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## (54) Apparatus for facilitating the assembly of ammunition belts.

(57) Apparatus for aiding the connection of lengths of ammunition belt into longer lengths including a bench, a channel on the bench for ducting belted ammunition past an ammunition round insertion station to a delivery station at which a transportable magazine is temporarily located, ramps being located in the floor of the channel to each side of the insertion station, the ramps being movable from a lowered position to a raised position in which belted ammunition is locally elevated to allow easy flow over the insertion station.

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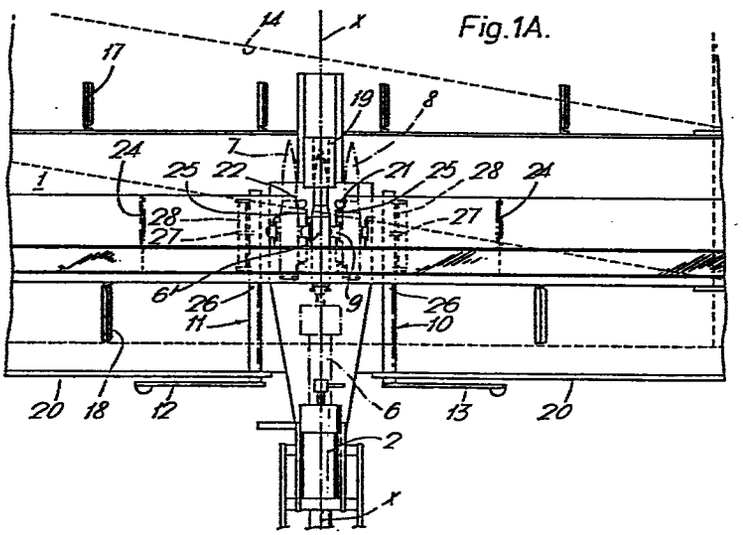
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Fig.1A.

# APPARATUS FOR FACILITATING THE ASSEMBLY OF AMMUNITION BELTS

This invention relates to apparatus for aiding the connection of lengths of ammunition belt into longer lengths for loading into a magazine of a gun, or, if the ammunition is already in such longer lengths, for aiding disconnection into shorter lengths as desired.

Ammunition belts comprise a series of inter-connecting links which, when interconnected, are locked together by the presence of an ammunition round, namely a shell plus its cartridge. The rounds lie parallel to one another transverse to the length of the belt. Length of such belts require, during the preparation for use, to be joined one to another to form one continuous length which is then fed into a magazine for use by the gun. At the end of each belt length is a free link portion. Interconnection of a pair of such free link portions connects the otherwise separate belt lengths whilst insertion of a round of ammunition into the interconnected link portions ensures that they remain positively interlocked during use at least until the round is fired.

It is known to provide apparatus for so inserting a round of ammunition; the design of such apparatus does not form part of this invention. Rather, the present invention relates to apparatus for aiding the connection of the separate belt portions into more continuous lengths by facilitating the handling of the separate portions prior to interconnection and also the handling of continuous lengths subsequently.

According to one aspect of the present invention, such apparatus includes support means, channel means, having first and second ends, carried by said support means, in which the belted ammunition lies and can be urged along, the individual rounds of the belt having their axes lying transverse to the direction of movement along the channel, and ammunition round insertion removal means positioned at a station intermediate the ends of the channel means for urging a round axially to or from a position at one side of the channel means to or from a position aligned with other rounds of the belts. Preferably, ramp means are provided to locally raise the belted ammunition above said station to facilitate movement thereof along the channel means.

Although the apparatus is suitable for both round insertion (for link locking purposes) and removal (for link unlocking purposes), for ease of description it is described below only in respect of round insertion.

Conveniently, a magazine loading station is situate at or near a delivery end (that is to say the second end) of the channel means, a magazine being moved to this station and removed when loaded. Preferably, the magazine is situated below the level of the delivery end of the channel means when in the loading station, so that loading is by gravity. Accordingly, initially separate lengths of ammunition belt are fed from that end of the channel means remote from the loading station (i.e. the entry or first end) so that adjacent free ends are located at the round insertion station where they are interconnected and then locked together by insertion of a

round, the now continuous belt being fed to the loading station whilst further separate lengths are interconnected and locked together as desired.

For insertion of the locking rounds, the belts are conveniently required to be in a "link down position", that is to say the links lie below the rounds. The previously discussed sequence of operation is applicable when the magazine accepts belts in this link down position. However, where the magazine requires to accept belts in the "link up" position, then an additional arrangement is provided. In practice, the magazine may have twin chambers, one for "link down" and one for "link up". Thus, in this case, the apparatus must be able to provide for both. Accordingly, further channel means are provided at a level below the first mentioned channel means, having an entry end in register with but below the entry or first end of the first channel means and having a delivery end near the delivery or second end of the first mentioned channel means but placed to one side.

One embodiment of the invention is now described by way of example with reference to the accompanying drawings in which:-

Figure 1 is a plan view of apparatus for facilitating the assembly of ammunition belts,

Figure 1A is an enlarged view of the insertion station region of Figure 1,

Figure 2 is an end view, that is to say, a view on Arrow A of Figure 1,

Figure 3 is a similar view to that of Figure 2 but with the round insertion apparatus in a different configuration, and,

Figure 4 is an enlarged view upon Arrow B of Figure 1 showing ramp means in two positions.

In the Figures, the apparatus comprises a bench or stand including an upper surface in which is provided a first channel 1 having an ammunition round insertion tool 2 of known design situated at an intermediate point along its length. This intermediate point is the round insertion station. It is indicated by the transverse axis X - X (along which a round is axially urged, as is shown in Figures 1, 2 and 3) and by two pairs of upright pillars 21, 22. A round to be inserted is urged along axis X - X between the pairs of pillars, whilst those adjacent rounds, i.e. the first and final rounds of lengths of belted ammunition lie outside the pairs of pillars. Although referred to as being for insertion purposes, the tool 2 is also capable of round extraction. One end of the channel, the delivery (or second) end 3, provides a loading station. At this station is positioned a magazine, not shown, which is wheeled up to the delivery end 3 of the channel at a level below the channel. The belted ammunition is thus gravity fed into the magazine.

The other end of the channel, the entry (or first) end 4, is provided with a transversely mounted but slightly skewed roller 5 lying the full width of the channel. The purpose of this roller will be described later in the specification.

The insertion tool 2 lies to one side of the channel 1. It is hand-operated and is movable from a position shown in solid outline

in Figure 1 and also in Figure 2 to a round insertion position shown in broken outline in Figure 1 and also in Figure 3. An individual round is thus moved from a position 6 to an insertion position shown at 6'.

In Figure 1, the final round of one length of belted ammunition is shown at 7 whilst the first round of a further length of belted ammunition is shown at 8. Interconnecting links are shown at 9.

Ramps 10 and 11 are provided at the entry and exit sides of the insertion station. These are extendable upwards from the base of the channel 1 by means of levers 12 and 13 respecrtively, so that the belted ammunition can flow over the insertion station. Figure 4 illustrates a side view of that ramp referenced 10 in its two positions, the raised position of its components being shown in solid outline and being given the suffix 'R' indicating 'raised'. The ramp 10 includes a resilient metal sheet 23 which is anchored at an end 24 to a floor region of the channel 1. The metal sheet 23 has a free end 25 pre-formed to give a slight hump with respect to the channel floor to accommodate a horizontal spindle 26 carried by the channel floor. The lever 13 is attached to an outboard end of the spindle. Also attached to the spindle is a cam arm 27, itself carrying a roller cam 28, the latter engaging an underside of the free end 25 of the resilient sheet when the lever 13 is moved from a generally horizontal position to a generally vertical position shown at 13R. The free end is thus raised to the position shown at 25R so that an ammunition belt can flow over the station or rather its pillars 21, 22.

A further channel 14 lies below the level of the channel 1 and is arranged so that its entry end 5 lies immediately below that of the channel 1 and therefore adjacent the roller 5. The channel 14 is however angled to the channel 1 such that its delivery end 16 lies to one side of that of channel 1 but still below its level. The channel 14 thus delivers its belted ammunition into a waiting magazine at a point to one side of the delivery from channel 1. This is to suit a specific type of magazine which accepts belted ammunition in two side-by-side chambers.

As has been described previously, a length of belted ammunition is fed into the channel 1 at 4 and manually urged along the channel until its final round 7 lies in the position shown, the ramps 10, 11 are then lowered. A further length of belted ammunition is similarly fed along the channel until its initiual round 8 lies in the illustrated position. The links 9 have their free ends interconnected and then an individual round 6 is inserted axially into the interconnected links to lock them in the interconnected state. The ramps 10, 11 are then raised and the continuous belted length is fed along the channel to the delivery end 3 whereupon it is gravity fed into one chamber of the waiting magazine.

This description is of one sequence of operation namely that in which the ammunition belt is to be loaded into the magazine in a link down position. If the ammunition belt is to be loaded link up, then the individual lengths of belt are fed along the channel 1 in the reverse direction to that previously described, i.e. from the

delivery end 3 through the insertion station to the entry end 4. The continuous lengths then pass over the roller 5 to reverse direction and be guided into the lower channel 14. The ammunition belt in the lower channel therefore lies link up and is delivered to the second chamber of the magazine accordingly.

Glazed and/or armoured screens are positioned adjacent the channels for protection purposes. These are referenced 17 and 18.

Although the apparatus has been described with primary reference to the connecting of individual lengths of belted ammunition into continuous lengths for delivery into a magazine, the apparatus can be used in the reverse sequence if for any reason it is necessary to unload an unexpended magazine of ammunition. In this case, the insertion tool 2 is used as a removal tool and a restraint block 19 is moved into the position shown in the Figures to engage a round 6 to be removed to prevent that round tilting during the removal or extraction sequence.

Additional armoured screens are optionally fitted at 20 for use when handling especially sensitive ammunition.

CLAIMS:

1. Apparatus for aiding the connection and/or disconnection of lengths of ammunition belt into and/or from longer lengths, characterised by including support means, channel means having a first end and a second end, carried by said support means, in which the belted ammunition lies and can be urged along, the individual rounds of the belt having their axes lying transverse to the direction of movement along the channel, and ammunition round insertion/removal means positioned at a station intermediate the ends of the channel means for urging a round axially to or from a position at one side of the channel means to or from a position aligned with other rounds of the belts.

2. Apparatus according to Claim 1, wherein said channel means has ramp means movable from a lowered position in which the belted ammunition in the channel means is directed to said station, to a raised position in which the belted ammunition is locally raised above said station to flow over it and thus facilitate movement of the belt along said channel means.

3. Apparatus according to Claim 2, wherein said ramp means include two ramps, one to each side of said station, each ramp comprising a resilient sheet anchored at one end to a floor region of the channel means remote from said station and having a free end adjacent said station, and cam means adapted to urge said free end to the raised position.

4. Apparatus according to any one of the previous Claims, including further channel means at a different level to the first

mentioned channel means, extending from a position adjacent and in register with said first end when viewed in plan, to a position adjacent said second end but to one side thereof when viewed in plan, whereby the apparatus can supply belted ammunition in alternatively both a link-up and a link-down condition.

5. Apparatus according to Claim 4, wherein translation means are provided at the first end of said channel means to effect translation of belted ammunition in height and direction from one channel means to the other.

6. Apparatus according to any one of the previous Claims, wherein said support means is of such a height that belted ammunition can be gravity fed to a receptacle.

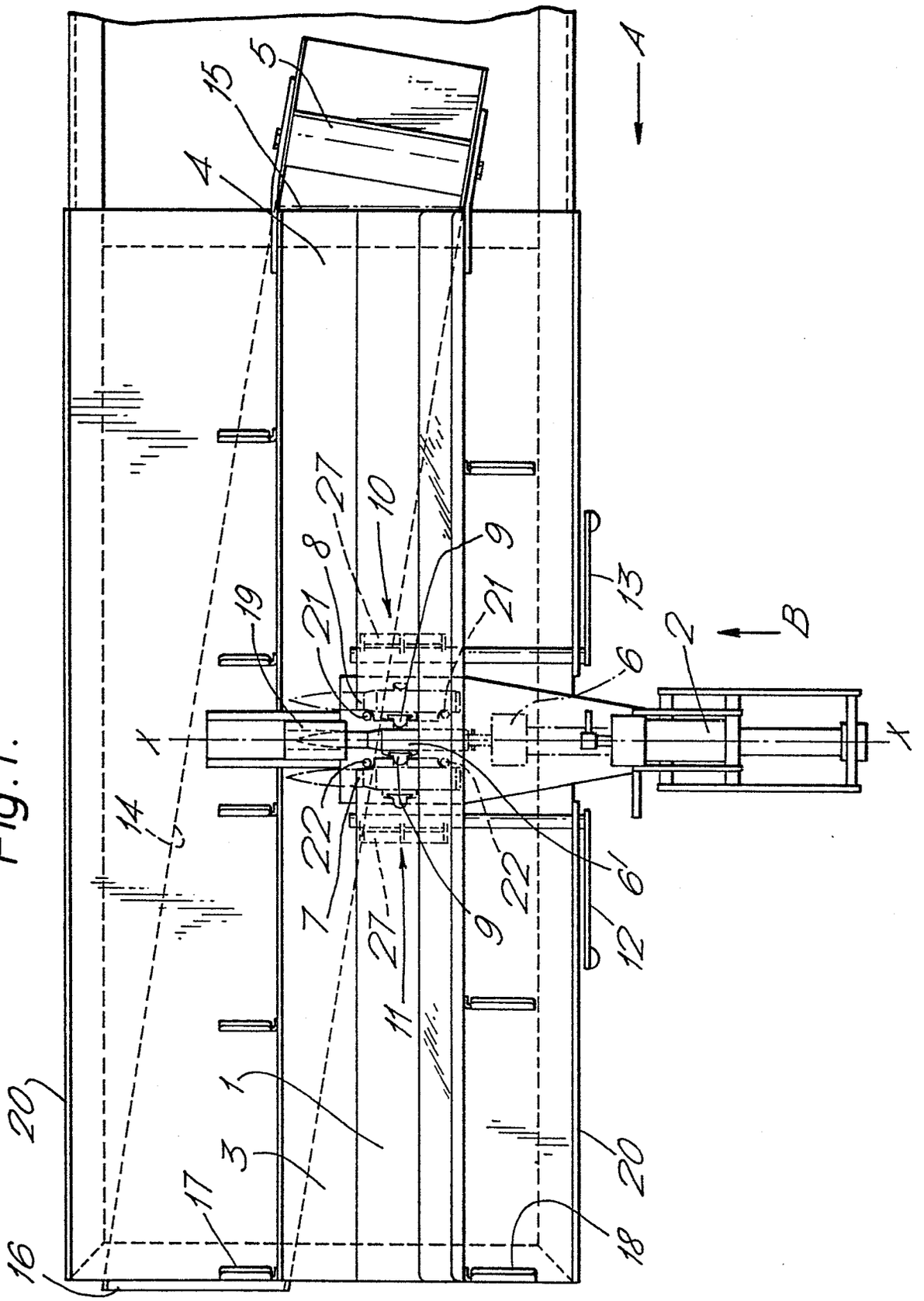


Fig. 1.

Fig.1A.

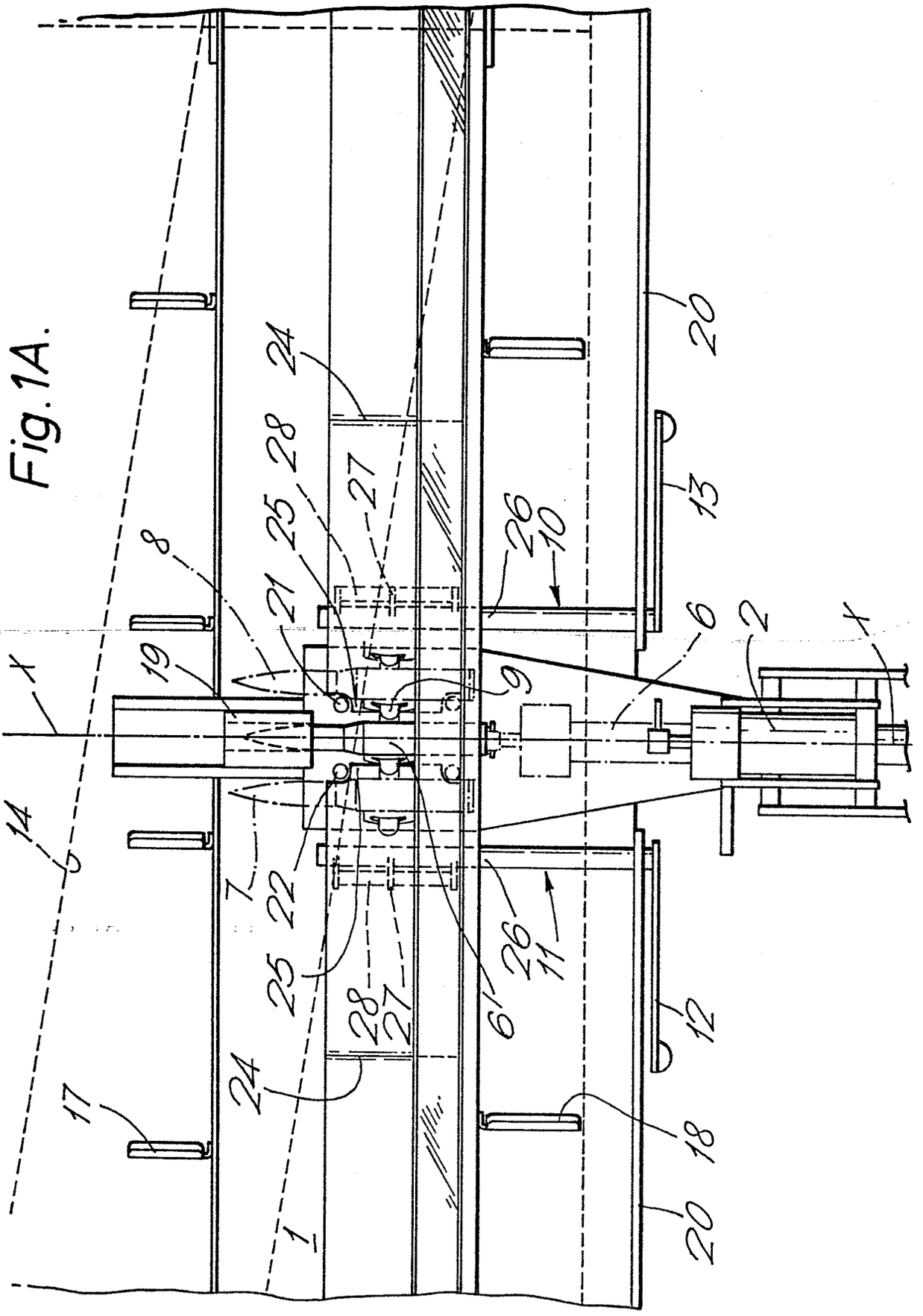
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Fig.2.

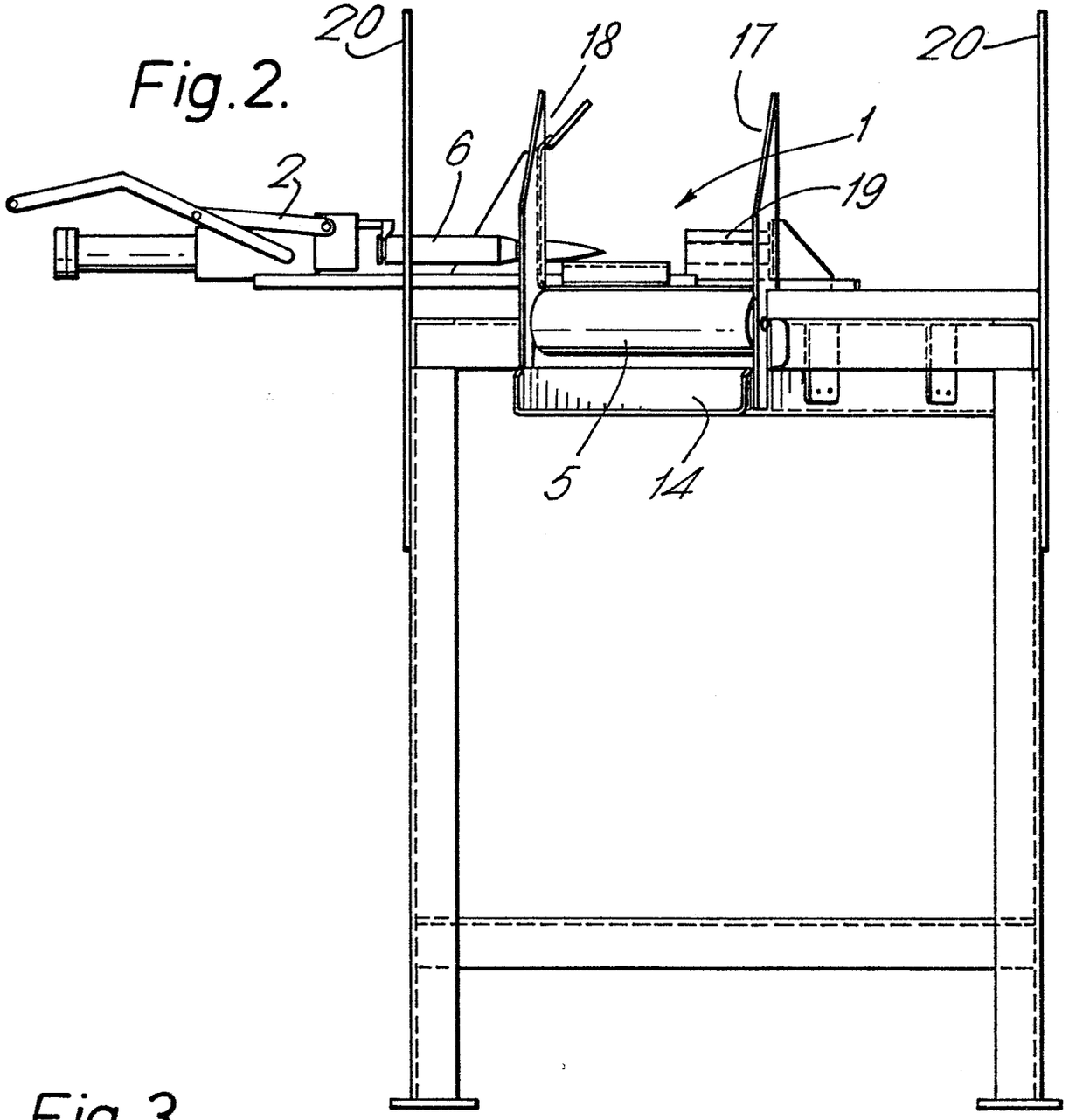
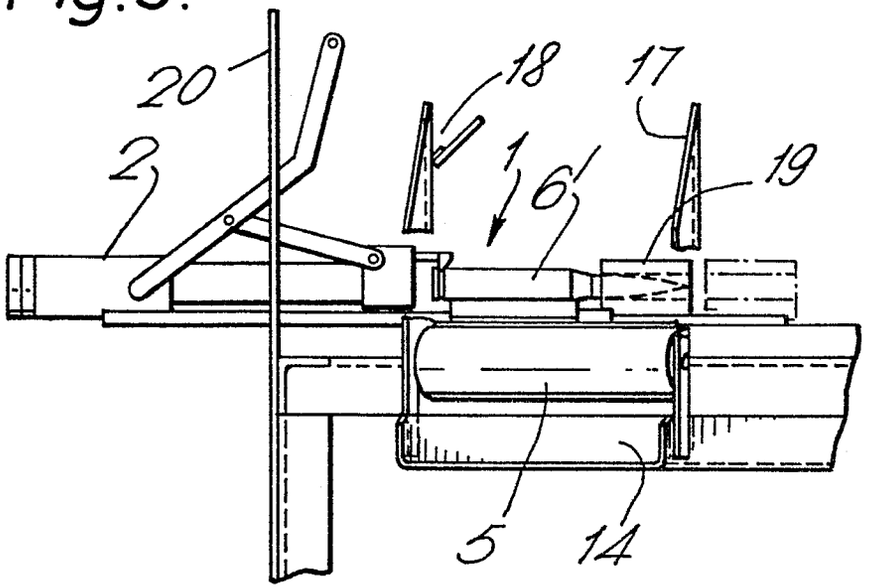



Fig.3.



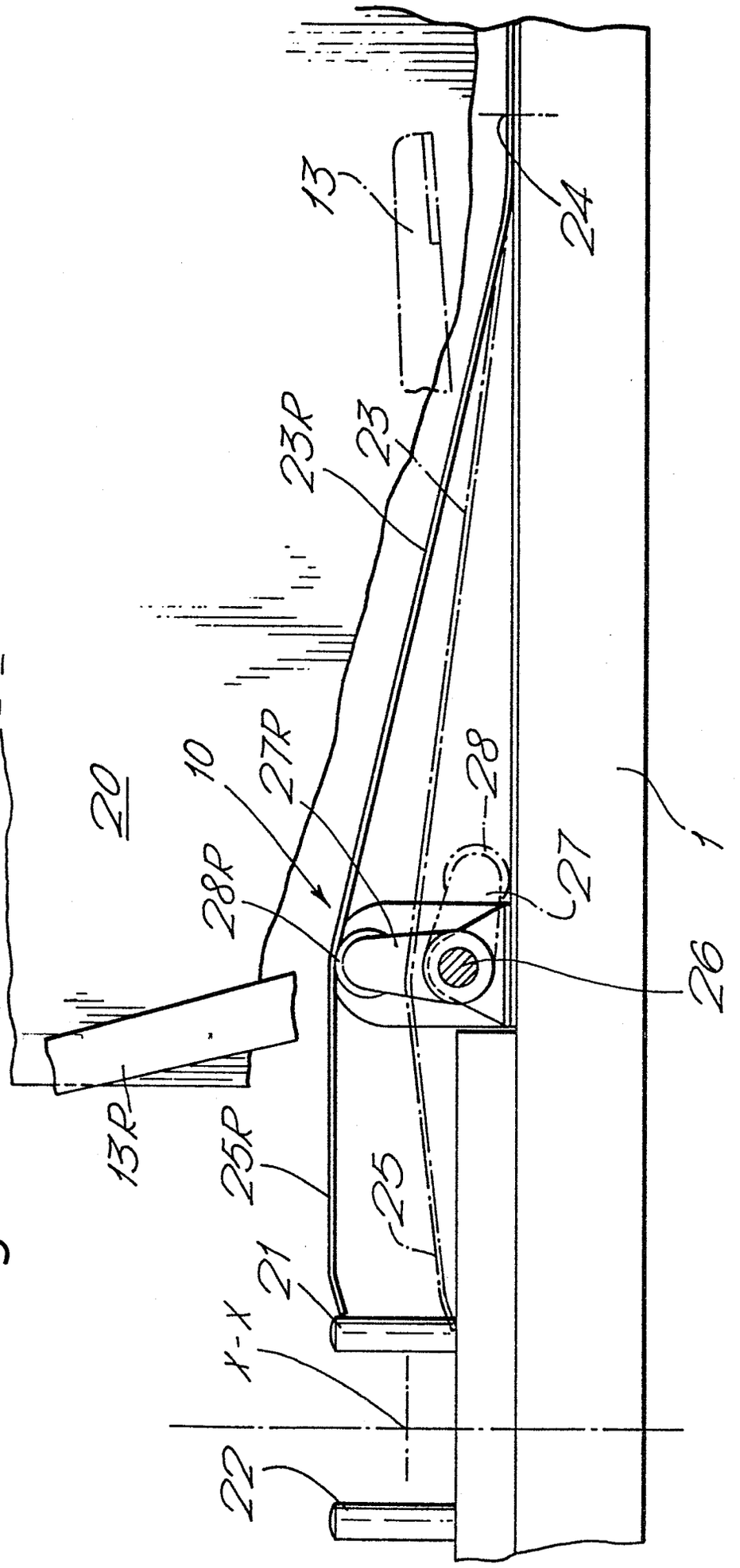



Fig.4.