists in guiding the carriage by means of an endless pulling cable or rope guided in the profile rail, said endless cable or rope being guided by reversing rollers adapted to be mounted at the ends of the profile rail. This pull cable arrangement by means of an endless pulling cable and two reversing rollers can be employed in a particularly simple manner with the device according to the invention because the distance between the firing stand and the target location is fixed unequivocally by the profile rail. Changing links or spring links for the pull rope are not necessary.

Referring now to the drawings in detail, the profiled rail 2 is open toward the top and has inwardly bent guiding sections 3. The profile rail 4 which comprises a supporting rail 1 and a profiled rail 2 is composed of a plurality of sections. The said sections are put together by means of fitting blocks 5 at one end of said sections, which blocks engage the interior of the supporting rail 1. By means of a handle 6 with eccentric friction surfaces 7, a stable connection of the individual members will be assured. The profile rail 4 is at the target location supported by a support 8 which, as is clearly shown in FIG. 2, may be folded away into the plane of the profile rail 4. Moreover, the two supporting legs may also be folded up or may be pulled out of the bearing 9 connected to the profile rail 4. An accidental folding up of the supports 8 is prevented by an abutment 10 on the profile rail 1. Of a similar design is an intermediate support 11 which is located in about the central area of the profile rail 4 and is provided with a bearing 12 adapted to be folded into the plane of the profile rail 4. The supporting legs 11 may, if desired, be pulled out of the bearing 12.

At the firing stand, the profile rail 4 is inserted into a winch 13 which is supported by a tripod T. The device 13 may be turned on the tripod T so that a simple alignment of the profile rail will be possible. The device 13 comprises an electric motor 14 which through a self-locking transmission the locking mechanism of which may, if desired, be adjusted by screws 15, and through a slip clutch drives a winch. The motor 14 may be turned on and off by pushbuttons 16 and 17. With the particular arrangement shown in FIG. 1, the winch housing has connected thereto a depositing box 18 which by means of a wing nut 19 or the like is connected to said winch housing. Wound onto the winch 13 is steel band 20 having connected thereto a carriage 21. The carriage 21 is provided at both sides with guiding edges 22 which engage the surrounding parts 3 of the profiled rail 2. At the front end of the carriage 21 there is provided a clamping surface 23 which at the target location extends below the clamping spring 24 of a clamping block 24a. The clamping spring 24 is together with a butt 25 connected to the profile rail 4 by means of a screw clamp 26. A card holder 28 is mounted on the carriage 21 by means of a knurled screw 27.

When actuating the push button 16, the electric motor 14 is so excited that through the intervention of the winch 13 it displaces the steel band 20 and thereby also the carriage 21 of the profile rail 4 to the target place. When the carriage 21 has arrived at the target place, its clamping portion 23 wedges itself underneath the clamping spring 24 so that it will be firmly held in its position. Damage to the electric motor 14 is prevented by means of the slip clutch interposed between the shaft of the electric motor and the shaft of the winch 13. Inasmuch as the transmission between the electric motor and the winch 13 is self-locking, also an abutment at the target

place would suffice because the self-locking transmission will prevent a slipping back of the steel band. The clamping device 23, 24 will assure that the target will always be held in the predetermined distance.

For purposes of withdrawing the target disc, the pushbutton 17 is actuated whereby the electric motor 14 by means of the winch draws back the steel band and thereby the carriage 21 with the target disc mounted thereon is via the profile rail 4 again returned to the device 13. The device 13 is equipped with a resilient abutment 29 which will prevent damage to the carriage 21 and the device 13. It is a matter of course that, if desired, limit switches may be provided at the target place and also at the firing stand and may be actuated by the carriage 21 so that faulty operations and too high a load on the slip clutch will safely be avoided.

FIG. 3 shows the cross section through the profiled rail 2 while the inner wall of the rail 2 is provided with a sliding liner 30 for instance of Teflon for improving the sliding ability of the carriage 21 and the pulling medium, especially the steel band 20. If desired, this sliding liner or layer may be provided merely on the bottom of the profiled rail 2 which bottom is most subjected to friction pressure whereby already a considerable reduction in the friction between the carriage 21 and the profiled rail 2 will be effected.

FIGS. 4-6 illustrate a further possibility of displacing the carriage 21. Within the profiled rail 2 there is provided an endless pulling rope or cable 31 one section of which is connected to the carriage 21 and by means of deviating rollers 32 is guided at the ends of the installation. Instead of the deviating rollers 32 at the ends of the installation, at least on one side there may be provided a driving roller 33 which is connected to a motor 34. The endless pulling rope slides in a recess 35 of the carriage 21 in such a way that the movements of the carriage 21 will not be interfered with. Expediently, the pulling rope 31 may be an elastic nylon rope which when turning off the drive 34 will by means of its elasticity press the carriage 21 against the end abutment.

Inasmuch as the profile rail 4 is composed of sections, and since furthermore the supports 8, 11, 14 are adapted to be taken apart, the individual elements of the shooting installation according to the invention can easily be transported. This easy transportability is furthermore aided by the fact that the essential elements may be made of light metal. At the place of use it is merely necessary to put together the profile rail sections 4 and to clamp the same together by means of the clamp or handle 6. Additionally, the supporting legs are inserted into the corresponding bearings and the winch is connected to the network. After the butt or device 25 for catching the cartridges has been mounted, the installation is ready for use.

It is, of course, to be understood that the present invention is, by no means, limited to the particular construction shown in the drawings but also comprises any modifications within the scope of the appended claims.

What is claimed is:

1. In a target-shooting installation having a shooting station and a target station and means for moving a target from one station to the other, said means comprising a profile rail extending between said stations, a carriage slidably supported by said rail and including target-supporting means, an actuating element connected to said carriage and extending along said rail and driveable in respectively opposite directions for moving said carriage in opposite directions along said rail, means at the shooting-station end of said rail and connected to said actuating element and operable to drive said actuating element to move said carriage along said rail, said carriage being provided with a clamping surface extending from the carriage on the side facing said target station, and a clamping element carried by said rail at the target-station end thereof clampingly engageable with said clamping surface in response to movement of the carriage into said target station.

2. An installation according to claim 1, which includes a catching device upstanding behind the target when the latter is in said target station and supported with said clamping element.

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3. An installation according to claim 1, which includes support means for said rail at the ends thereof, said support means being foldable against said rail.

4. An installation according to claim 1, in which said profile rail comprises sections joined detachably together in end-to-end relation.

5. An installation according to claim 1, in which said profile

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rail comprises an upper carriage-supporting profile rail and a support rail therebeneath in supporting relation thereto.

6. An installation according to claim 1, in which at least some of the surface of said rail engaged by said carriage is provided with a sliding lining thereon.

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