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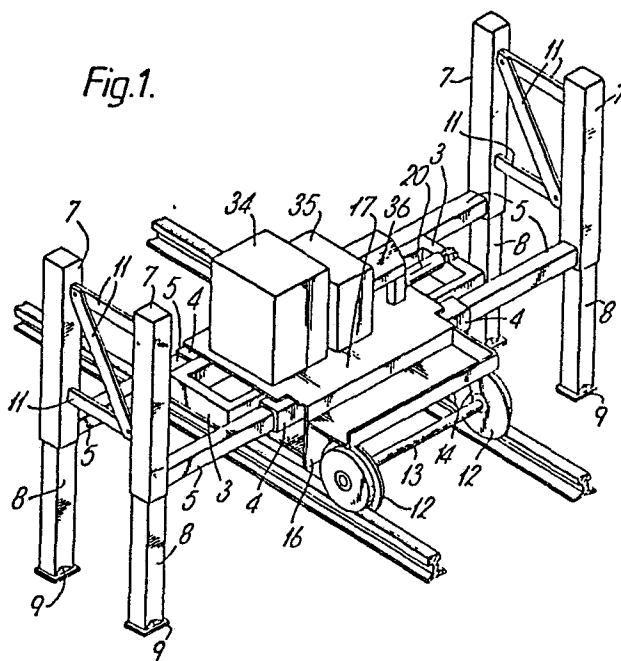
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54 Machine for handling and replacing rail switches, and track sections generally.

57 Machine for replacing and laying track portions comprises a portal structure of adjustable height and width having two lifting hooks (30) and swivel mounted wheels (12) for transferring the machine along a railway line (2); such portal structure consisting of a flat rectangular frame (3) having pairs of telescopic feet (7-8) at its opposing ends, pairs of mutually orthogonal carriages being provided, sliding longitudinally and transversely to the flat frame to support the lifting hooks (30).

Fig.1.



- 1 -

MACHINE FOR HANDLING AND REPLACING RAIL SWITCHES, AND TRACK
SECTIONS GENERALLY

5 This invention relates to a machine able to simplify and
accelerate the operations involved in picking-up and laying rail
switches and track sections generally, it being particularly
suitable for small and medium sized firms.

10 For said operations, units are known comprising at least two
identical machines self-propelled on rails and used together
along a railway line, they each comprising a portal structure
with its uprights and cross-member of telescopic type, said
portal being disposed transversely to the rail track in order to
lift a section thereof and shift it laterally stepwise by means
15 of two pivotally-mounted hooks situated below said cross-member.
The use of said known machines has shown them to be deficient in
terms of stability and safety, and to be limited operationally in
that they are unable to abut the track section against the pre-
existing track. Said deficiencies are due to the fact that the
20 plane portal structure has only one pair of telescopic feet, and
for this reason the stability of the entire operational unit
relies on the actual track section to be handled, this connecting
together said at least two machines by being clamped tightly by
them.

25

In view of the considerable weight and dimensions of track
sections and rail switches, and the type of ground on which said
machines have to operate, the considerable risks deriving from
said stability deficiency are immediately apparent, in terms of

operator safety and the danger of damage both to the rail switches themselves and to the machines which handle them. This also makes it impossible to enable known machines to undergo the longitudinal movement required for abutting the track sections
5 together, this having been done up to the present time by using auxiliary equipment such as hydraulic jacks and the like, which makes the operation difficult, lengthy and complicated.

The present patent provides and protects a machine which is able
10 to obviate the aforesaid within the framework of a simple and rational construction.

According to the invention the proposed machine is of the aforesaid type, ie of adjustable height and grippage width, and
15 is arranged to operate at least in a pair with a further similar machine, it being designed to lie transversely to a railway line, towards which its two pivotally-mounted lifting hooks point. It comprises a frame of elongated shape, at the corners of which there are disposed telescopic feet, and along the longitudinal
20 members of which there is slidably mounted a pair of sliders of variable distance apart which, by means of carriages transversely slidable relative to the sliders, support the pivotally-mounted hooks which grip the rails, the distance apart of these hooks being adjustable by moving one slider relative to the
25 other.

By virtue of the aforesaid constructional details, all the objects of the invention are attained in that the provision of four feet ensures the necessary stability to the machine, and the
30 two mutually orthogonal movements which the hooks can undergo enable a track section to be shifted laterally and inserted with the necessary accuracy between two pre-existing sections.

In particular, the provision of said two transverse carriages is
35 advantageous for said accurate insertion, as they enable the track section to be shifted longitudinally after having disposed it in correspondence with the sections to be joined up.

According to the invention, said pair of sliders of variable distance apart is arranged to support a platform for the operator and for the service equipment required for producing and controlling the various machine movements, said platform being
5 able to slide along the machine frame under the control of a hydraulic cylinder-piston unit.

In addition, said platform is supplied with two pairs of flanged wheels which are able to be swivelled so that they can be
10 disposed either to the side of the longitudinal members or below these latter to enable the machine to be transferred under international clearance gauge conditions, and to lock the rail switch against the grippers and permit the machine to be levelled.

15 The constructional characteristics and merits of the invention will be more apparent from the detailed description given hereinafter with reference to the figures of the accompanying drawings in which:

20 Figure 1 is an overall perspective view of the invention;
Figure 2 is a partly sectional view of the invention from above;
Figure 3 is a section on the line III-III of Figure 2;
Figure 4 is a section on the line IV-IV of Figure 3;
25 Figure 5 is a diagrammatic view from above showing a rail switch across which three machines according to the invention are disposed.

From said figures it can be seen that the machine in question is
30 overall of portal configuration (Figure 1) so as to be able to be disposed transversely to a section of a railway line such as the switch 1 shown in Figure 5, or the track section indicated by 2 in Figures 2 and 4.

35 The cross structure of said portal comprises a rectangular frame 3 of elongated shape (Figures 1, 2), to the outside of its longitudinal members there being fixed two robust tubular members

4, in each of which two tubular bars 5 are slidingly housed.

These latter are controlled by respective coaxial hydraulic cylinder-piston units 6 which are fixed to the interior of the tubular members 4 as shown in Figures 2 and 4. To the outer end of each bar 5 there is fixed a telescopic foot or upright comprising an upper hollow column 7 which slidingly houses a lower shank 8 provided with a support plate 9 (Figure 1).

Said shank 8 is controlled by a coaxial hydraulic cylinder-piston unit 10 which is housed in the column 7 as shown in Figure 3, and the two opposing columns 7 of each pair are connected together by suitable stiffening elements 11 (Figures 1, 4).

With reference to Figure 2, it will be seen that the length of the tubular members 4 is less than the length of the rectangular frame 3, in order to form four recesses for receiving the columns 7 when in their withdrawn position.

This enables the invention to be kept within the allowable transverse dimensions for its transfer along a railway line, for said transfer there being provided external to each tubular member 4 a pair of flanged wheels 12, each fixed on to an axle 13 (Figure 1), one of which is driven by a hydraulic geared motor, not shown.

Each axle 13 (see Figure 4) is supported by two arms 14 branching from a shaft 15 which is rotatably mounted on a descending wall 16 pertaining to a sliding platform 17 disposed to centrally embrace the elements 3, 4. By way of a pair of levers 18, each shaft 15 is caused to swivel by two hydraulic cylinder-piston units 19 hinged to the platform 17 below the frame 3 (Figure 4). In this manner, the wheels 12 can be disposed either in a working position or in a rest position, these being indicated by continuous lines and dashed and dotted lines respectively in Figure 4.

To that cross-member of the frame 3 which in Figures 2 and 3 is situated on the right hand side there are hinged two opposing hydraulic cylinder-piston units 20, which are connected to the platform 17 so as to cause it to undergo longitudinal movement
5 along said frame.

For the purposes of said movement, the platform 17 is lowerly provided, on the same side as said units 20. with a carriage comprising two vertical end walls 21 connected together by a
10 central cross-member 22, and provided upperly with a pair of wheels 23 and lowerly with a pair of rollers 24 (Figure 4). The elements 23, 24 are arranged to roll on the upper and lower faces of the longitudinal members of the rectangular frame 3. A further carriage 25 also provided with upper rollers 230 and
15 lower rollers 240 (Figures 2, 3) is fixed to the said platform 17 in an intermediate position.

In addition, at the opposite end of the platform 17 a third carriage is provided identical with the described carriage 21,
20 22, 23, 24, so that no description thereof will be given. In contrast to that carriage 21-24 which in Figure 3 is situated on the right hand side and is directly fixed to the platform by its plates 21, the left hand carriage 21-24 is connected to the platform by way of a hydraulic cylinder-piston unit 26 which lies
25 between said platform 17 and frame 3, and is parallel to the longitudinal members of this latter.

On the cross-member 22 of each carriage 21-24, there is slidingly mounted a trolley comprising a channel member 27 which is mounted
30 from below over said cross-member, and is upperly provided with a pair of rollers 28 disposed in contact with said cross-member 22. Each trolley 27, 28 is controlled by a respective hydraulic cylinder-piston unit 29 disposed above the cross-member 22, and hinged to one of the end plates 21 of this latter (Figures 2, 4).

35

Transversely to each trolley 27, 28 there is lowerly pivoted a lifting hook 30 having an upper lever 31, this latter being

caused to swivel by a hydraulic cylinder-piston unit 32 which is hinged to said trolley 27, 28 by way of two lateral plates 33 (Figures 2, 3).

5 Finally, as shown in Figures 1 and 2, a motor unit 34 for driving the hydraulic service pumps, a hydraulic oil tank 35 and a control and monitoring console 36 are disposed on the platform 17.

10 With reference to Figure 5, it can be seen that the machine in question is arranged to operate together with at least one other identical machine, the number of these latter machines depending obviously on the weight and dimensions of the structure 1 or 2 to be handled and/or laid.

15

As stated in the introduction, a rail switch 1 or a track section 2 is handled in known manner by laterally shifting said structure 1 or 2 through successive steps, this being done by lifting it, shifting it to one side of the frame 3, then resting it on the
20 ground, then moving the frame 3 in the same direction with the feet 7, 8 completely raised, then again lifting the structure by extending the feet 7, 8, to then continue in the aforesaid manner until the required location is reached.

25 It should be noted that the invention attains all the stated objects in that its stability is ensured by the four telescopic uprights 7, 8, while the ample facility for moving and adjusting the two pivotally-mounted hooks 30 allows simple and accurate laying of a track section 2 or rail switch 1, as stated in the
30 introduction.

In particular, said laying accuracy is made possible by the fact that the hooks 30 are advantageously able to slide in a direction parallel to the railway line above which the machine of the
35 invention lies.

PATENT CLAIMS

1. A machine for replacing and laying track portions in general, of the type arranged to operate together with at least one further machine, and comprising a portal structure of adjustable height and overall width, said structure to be disposed transversely to a railway line (2) towards which it extends two opposing lifting hooks (30) able to swivel transversely to said railway line (2), characterised in that the cross structure of said portal profile is constituted by a flat rectangular frame (3) of elongated form, at its opposing ends there being disposed respective pairs of telescopic feet (7, 8), the lifting hooks (30) being supported, with the facility for adjusting their distance apart, by corresponding pairs of mutually orthogonal carriages arranged to slide longitudinally and transversely to the frame (3), there being provided, external to the longitudinal members of said frame, respective pairs of swivel-mounted wheels (12) for transferring the machine along a railway line (2).
2. A machine as claimed in claim 1, characterised in that to enable said telescopic feet (7, 8) to be moved laterally outwards and inwards, the respective support bars (5) are slidably housed in two box members (4) fixed to the outside of the longitudinal members of the frame, said box members (4) being shorter than the frame so as to form four recesses for receiving the transverse profile of the feet (7, 8) when these latter are in their inwardly withdrawn position.
3. A machine as claimed in claim 1, characterised in that to enable the hooks (30) to slide longitudinally along the frame (3) and their distance apart to be adjusted, there are provided a first carriage (21-24) and a second carriage (25, 230, 240) which are slidably mounted on the longitudinal members of said frame (3) and are connected together by an overlying platform (17) which embraces the frame (3), and a third carriage (21-24) situated on the other side of said second carriage (25, 230, 240)

and connected to the overlying platform (17) by a hydraulic cylinder-piston unit (26), there being provided a further cylinder-piston unit (20) which connects said platform (17) to said frame (3).

5

4. A machine as claimed in claim 1, characterised in that to enable the hooks (30) to slide transversely relative to said frame there are provided two carriages (27, 28) which are slidingly mounted on said first and third longitudinally
10 slidable carriage (21-24), and to which the hooks and the respective cylinder-piston operating units (32) are lowerly hinged.

5. A machine as claimed in claim 1, characterised in that
15 said two opposing pairs of transfer wheels (12) are fixed on to corresponding axles (13) disposed parallel to and external to the longitudinal members of the frame (3), where they are supported by the platform (12) by way of hydraulically controlled lever systems (16, 18, 19) arranged to adjust the height of the wheels.

Fig.1.

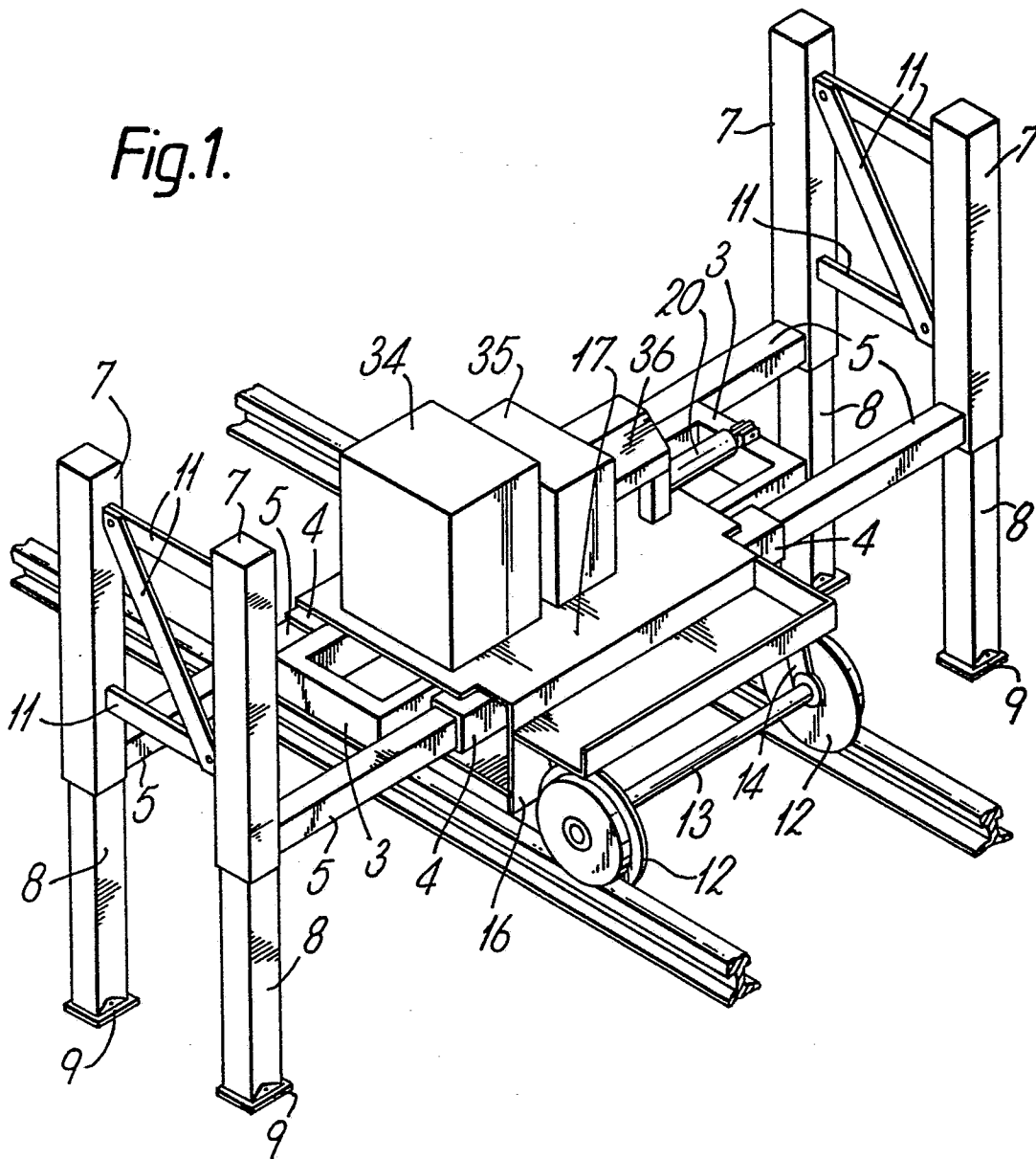


Fig.5.

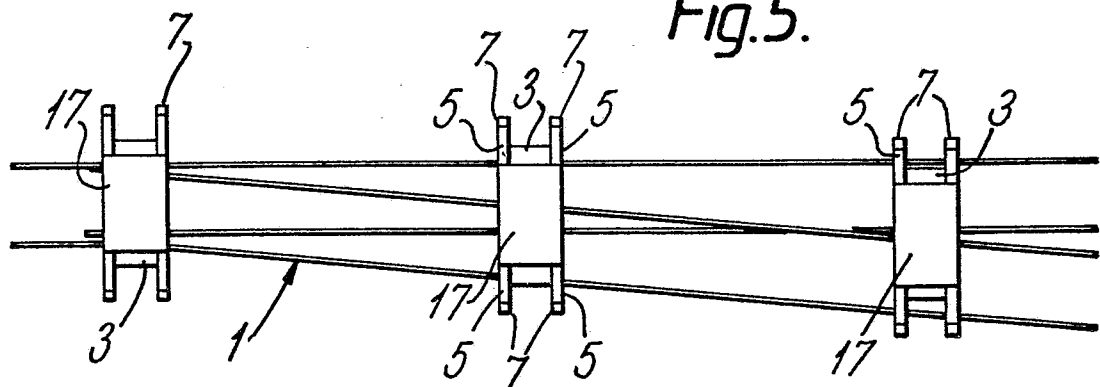


Fig. 2.

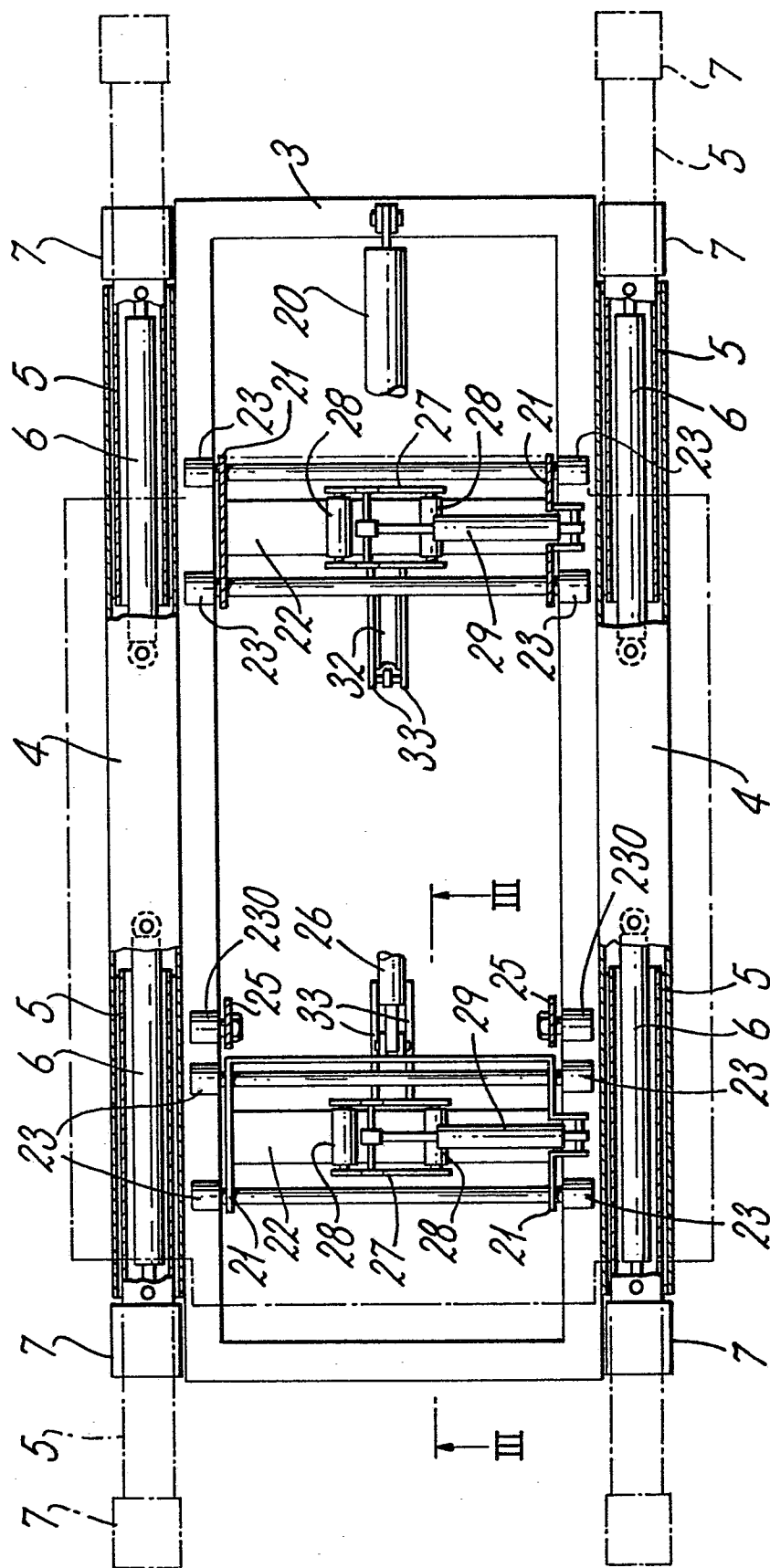
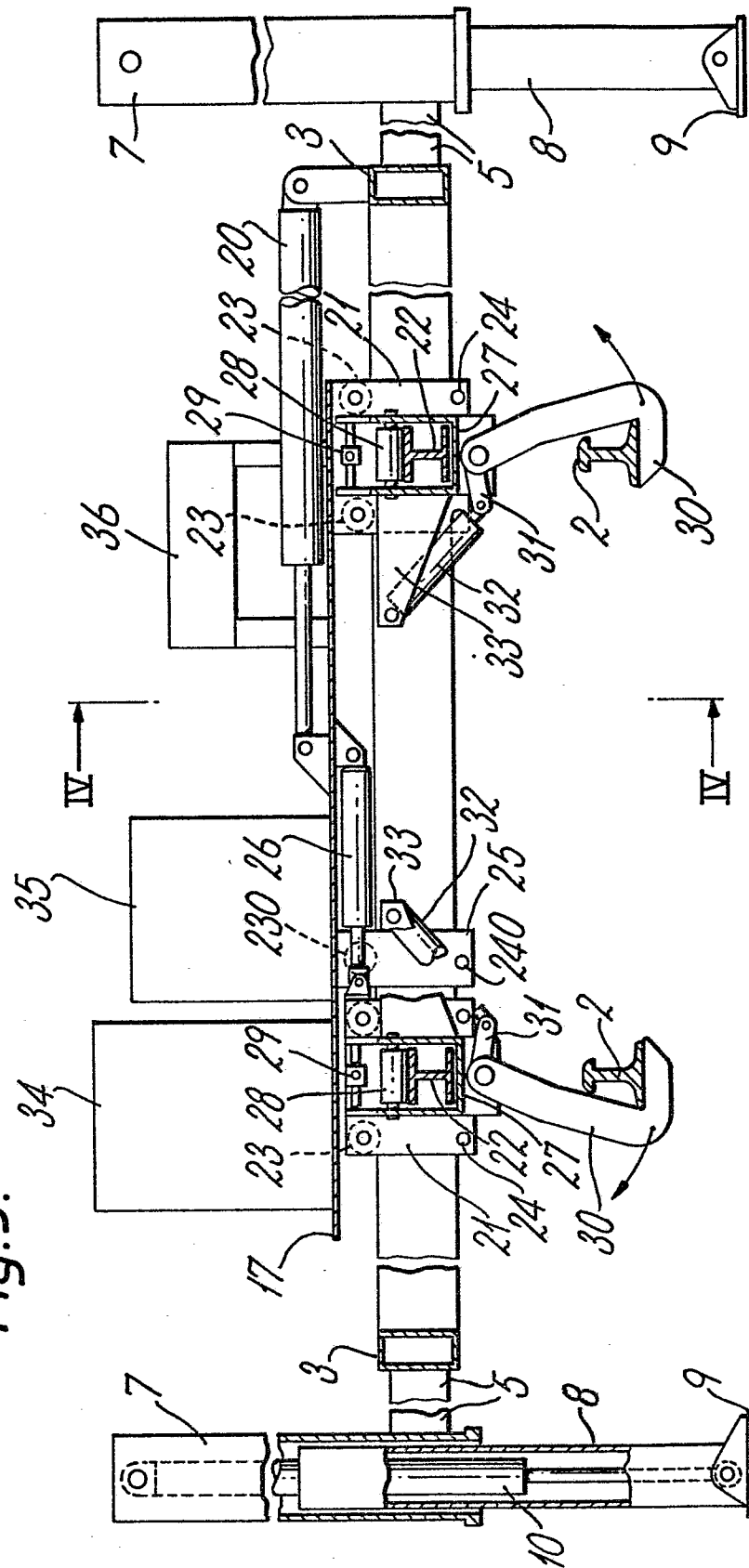
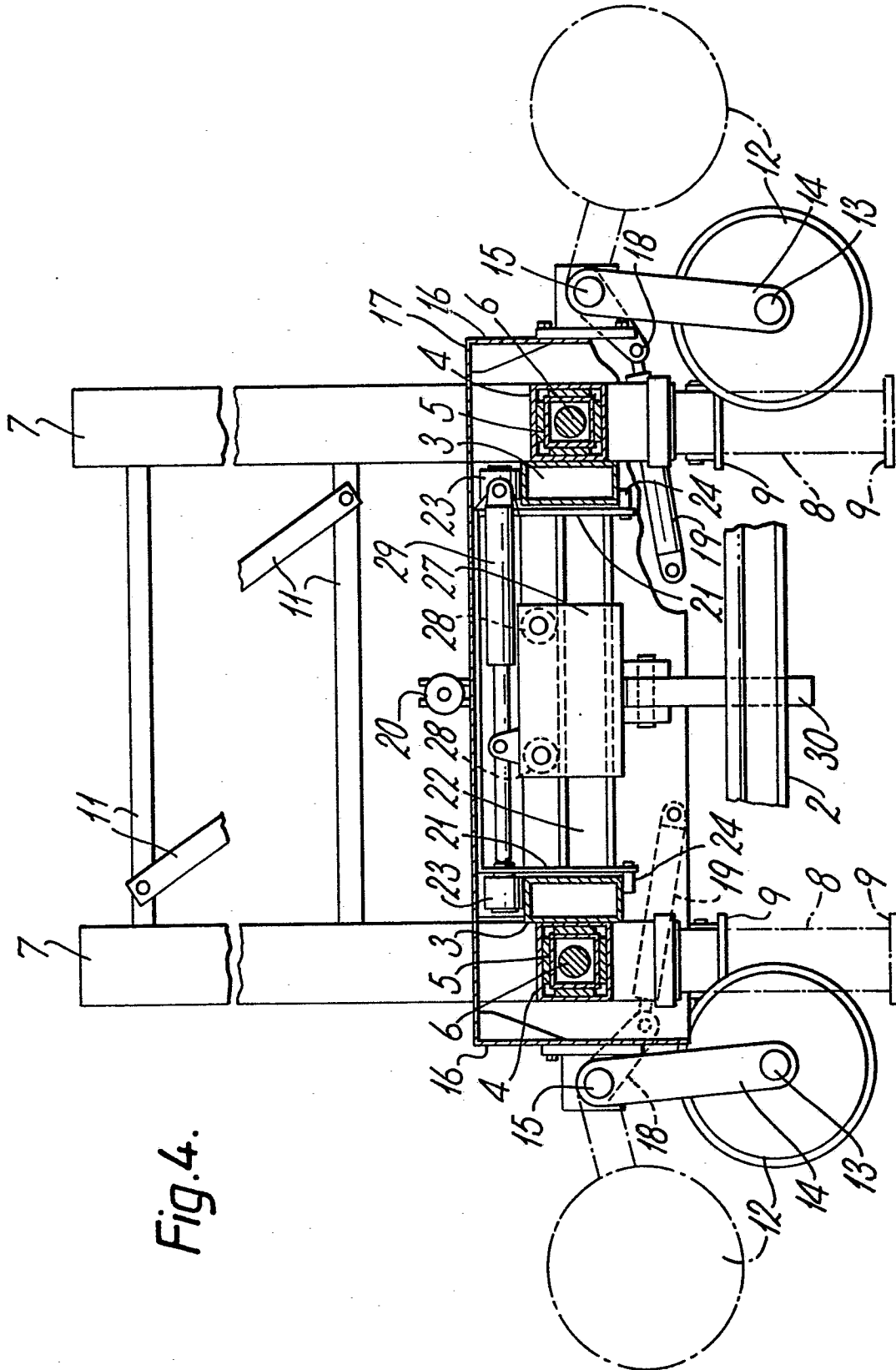


Fig. 3.







DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	EP-A-0 084 298 (TEDESCHI) * Page 3, lines 17-20,32-37; page 4, lines 1-11,28-31; page 5, lines 16-21,29-37; page 6, lines 1-13; page 8 - claims 1,2,3; figures 1,2 *	1,2,5	E 01 B 29/02
A	DE-A-2 309 930 (FRENZEL) * Page 2, paragraphs 5,6; page 3, paragraphs 1,2,3; page 6, last paragraph; page 7, paragraphs 1,2,6; page 8, paragraphs 1-5; page 9, paragraphs 1,3; page 10, paragraphs 2-4; page 11, paragraphs 1-3; page 12, paragraph 4; page 14, paragraphs 1-3; page 15, paragraphs 3,4; page 16, paragraph 1; page 17, paragraphs 3,4; page 18, paragraphs 1,2; figures 1-9 *	1,3	
A	FR-A-2 546 924 (MATISA) * Page 9, lines 30-31; page 10, lines 1-24; page 12, lines 1-19,27-34; figures 3-9 *	1,2,5	E 01 B
A	DE-C- 563 834 (TAXIS)		
A	FR-A-2 563 545 (SOTRAMEF)		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 02-07-1986	Examiner RUYMBEKE L.G.M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			