(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 064 958**
A2

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: 82830124.2

(51) Int. Cl.³: B 66 F 7/20

(22) Date of filing: 10.05.82

(30) Priority: 12.05.81 IT 21642

(43) Date of publication of application:
17.11.82 Bulletin 82/46

(84) Designated Contracting States:
AT BE CH DE FR GB LI LU NL SE

(71) Applicant: CAR BENCH S.p.A.
Via Dorsale
I-54100 Massa(IT)

(72) Inventor: Bigini, Alberto
Via Cervolapittola 25
I-54100 Massa(IT)

(74) Representative: Perani, Aurelio et al,
c/o JACOBACCI-CASETTA & PERANI S.p.A 7, Via
Visconti di Modrone
I-20122 Milano(IT)

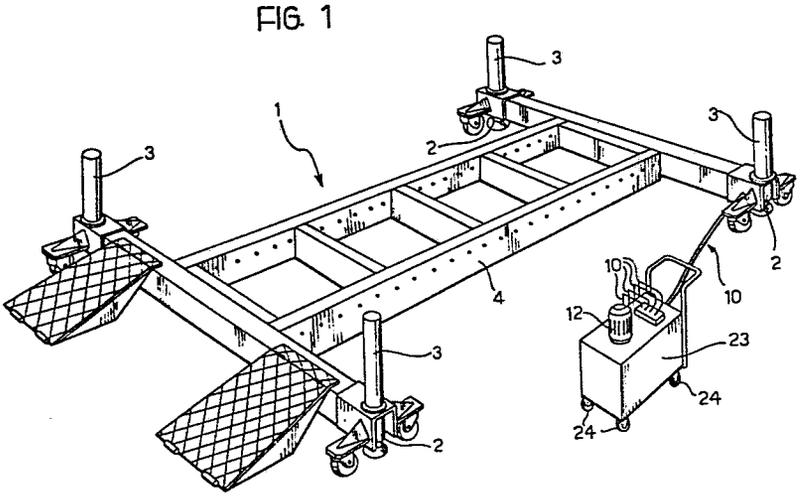
(54) **Improvements in motor-vehicle platform lifts.**

(57) A motor vehicle platform lift is provided of the four-column type. The lift comprises four hydraulic lifting cylinders (2) each arranged in correspondence with a respective column of the lift, and four hydraulic pumps (6), each connected to a respective one of the cylinders (2) via a respective pipeline (10). Each of the pipelines (10) includes a respective non-return valve (14) operative to permit the passage of fluid from the corresponding pump (6) to its associated cylinder (2) whereby to provide for elevation of the platform lift and its maintenance at a desired height. The lift also includes control means (19) for neutralising the operation of the non-return valves (14) so as to permit lowering of the lift by allowing the return flow of fluid from the cylinders (2). In order to ensure that all four cylinders (2) operate in synchronism both during elevation and lowering of the platform lift, the drive shaft (6*a*) of the pumps (6) are made fast for rotation with each other.

EP 0 064 958 A2

./...

FIG. 1



"Improvements in motor-vehicle platform lifts"

The present invention relates to a motor-vehicle platform lift of the four-column type, comprising four lifting cylinders each arranged in correspondence with a respective column of the lift.

In such platform lifts the vertically movable member on which the motor vehicle is placed must be kept strictly horizontal whilst it is in motion. This requires the four lifting cylinders to displace synchronously. In order to meet this requirement, lifts cu[illegible]tly in use employ complex hydraulic circuits for supplying fluid to the lifting cylinders, in which the cylinders are connected together in series so that each cylinder is fed with fluid coming from the cylinder that precedes it in the said series connection. These circuits require a large number of distributor valves for reversing movement.

It is an object of the present invention to provide a lift of the type specified, which has such structural and operational characteristics as to satisfy the above-stated requirement and which at the same time overcomes the abovementioned drawbacks in the art.

This object is achieved by the provision of a lift of the type specified, which comprises four hydraulic pumps each connected to a respective one of the lifting cylinders via a respective pipeline, these pumps having their respective drive shafts fast for rotation with each other.

Further characteristics and advantages of the platform lift according to the present invention will become apparent from the following description of one of its preferred embodiments which is given by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1 shows a perspective view of a motor-vehicle platform lift in accordance with the present invention,

Figure 2 shows a diagrammatic view of a detail in Figure 1,

Figure 3 shows a sectional view of an element of the Figure 2 detail, and

Figure 4 shows a sectional view of the Figure 3 element taken on line IV-IV.

Referring to the appended drawings, by 1 is generally indicated a motor-vehicle platform lift of the four column type, comprising four single-acting hydraulic lifting cylinders, all indicated by 2, arranged in correspondence with the four columns, all indicated by 3, of the lift 1.

The platform lift 1 comprises a member 4 vertically movable under the action of the cylinders 2, and which in the example illustrated, is constituted by a checkout bench for repairing damaged motor-vehicle bodies.

An hydraulic unit for supplying fluid to the cylinders 2 is indicated in its entirety by 5. The unit 5 comprises four hydraulic pumps, all indicated by 6, of equal displacement, which have intake pipelines 7 fitted with intake filters 8 and drawing from a common reservoir 9, and delivery pipelines 10 each fitted with a respective pressure relief valve 11, of conventional type, and connected to a respective lifting cylinder 2.

The pumps 6 have coaxially-arranged drive shafts 6a, fast for rotation with each other and connected to an electric motor 12 for driving them in rotation.

Valve means indicated in their entirety by 13 are provided in the pipelines 10, in a position between the pressure relief valves 11 and the cylinders 2. These means comprise four non-return valves 14 each having a respective closure member 15 movable within a valve body 16 to sealingly engage with a sealing seat 17.

The valves 14 are inserted in the pipelines 10 in such manner as to permit the passage of fluid from the pumps 6 to the cylinders 2 but to prevent the passage of fluid in the reverse direction.

The valve means 13 also comprise control means 18 for neutralising their operation; in particular these control means 18 comprise a shaft 19 with four eccentric cams 20 arranged to engage respective push-rods 21 of the closure members 15 whereby to displace them from their respective sealing seats 17 of the non-return valves 14.

Since the lift 1 is of the movable type, the hydraulic unit 5 is mounted on a portable structure 23, preferably in the form of a trolley provided with wheels 24.

The operation of the illustrated platform lift will now be described.

In the following description the lift will be initially considered in its condition shown in the drawings where the movable member 4 is in a lowered position.

To raise the movable member 4, the electric motor 12 is caused to rotate in the sense indicated by arrow M; this results in the pumps 6 being entrained in rotation and sending fluid under pressure to the cylinders 2 whereby the movable member 4 is raised.

When the movable member 4 reaches its raised position, fluid is discharged into the reservoir 9 until the motor 12 is halted with the consequent halting of the pumps 6. The movable member 4 remains in its raised position through the action of the non-return valves 14, the closure members 15 of which engage with their respective sealing seats 17.

To lower the movable member 4 it is sufficient to turn the control shaft 19, by means of a suitable key, not shown, so as to cause the closure members 15 to be displaced from their respective sealing seats 17 and thus neutralise the non-return valves 14.

The movable member 4 descends under the action of its weight and the fluid contained in the cylinders 2 is expelled via the pipelines 10, causing the pumps 6 to rotate in a sense opposite to that above. The synchronisation of the lowering of the member 4 by the four cylinders 2 is ensured by the fact that the pumps 6 allow the passage of an equal volume of fluid therethrough as they are constrained to rotate at the same speed due to their shafts being fast for rotation with each other.

The four-column type platform lift according to the invention possesses the required synchronisation of the four cylinders during raising and lowering of the movable member and, at the same time, is simple to construct and reliable in operation.

CLAIMS

1. A motor-vehicle platform lift (1) of the four column type, comprising four hydraulic lifting cylinders (2) each arranged in correspondence with a respective column (3) of the lift (1), characterised in that it further comprises four hydraulic pumps (6) each connected to a respective one of the cylinders (2) via a respective pipeline (10), these pumps (6) having their respective drive shafts (6a) coupled for rotation with each other.

2. A lift according to Claim 1, characterised in that valve means (13) are provided in the said connecting pipelines (10).

3. A lift according to Claim 2, characterised in that the said valve means (13) comprise four non-return valves (14) each inserted in a respective one of the connecting pipelines (10) such as to permit the passage of fluid from the corresponding pump (6) to its associated cylinder (2) but to prevent the passage of fluid in the reverse direction, and control means (19, 20) for neutralising the operation of the non-return valves (14).

4. A lift according to Claim 3, characterised in that the said control means comprise a control shaft (19) having four eccentric cams (20) arranged to engage the closure members (15) of the non-return valves (14) whereby to displace them from their respective sealing seats (17).

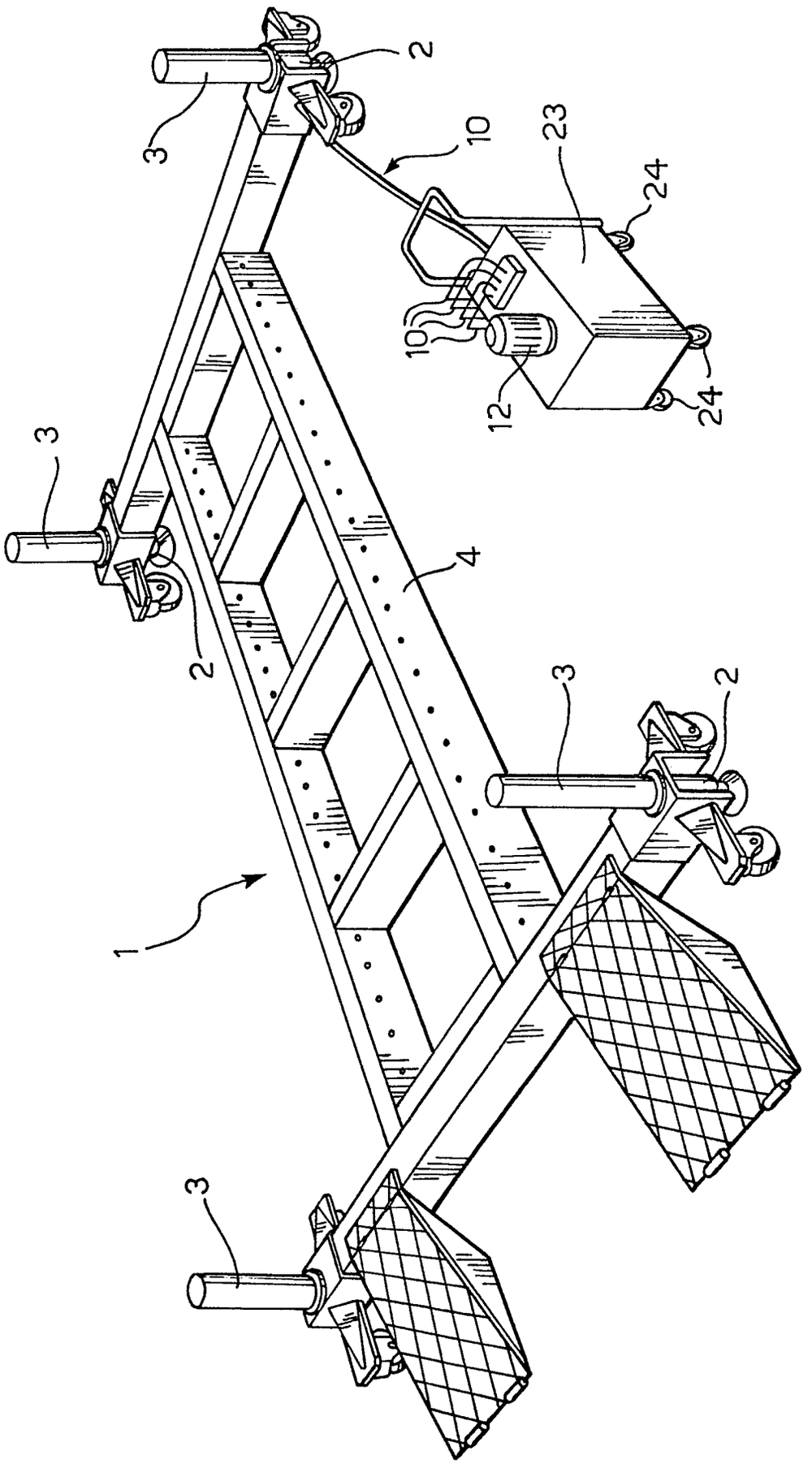


FIG. 1

FIG. 2

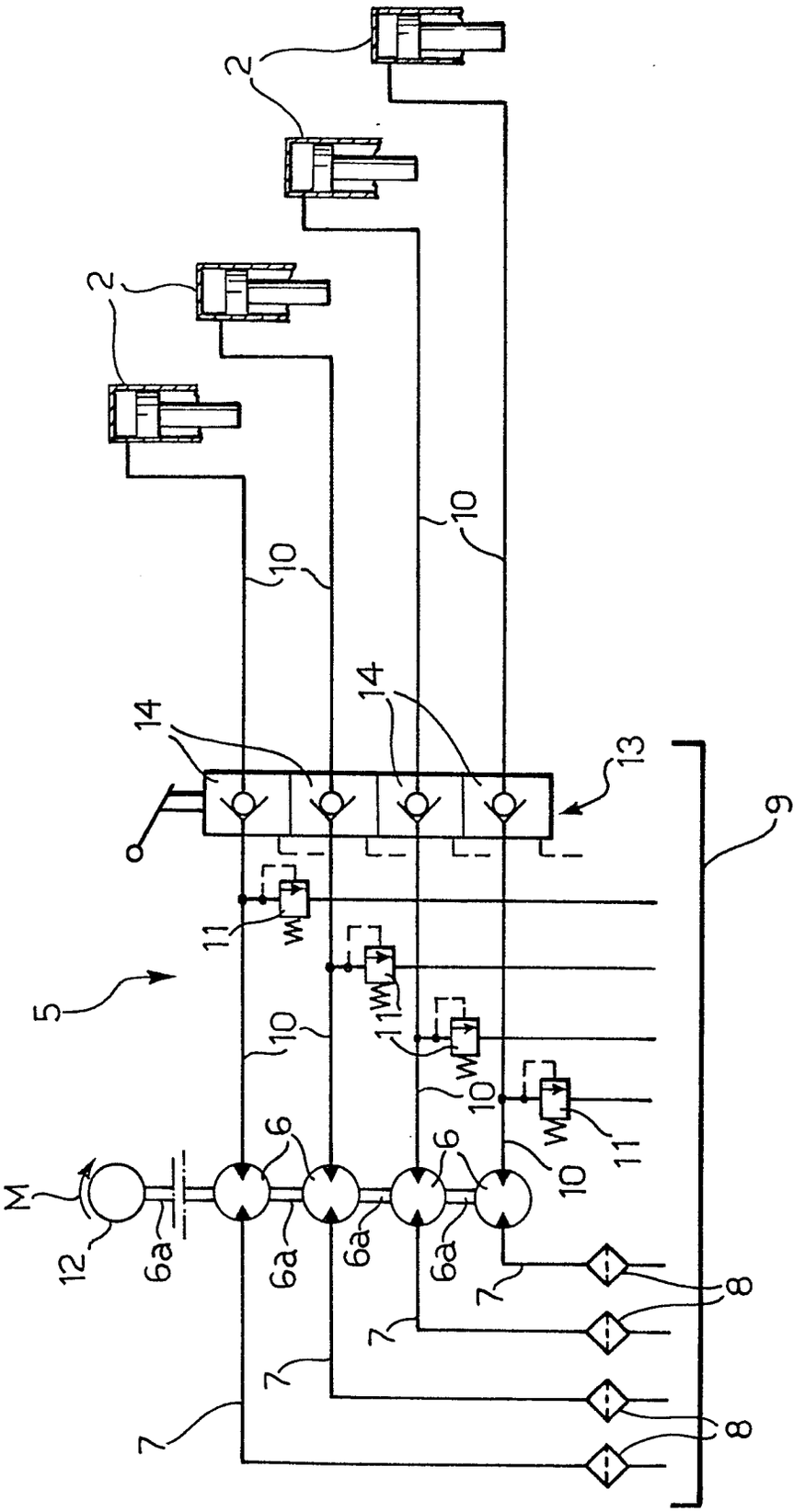


FIG. 4

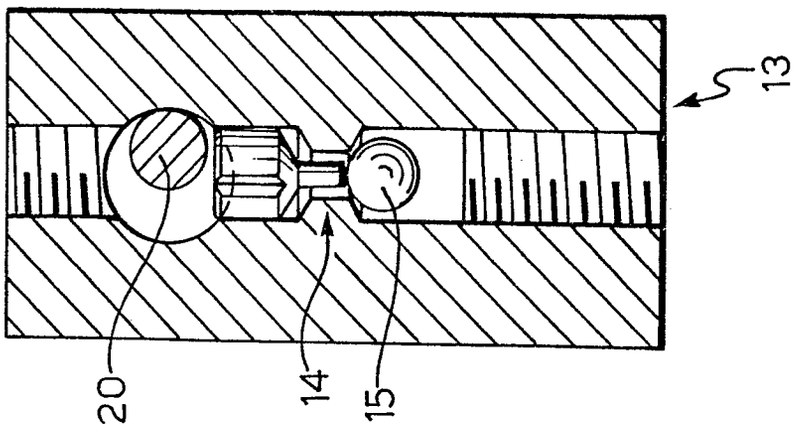


FIG. 3

