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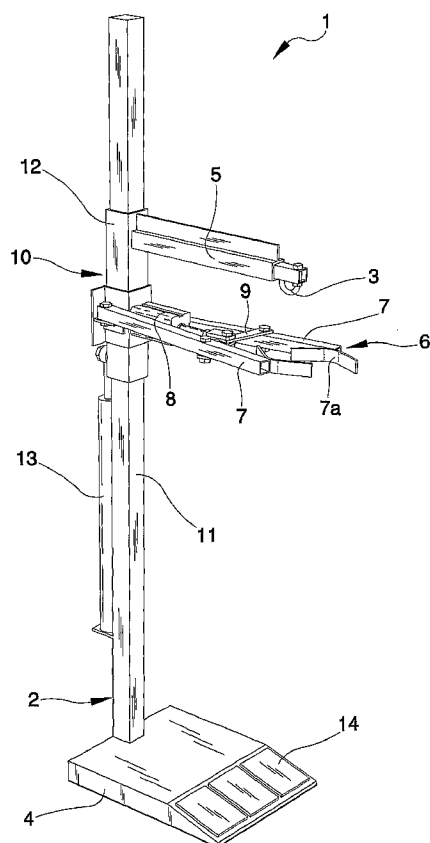
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(54) Title: APPARATUS FOR SUPPORTING TROUSERS, PARTICULARLY USABLE DURING THE FINISHING OPERATIONS IN IRONING TROUSERS



(57) Abstract: The apparatus for supporting trousers, particularly usable during the finishing operations in ironing trousers, comprising a bearing structure, fastening means associated to the bearing structure and to which, in one work configuration, at least one trouser support element is associable, with the trousers having at least one end associated removably to the support element and extending along a substantially vertical direction, and automatic removal means for removing the support element from the trousers.

APPARATUS FOR SUPPORTING TROUSERS, PARTICULARLY USABLE DURING THE FINISHING OPERATIONS IN IRONING TROUSERS

Technical Field

- 5 The present invention relates to an apparatus for supporting trousers, particularly usable for the finishing operations in ironing trousers.

Background Art

It is common knowledge that professional ironing machines for ironing clothes are used in the industrial laundry sector or for industrial ironing in general.

- 10 With particular reference to ironing the crease in trousers, it is also common knowledge that there is the need to finish ironing by hand, after the above mentioned machines have been used.

- As a rule these finishing operations are done by an operator using an iron and with the trousers laying on a horizontal ironing surface or, alternatively, hanging
15 from a support hook and extending vertically.

This last solution is opted for particularly after using ironing machines with a vertical ironing surface.

- In this case, in fact, a pair of spring clamps is associated removable to each free end of the trouser legs and is used to hang the trousers on a support of the
20 ironing machine, during ironing, as well as to position the trousers on said hook in the next finishing phases.

- These spring clamps normally have two toothed appendages, spaced from each other, which can be inserted inside the opening by the free ends of the trouser legs and which are positionable by the edge of the opening in order to grip it
25 and keep it taut.

Once ironing is completed, the trousers are taken off the machine and hung, by means of the spring clamps, on the support hook that can either be fixed or, if wanted, manually height adjustable.

- The finishing operations are carried out by the operator on the trousers placed
30 vertically, using an iron.

The operator then removes the spring clamps from the hook, frees the trousers from the spring clamps and lastly positions the trousers on an ordinary clothes

hanger.

These finishing operations do have some drawbacks such as, for example, they are particularly wasteful in terms of time and even have an effect on the overall cost of ironing that is far from negligible.

- 5 In fact, the operator has to manually adjust the height of the hook based on his/her height and on the length of the trousers to iron.

In addition, removing the spring clamps from the trousers and positioning them correctly on a hanger constitute most of the "downtime" between one ironing operation and the next.

10 Object of the Invention

The main aim of the present invention is to provide an apparatus for supporting trousers that allows the finishing ironing operations to be done on trousers limiting inactivity times between one ironing phase and the next.

- 15 Within the scope of this technical aim, another object of this invention is to simplify such finishing operations as regards to ironing trousers.

Another object of this invention is to reduce the overall costs resulting from ironing trousers.

- 20 A further object of the invention is to cater for the previous aims with a simple structure, of relatively easy practical implementation, safe and effective to use and work, as well as having a fairly low cost.

- All the objects described above are achieved with this apparatus for supporting trousers, particularly usable during the finishing operations in ironing trousers, characterised in that it comprises a bearing structure, fastening means associated to said bearing structure and to which, in one work configuration, at least one
25 trouser support element is associable, with said trousers having at least one end associated removable to said support element and extending along a substantially vertical direction, and automatic removal means for removing said support element from said trousers.

Brief Description of the Drawings

- 30 Further characteristics and advantages of the present invention will appear more evident from the detailed description of a preferred, but not exclusive, embodiment of an apparatus for supporting trousers, particularly usable during

the finishing operations in ironing trousers, illustrated by way of non limiting example in the accompanying drawings, wherein:

figure 1 is a perspective view of the apparatus according to the invention;

figure 2, 3 and 4 are perspective views showing three subsequent phases of the

5 use of the apparatus according to the invention.

Embodiments of the Invention

With special reference to such figures, the reference numeral 1 globally designates an apparatus for supporting trousers, particularly usable during the manual finishing operations in ironing trousers, after using professional ironing
10 machines.

The apparatus 1 comprises a bearing structure 2 that supports fastening means 3 and to which, in a work configuration, at least one support element S of trousers P is associable.

In the particular embodiment of the apparatus 1 in question, the bearing
15 structure 2 develops along a substantially vertical direction and comprises one floor standing base 4. An arm 5 extends substantially horizontally from a top portion of the bearing structure 2 and has the free end with the above mentioned fastening means 3 made up, for example, of a hook.

However, different conformations of the bearing structure 2 and/or different
20 types or arrangements of the fastening means 3 are not excluded.

In the work configuration the support element S is hanging from the hook 3 and the trousers P have at least one end associated removable to the support element S and extend downwards along a substantially vertical direction.

More specifically, the apparatus 1 sees the use of a pair of such support
25 elements S, made up of metal spring clamps, of the type normally used to support trousers P during conventional ironing operations performed by professional ironing machines. The spring clamps S are applied at each free end of the trouser P legs and both hang from the hook 3.

Particularly, the spring clamps S comprise one gripping section S1 associable to
30 the hook 3, substantially curved and bending when pressed, which extends into a pair of rods S2 substantially parallel to each other. The rods S2 have ends with respective toothed appendages S3 and insertable inside the opening A by the

free end of one of the trouser P legs.

Each of the spring clamps S is normally open with the rods S2 substantially distant from each other and their respective appendages S3 inserted inside one of said openings A of the trouser P legs, in contact with substantially opposite
5 sections of the edge extended in such a way.

By pressing on the rods S2 to bring them closer together, the appendages S3 move away and disengage from the respective sections of the edge of the opening A.

Advantageously, the apparatus 1 comprises automatic removal means 6 of the
10 spring clamps S from the trousers P.

The automatic removal means 6 are made up of a gripping body associated to the bearing structure 2, below the arm 5, which can be fastened on the rods S2 of the spring clamps S for the disengagement of the appendages S3 from the edge of the openings A of the trousers P.

15 Particularly, the gripping body 6 comprises a pair of small arms 7 hinged to the bearing structure 2 and turnable thanks to the action of first actuator means 8 between an open configuration, in which they are substantially distant from each other and detached from the spring clamps S, and a closed configuration, in which they are substantially brought together and engaged on sections of
20 respective rods S2 of the spring clamps S.

Particularly, the small arms 7 are substantially horizontal and turnable around their respective substantially vertical hinged axis.

Usefully, each of the small arms 7 has the free end with a contact surface 7a substantially of a concave shape to define an invitation housing of the rods S2.

25 The first actuator means 8 are made up of a first linear actuator, of the type of a pneumatic, hydraulic or electro-mechanical cylinder, that has one end associated to the bearing structure 2 and the opposite end associated to the small arms 7 by interposition of a system of levers 9.

In particular, the first actuator 8 is associated to the bearing structure 2 between
30 the hinging axes of the small arms 7 and is arranged substantially parallel to the small arms 7.

The system of levers 9 comprises a first lever and a second lever that have an

end hinged at a point on the mobile portion of the first actuator 8 and hinged, at the opposite end, by the substantially intermediate sections of respective small arms 7.

Hence the extension of the first actuator 8 leads to the rotation of the first and
5 second lever, with the two small arms 7 moving away from each other. On the contrary, the retraction of the first actuator 8 leads to the rotation of the first and second lever with the small arms 7 moving closer together.

Advantageously, the bearing structure 2 comprises moving means 10 of the fastening means 3 and automatic removal means 6 along a substantially vertical
10 moving direction. Such moving means 10 are suitable for adjusting the height of the trousers P, in the work configuration, according to parameters such as the length of the trousers P and/or the height of the operator who has to perform the ironing finishing procedure.

In particular, the bearing structure 2 comprises an upright 11 supported by the
15 base 4 and the moving means 10 comprise a sliding carriage 12 that supports the arm 5 and the gripping body 6 and is movable along said vertical direction, on said upright 11, due to the action of second actuator means 13.

The second actuator means 13 are made up of a second linear actuator, of the type of a pneumatic, hydraulic or electro-mechanical cylinder with one end
20 anchored to the upright 11 and the opposite end fixed to the sliding carriage 12.

Usefully, the arm 5 is suitably shaped to define at least one housing section for one or more clothes hangers G of the type conventionally used in the industrial laundry sector.

Such hangers G are generally made up of a top portion G1 that has a hook and
25 supports a small rod G2 for supporting trousers.

Particularly, the arm 5 is substantially straight and has a shaped cross section that partly reproduces the profile of the top portion G1 of the hangers G to support. The hangers G are positioned with the top portion G1 resting on the arm 5 and with the small rod G2 suitable for supporting the trousers P placed
30 below the arm 5.

Usefully, the apparatus 1 comprises a control unit, of the type of an electronic control unit or the like, operatively connected to the first actuator 8 and to the

second actuator 13.

The control unit is operatively connected to a control foot pedal 14, defined by the standing base 4 and suitable for allowing the operator to start the first actuator 8 and the second actuator 13.

- 5 When using the apparatus 1 the operator places one or more hangers G on the arm 5 to start with.

Subsequently, the operator hangs the two spring clamps S associated to the free ends of both trouser P legs on the hook 3 (Figure 2).

- The height of the hook 3 can be adjusted if needed by the operator according to
10 the length of the trousers P and his/her height. In fact, by means of the relative control on the foot pedal 14 the operator can start the second actuator 13 so the sliding carriage 12 can slide up or down along the upright 11.

With the trousers P hanging in this fashion, they are extending vertically and downwards and the operator can finish ironing by hand using an iron.

- 15 After this the operator moves one of the hangers G down from the arm 5 until its small rod G2 is by a middle section of the trousers P (Figure 3).

By pressing the control on the foot pedal 14, the operator starts the first actuator 8, bringing the small arms 7 into the closed configuration for the disengagement of the appendages S3 of the spring clamps S from the openings A of the trousers

- 20 P (Figure 4).

The finishing operation is now complete and the trousers P are ready to hang on the hanger G.

It was in actual fact seen how the invention described achieves the objects set and, in particular, the fact is underlined that by using the automatic removal
25 means of the spring clamps from the trousers it is possible to speed up and streamline the phases following the manual finishing of ironing trousers with a considerable reduction in overall ironing costs.

- Being able to put the hangers on the arm of the apparatus and the simplicity with which they can be positioned by the operator on the trousers results in even
30 less downtimes between one ironing phase and the next.

Another advantage is given by the presence of the moving means of the fastening means, which simplify positioning the trousers at the right height

depending on the length of the trousers and/or the height of the operator.

The invention thus conceived is susceptible to numerous modifications and variations, all of which falling within the scope of the inventive concept.

Furthermore all the details can be replaced with others that are technically
5 equivalent.

In practice, the materials used, as well as the shapes and dimensions, may be any according to requirements without because of this moving outside the protection scope of the following claims.

CLAIMS

- 1) Apparatus for supporting trousers, particularly usable during the finishing operations in ironing trousers, characterised in that it comprises a bearing structure, fastening means associated to said bearing structure and to which, in
5 one work configuration, at least one trouser support element is associable, with said trousers having at least one end associated removable to said support element and extending along a substantially vertical direction, and automatic removal means for removing said support element from said trousers.
- 2) Apparatus according to claim 1, characterised in that said support element is
10 of the spring clamp type associable to the free end of at least one of the legs of said trousers and said automatic removal means comprise at least one gripping body associated to said support structure and which can be tightened on said spring clamp.
- 3) Apparatus according to one or more of the preceding claims, characterised
15 in that said gripping body is arranged below said fastening means.
- 4) Apparatus according to one or more of the preceding claims, characterised in that said gripping body comprises at least one pair of small arms associated turnable to said bearing structure between an open configuration, in which they are substantially distant from each other, and a closed configuration, in which
20 they are substantially brought together and engaged on respective portions of said spring clamp for the disengagement of said spring clamp from said trousers.
- 5) Apparatus according to one or more of the preceding claims, characterised in that said small arms are turnable thanks to the action of first actuator means.
- 25 6) Apparatus according to one or more of the preceding claims, characterised in that said first actuator means comprise at least a first linear actuator having one end associated to said bearing structure and the opposite end associated to at least one of said small arms.
- 7) Apparatus according to one or more of the preceding claims, characterised
30 in that each of said small arms has the free end having at least one contact surface with at least one portion of said spring clamp.
- 8) Apparatus according to one or more of the preceding claims, characterised

in that said contact surface has substantially a concave shape to define an invitation housing of said portion of spring clamp.

9) Apparatus according to one or more of the preceding claims, characterised in that said bearing structure develops substantially in a vertical direction.

5 10) Apparatus according to one or more of the preceding claims, characterised in that said bearing structure comprises at least one floor standing base.

11) Apparatus according to one or more of the preceding claims, characterised in that said bearing structure comprises at least one substantially horizontal arm having said fastening means.

10 12) Apparatus according to one or more of the preceding claims, characterised in that said arm is defined close to a top portion of said bearing structure.

13) Apparatus according to one or more of the preceding claims, characterised in that said bearing structure comprises moving means of at least one between said fastening means and said automatic removal means along at least one
15 moving direction.

14) Apparatus according to one or more of the preceding claims, characterised in that said moving means comprise at least one carriage sliding along said moving direction.

15) Apparatus according to one or more of the preceding claims, characterised
20 in that said fastening means are integrally associated to said sliding carriage.

16) Apparatus according to one or more of the preceding claims, characterised in that said gripping body is integrally associated to said sliding carriage.

17) Apparatus according to one or more of the preceding claims, characterised in that said moving means comprise second actuator means of the movement of
25 said carriage sliding along said moving direction.

18) Apparatus according to one or more of the preceding claims, characterised in that said moving direction is substantially vertical.

19) Apparatus according to one or more of the preceding claims, characterised in that said bearing structure comprises at least one upright.

30 20) Apparatus according to one or more of the preceding claims, characterised in that said sliding carriage is associated movable along said upright.

21) Apparatus according to one or more of the preceding claims, characterised

in that said second actuator means comprise at least a second linear actuator associated to said upright at one end and associated to said sliding carriage at the opposite end.

22) Apparatus according to one or more of the preceding claims, characterised
5 in that said arm is integrally associated with said sliding carriage.

23) Apparatus according to one or more of the preceding claims, characterised in that said fastening means comprise at least one hook.

24) Apparatus according to one or more of the preceding claims, characterised in that said hook is associated close to the free end of said arm.

10 25) Apparatus according to one or more of the preceding claims, characterised in that said arm is shaped to define at least one housing section of clothes hangers.

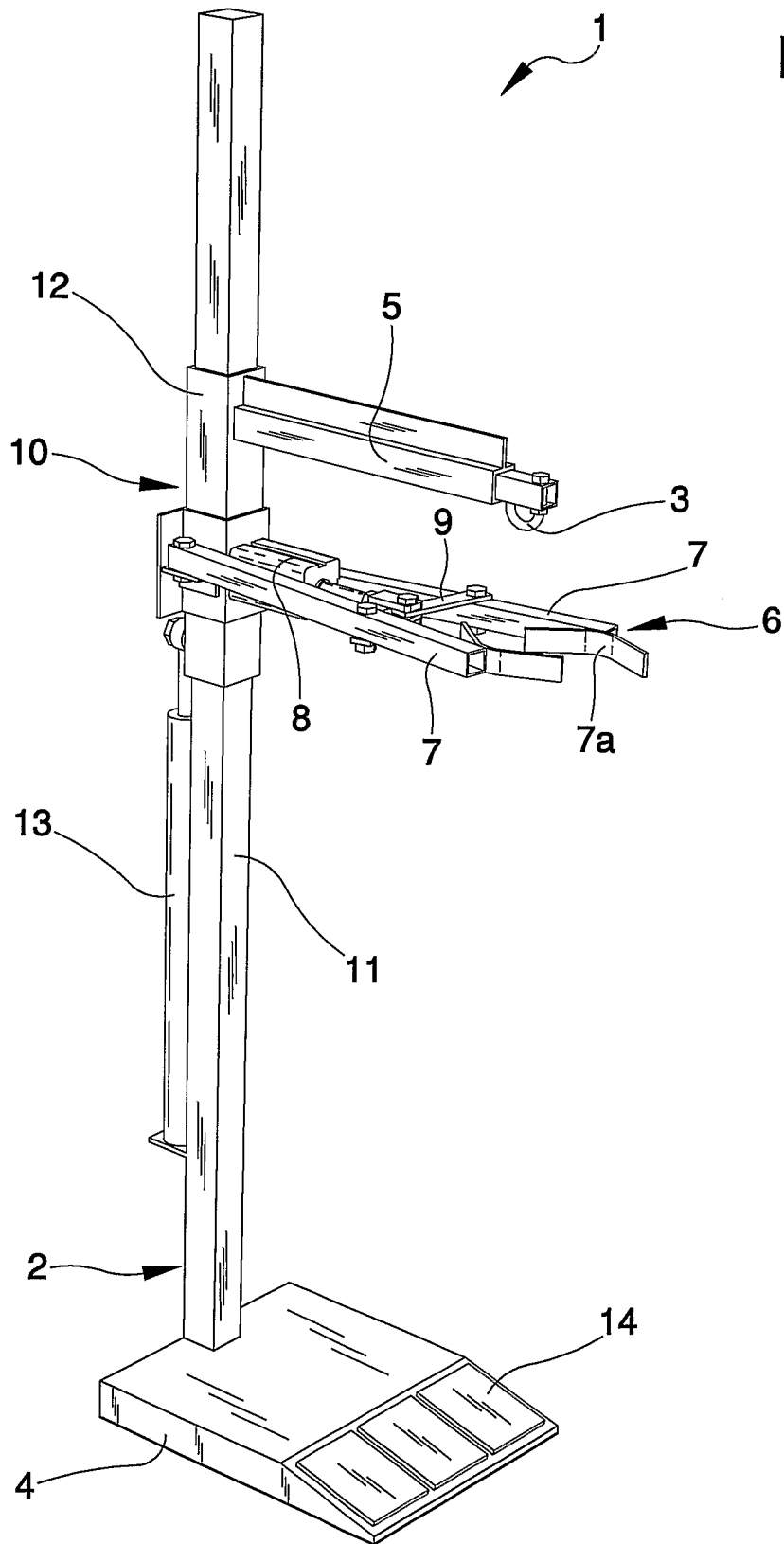
26) Apparatus according to one or more of the preceding claims, characterised in that it comprises at least one control unit operatively connected to at least one
15 between said automatic removal means and said moving means.

27) Apparatus according to one or more of the preceding claims, characterised in that said control unit is operatively connected to at least one control foot pedal, defined by said standing base.

28) Apparatus according to one or more of the preceding claims, characterised
20 in that at least one between said first linear actuator and said second linear actuator is of the type of a pneumatic, hydraulic or electro-mechanical cylinder.

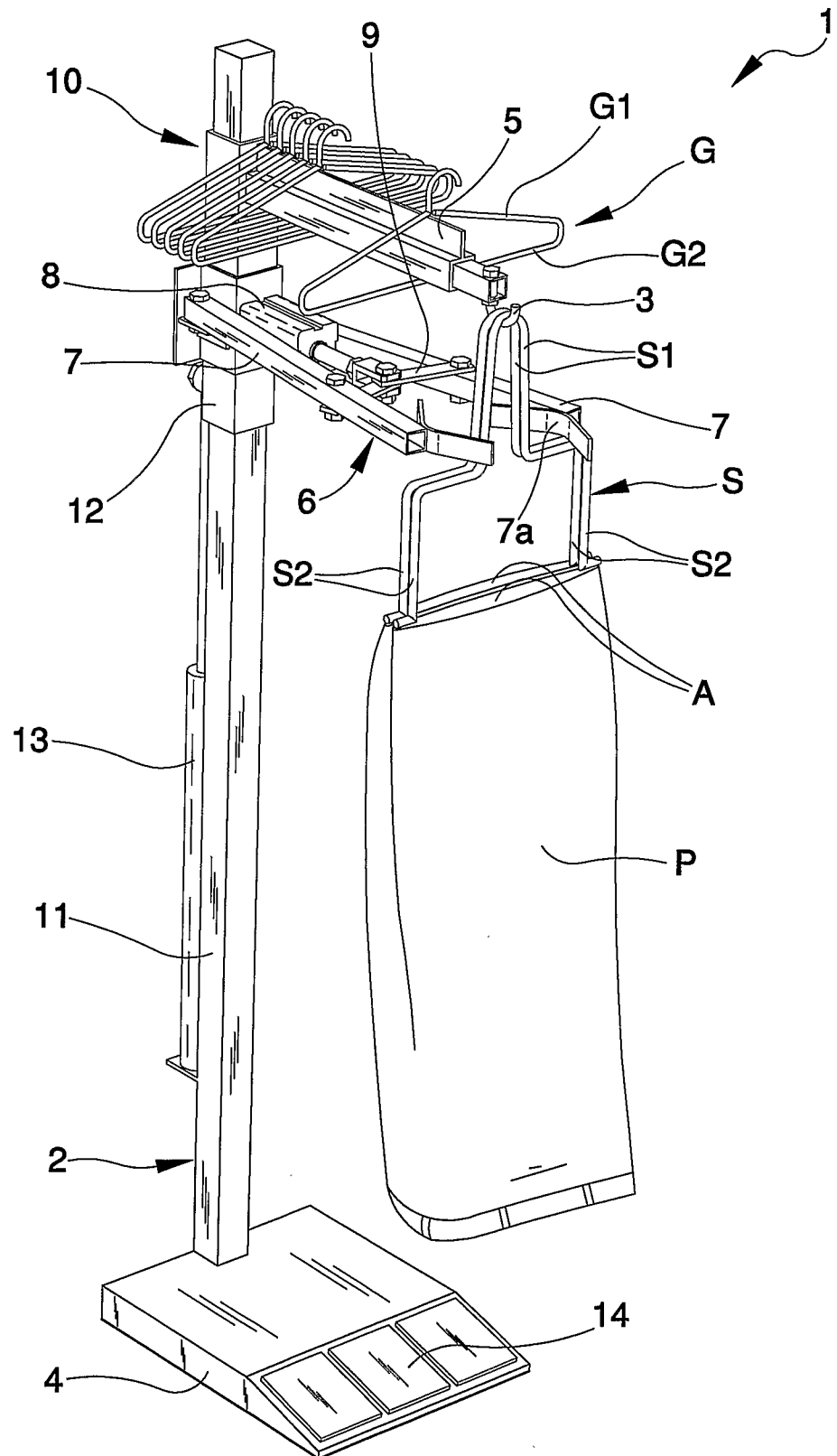
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Fig. 1



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Fig. 2



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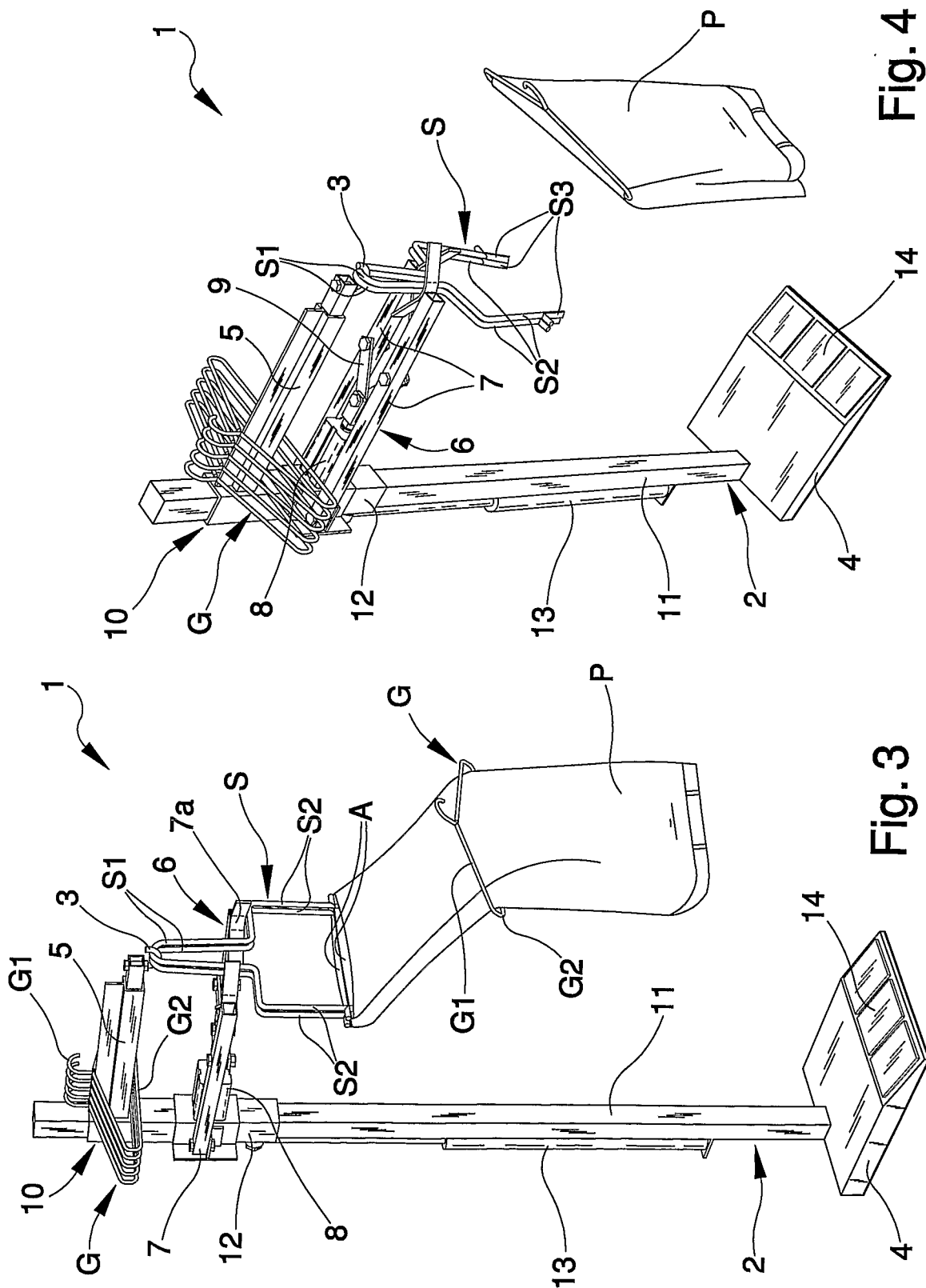


Fig. 4

Fig. 3