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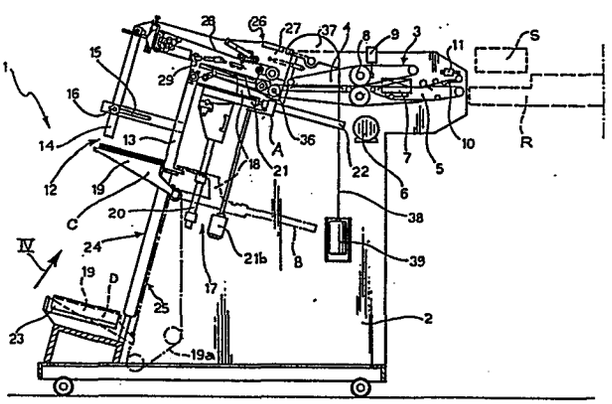
(54) Signature stacking machine.

(57) The machine comprises a supporting structure (2) to which are attached an approximately vertical-axis cage (12) for stacking signatures, and conveyor means (3) arranged to receive a continuous stream of signatures and feed these signatures to the stacking cage (12). Two platforms (18, 19) located one above the other, are movable axially relative to the stacking cage (12), the upper platform (18) (blade) being intended to receive the signatures fed to the stacking cage (12) and being lowerable as the signatures are stacked thereon, towards the lower platform (19) in synchronism with the feed movement of the signatures. The upper platform (18) can then be withdrawn from the stacking cage (12) to transfer the pile of signatures formed thereon onto the lower platform (19). Above the stacking cage (12) is a guide element for the signatures (26), this guide element (26) being at least partially movable relative to the structure (2) in the direction of stacking of the signatures themselves. The arrangement is such that the guide element (26) is kept constantly in a position of substantial contact with the last signature fed to the cage (12), its position being varied as a result of momentary variations in the speed of stacking of the signatures in order to prevent jamming of the signatures themselves.



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Signature stacking machine.

The present invention relates to machines for stacking signatures. Such machines are currently used in the printing and publishing industry for forming packs of signatures for making up into magazines and the like starting from unbound signatures.

In general, the signatures which come in a continuous stream from the exit of a printing press such as, for example, a rotary press, are collected by hand into small packs called bunches which are deposited on pallets, carriages or the like to be passed on to the collating department.

Machines are known in which the signatures are collected in taller piles which may be bound or strapped to facilitate their movement. Normally each pile is held together by two rigid plates which also have the function of protecting the profile of the signatures from any damage during the binding or strapping operations.

The object of the present invention is to provide a machine which enables signatures fed thereto in a continuous stream to be collected into successive piles at a very high working rate using a small number of employees.

This object is achieved according to the present invention by virtue of a machine of the type specified above, characterised in that it comprises:

- a support structure attached to which are an approximately vertical-axis cage for the stacking of signatures, and conveyor means arranged to receive a continuous stream of signatures and to advance these signatures towards the stacking cage,

- two platforms located one above the other and aligned in the longitudinal direction of the stacking cage, the upper platform being intended to receive signatures fed to the cage and being lowerable towards the lower platform from a position of substantial alignment with the conveyor means in a movement synchronised with the advancing movement of the signatures whereby to cause the formation of a pile of signatures on its upper face, the upper platform being withdrawable selectively from the stacking cage to transfer the pile of signatures on to the lower platform, and

- a guide element for guiding movement of the signatures, the element being located above the stacking cage and being at least partially movable relative to the structure in the direction of stacking of the signatures, the arrangement of the guide element being such that it is kept constantly in a position of substantial contact with the last signature fed to the cage, its position being varied as a result of momentary variations in the speed of stacking of the signatures in order to prevent compaction of the signatures themselves.

By virtue of this characteristic, a signature stacking machine is provided which enables the formation of successive piles containing a large number of signatures in a nearly completely automated operating cycle which allows high working rates to be achieved together with an end product of considerable quality.

More particularly, the use of an element for guiding the movement of the signatures relative to the structureavoids the typical disadvantage of jamming of the articles to be stacked which frequently occurs in stacking machines as a result of momentary

variations in the stacking speed due to variation in the rate of feed of the articles and the presence of variations in the thickness of the articles stacked.

These variations generally occur in signatures which, while being subject to successive compressions, retain a certain quantity of air within them which makes them resiliently compressible and may easily cause variations in thickness even of a considerable amount between two signatures fed sequentially to the stacking machine.

A further disadvantage is typically found where the signatures concerned are made by successive foldings of a single sheet. In this case the rigidity and thickness of each signature vary transversely of the signature itself, for example, as a result of the presence of lateral folded edges.

In order to remedy this disadvantage, according to a preferred embodiment, the machine according to the invention includes a guide element having associated motor-driven rotary bodies for moving the signatures, these rotary bodies being arranged in groups each of which includes rotary bodies mutually aligned in the direction of advance of the signatures; each of the groups of rotary bodies, typically constituted by pulleys connected by belts for moving the signatures, has associated support means which are independently adjustable in order to adapt the overall disposition of the rotary bodies to the transverse profile of the signature.

According to a further preferred characteristic of the machine according to the invention, a drive

mechanism is associated with the upper platform, this mechanism being disposed towards the interior of the support structure relative to the stacking cage whereby withdrawal movement of the upper platform relative to the stacking cage takes place towards the interior of the structure.

This further characteristic is intended to make the operation of the machine safer, avoiding the movement of movable parts towards the exterior of the machine which could result in danger to the operators.

The invention will now be described purely by way of non-limiting example with reference to the appended drawings in which:

Figure 1 is a partially cut-away and sectioned side elevational view of a machine according to the invention,

Figure 2 shows several of the elements visible in Figure 1 in greater detail and on an enlarged scale,

Figure 3, which is substantially similar to Figure 2, illustrates a possible variant of the machine, and

Figure 4 is a view taken in the direction of arrow IV of Figure 1.

In the drawings, a machine generally indicated 1 is used for stacking signatures leaving a printing machine such as a rotary press R in a continuous stream.

The signatures are arranged in overlapping relation with their spines foremost. Their number and their speed of advance can be continually monitored by means of a counter S located adjacent the outlet of the machine R.

Feed of the signatures with their spines foremost is considered preferable for operation of the machine 1: should they not be so disposed on leaving the machine R, it is thus helpful to interpose, between the machine R and the machine 1, any known device for turning the signatures over about their spines.

The machine 1 has a support structure 2 mounted on wheels that allow its rapid and easy movement.

An entrainment assembly generally indicated 3 is mounted on the upper portion of the structure 2 and is intended to be fed with the continuous stream of signatures leaving the machine R. The entrainment assembly 3 includes two superposed belt conveyors 4, 5 operatively driven by a motor 6 carried by the structure 2.

Associated with the conveyors 4 and 5 is a pair of movable elements 7 for effecting the squaring and precise alignment of the signatures as they are advanced along the conveyors themselves.

Reference 8 indicates pressure rollers which form part of the upper conveyor 4 and are urged against the lower conveyor 5 by a pneumatic jack 9 so as to flatten the signatures as much as possible, forcing out air trapped between the pages.

A pivoted stop element 10 is located above the conveyor 5 at the inlet end of the conveyor itself.

The stop member 10 is movable by a pneumatic jack 11 between a raised position in which the signatures coming from the machine R may advance freely towards the pressure rollers 8, and a lowered position in which it prevents the advance of the signatures.

The lowering of the stop element 10, normally controlled by the counter S, is intended to produce gaps or voids in the continuous flow of signatures fed to the stacking machine 1, these gaps separating groups of signatures intended to be stacked separately as will be best understood below.

A stacking cage 12 for the signatures is attached to the side of the structure 2 opposite the conveyor assembly 3.

The stacking cage 12 is constituted by a plurality of profiled elements schematically indicated 13 and 14, which together define a rectangular section chamber with an approximately vertical axis. The profiled elements 13, 14 are provided with support members which allow their translational movement along one or two coordinate directions lying in a plane transverse the cage 12 whereby to enable the dimensions of the cage itself to be adjusted to the dimensions of the signatures to be stacked.

In the embodiment illustrated, two cross members indicated 15 (only one of which is visible in the drawings) project from the structure 2 and support the profiled elements 14 at their free ends so as to define the outer side of the cage 12. The position of fixing of the elements 14 on the cross members 15 is adjustable by means of a rotary knob 16 or like device.

A mechanism generally indicated 17 controls the movement of two superposed movable platforms 18, 19, aligned in the longitudinal direction of the stacking cage 12.

The mechanism 17 includes two guides 20 which extend parallel to the profiled elements 13 adjacent the side of the stacking cage 12 facing inwardly of the structure 2.

A slide member 21 is slidable on the guides 20 between a raised position A illustrated in the drawings in full outline and a lowered position B illustrated in chain lines.

The slide member 21 has slide guides 21a which extend towards the stacking cage 12 in a radial direction relative to the cage itself.

The movable upper platform or blade 18 is movable on the guides 21a under the action of a pneumatic jack 22 which projects from the slide member 21 towards the interior of the structure 2.

The blade 18 is thus movable on the slide member between a retracted position in which the blade 18 itself is withdrawn from the stacking cage 12, and an extended position in which the blade 18 extends into the cage and can be impinged upon by the stream of signatures to be stacked, as will be better described below.

The drawings illustrate in full outline the blade 18 when it is in its retracted position on the slide member 21, the latter being in its fully raised position (A).

The chain line in Figure 1 illustrates the blade 18 when the blade 18 is in its retracted position and the slide member 21 in its lowered position.

In Figures 2 and 3 the position (indicated A_1) taken up by the blade 18 when the blade extends into the stacking cage 12 with the slide member 21 in its raised position (A), is illustrated schematically by a broken line.

The position of maximum extension of the blade 18 into the stacking cage 12 with the slide member 21 in the lowered position (B), is not illustrated in these drawings.

The lowering of the slide member 21 from its raised position A to its lowered position B (which involves an identical lowering movement of the blade 18) is effected by pneumatic actuators schematically indicated at 21b.

The operation of these actuators is synchronised, for reasons which will be better explained below, with the operation of the motor 6 that drives the conveyors 4, 5 causing advance of the signatures into the stacking machine.

Further actuators, constituted for example by motor-driven chains 19a which pass around return pulleys keyed onto shafts fixed to the structure 2, control the movement of the lower platform 19 between a fully raised position, illustrated in full outline and indicated C in Figure 1, and a fully lowered position illustrated in broken outline and indicated D in the same Figure.

The amplitudes of movement of the slide member 11 and of the lower platform 19 is regulated so that the fully raised position C of the lower platform 19 basically corresponds to the fully lowered position of the upper platform or blade 18.

As will be best seen below, this arrangement is intended to allow the transfer of a pile of signatures already formed on the blade 18 onto the lower platform 19.

The movement of the lower platform 19 towards its lowered position D is also coordinated with the speed of advance of the signatures between the belt conveyors 4 and 5, and brings the lower platform 19 into a position of alignment with the base plane of a conveyor device located on the lower portion of the structure 2 and extending in a direction transverse the direction of advance of the signatures on the conveyors 4 and 5.

This conveyor includes two groups of rollers indicated 23 and 24 respectively. The rollers 23 run along the base plane of the conveyor, this plane being perpendicular to the main axis of the cage 12. The rollers 24 extend as an elongation of the side of the stacking cage 12 nearest the structure 2.

The rollers 23 and 24 cooperate to support, in an approximately vertical position, piles of signatures deposited thereon by the lower platform 19 that moves, under the action of the chains 19a, along guides 25 located on the side of the rollers 24 nearest the structure.

Preferably, the lower platform 19 is constituted by a forked element the tines of which project from the exterior of the structure 2 through the spaces between the rollers 24. In the lowered position D, these tines extend into the spaces between the rollers 23.

A pivoted element generally indicated 26 is located downstream of the entrainment assembly 3 in the direction of advance of the signatures.

The element 26, which is intended to regulate the feed of signatures to the cage 12, is basically constituted by a pair of outer side supports 27 that support two superposed belt conveyors 28 and 29 receiving the signatures leaving the belt conveyors 4 and 5.

As is best seen in Figure 4, each of the conveyors 28 and 29 includes four belts indicated 28a to 28d and 29a to 29d respectively.

At least some of the circulation pulleys for the belts of the conveyors 28 and 29, instead of being keyed directly onto shafts rigid with the side supports 27 of the element 26, are mounted on movable elements the orientation of which relative to the structure of the element 26 is selectively adjustable.

In Figures 2 and 3, reference 30 illustrates one of these movable elements shaped as an L, that supports one of the circulation pulleys for the belt 28b.

Reference 31 indicates, moreover, a movable unit on which the outermost circulation pulley of each belt is mounted. The position occupied by the movable unit 31 can be selectivley adjusted by means of a screw member.

The arrangement described allows each of the belts of the conveyor 28 to be differently angled.

It is thus possible to adapt the transverse profile of the conveyor to the characteristics of the signatures fed to it. As indicated above, the signatures, particularly those obtained by successive foldings of a single sheet, do not generally have a uniform transverse profile and, in addition to the spine,

have at least one rigid, thickened side edge, in which a certain quantity of air is trapped within the signature.

At least one further group of pressure rollers is associated with the element 26 in addition to any further squaring elements, these rollers being arranged to squeeze the signatures in order to vibrate them and to make them more rigid in the movement direction immediately before other signatures are fed to the stacking cage 12.

In the embodiment illustrated, these pressure rollers, referenced 32, are associated with the upper belt conveyor 28 and press the signatures against the pulleys that define the discharge end of the lower conveyor 29, these pulleys being located in a position substantially aligned with the inner side of the stacking cage 12.

The pulleys defining the discharge end of the upper conveyor 29 are however mounted on the movable units 31 which are substantially aligned with the outer side of the same stacking cage 12.

Horizontal-axis rotary discs indicated 33 are mounted on the movable units 31. Around the periphery of each disc 33 are mounted idle bearings 33a which, as a result of rotation of the disc 33 itself, achieve a slight hammering action of the upper face of the signatures fed towards the cage 12. In this manner the signatures are pushed into positions of alignment against the outer side of the cage 12.

Reference 34 indicates an optical sensor that comprises a light source 34a intended to illuminate the upper face of the blade 18, and a photo-detector 34b arranged

to receive the radiation reflected back by a strip 35 of light reflecting material (for example a strip of reflecting tape) applied to the upper face of the blade 18 itself. The optical sensor 34 is intended to detect the presence or absence of signatures on the upper face of the blade 18 when the blade 18 is in its retracted position and the slide member 21 in its fully raised position.

The conveyors 28 and 29 are operated by a drive shaft 36 which in its turn is rotated by the entrainment assembly 3.

In the presently preferred embodiment, the shaft 36 carries four keyed pulleys around which pass the belts of the lower conveyor 29 mounted on the element 26.

Also keyed to the shaft 36 is a pulley around which passes a belt circulated by the lower conveyor 5. In this manner the complete synchronisation of the movements of the conveyors 4 and 5 and the conveyors 28 and 29 is ensured, thereby avoiding any possible discrepancies in entrainment speed that might result in the signatures 1a forming folds, rucks or similar defects.

The shaft 36 is carried by supports fixed to the structure 2 and in its turn carries, with the interposition of bearings, the side supports 27 of the element 26.

The element 26 is thus hinged to the structure 2 at one of its ends and can pivot about a horizontal axis corresponding to the axis of the shaft 36.

As a result of this pivoting, the end of the element 26 which overlies the stacking cage 12 can undergo translational movement along the longitudinal axis of the stacking cage 12 itself.

The element 26 is held in a position of equilibrium by a balance mechanism comprising two bodies 37, in the form of sectors of a circle, rotatably mounted about a single horizontal axis on the opposite sides of the structure 2.

Each body 37 is provided externally with a groove around which passes one end of a cable or a chain 38 the opposite end of which is connected to a counterweight 39.

Each body 37 also has a hub portion 40 on which is wound one end of a further metal cable or chain 41 the opposite end of which is connected to one of the side supports 27 of the element 26.

The cables 41 are connected to the side supports 27 in correspondence with the upper ends of these side supports that is, in a position offset relative to the shaft 36 to which the side supports 27are connected at their lower ends.

The arrangement is such that, with the weight of the counterweight 39 properly adjusted, it is possible to maintain the body 26 in a position of equilibrium in which the lower passes of the conveyor belts 28 and the upper passes of the conveyor 29 are substantially coplanar with each other, and lie in a plane approximately corresponding to the plane in which the upper face of the blade 18 lies when the slide member 21 is in its raised position A.

This position of alignment constitutes an equilibrium position from which the element 26 may easily move under the effect of modest forces exerted on the element 26 itself in a direction towards the main axis of the cage 12, that is, towards a stack of signatures.

The size of the pivoting movement of the element 26 is limited by adjustable check elements one of which is indicated 42 in Figures 2 and 3.

In the variant illustrated in Figure 3, the movable upper platform or blade 18 is mounted on the slide member 21 through a hinge element 43 which allows the blade 18 itself also to effect a slight pivoting or training movement about a horizontal axis defined by the element 43.

Resilient elements 44 are interposed between the slide member 21 and the blade 18 and urge the blade 18 towards the conveyor belts 28, that is, towards the pivoting element 26.

In this arrangement, the blade 18 is thus able to follow pivoting movement of the element 26.

Also mounted on the structure 2 is an electro-pneumatic control unit (not visible in the drawings) which is connected to the sensor S for counting signatures. This control unit controls the operation of the stacking machine 1 to effect the cycle of operations that will now be described starting from an initial phase in which the upper platform or blade 18 is in its position A_1, that is, in a position of substantial alignment with the entrainment assembly 3, and the lower platform 19 is in its raised position and carries a rigid plate on its upper face (placed in position by the operator controlling the machine), the plate being intended to act as a base for a pile of signatures.

As the signatures start to leave the machine R in a continuous stream, they are received by the conveyors 4 and 6 which square and align them.

After they have been compressed by the rollers 8, the signatures are fed from the outlet of the conveyors 4 and 5 to the superposed conveyors 28 and 29 which direct them onto the upper face of the blade 18.

The pressure rollers 32 effect a further compression and the bearings 33a mounted on the discs 33 push the spines of the signatures into alignment against the elements 14 which define the outer side of the stacking cage 12.

Simultaneously with the beginning of the flow of signatures and in synchronism with their advancing movement (the speed of which is detected by the counter S or by similar devices), the slide member 21 starts to descend gradually down the guides 20, moving with it the upper platform or blade 18.

The signatures which are fed in sequence to the stacking cage 12 are superimposed one on another making a pile on the upper face of the blade 18, each signature sliding substantially unhindered on the upper face of the preceding signature which is moving downwardly as a result of the lowering of the slide member 21.

The element 26 and specifically the portion of the conveyor 28 projecting beyond the conveyor 29, acts as a pressure member which exerts a limited longitudinal thrust on the pile being formed within the cage 12, ensuring the controlled growth of the pile itself.

Any discontinuities in the rate of formation of the pile due to momentary variations in supply speed of the signatures or to variations in thickness of the signatures themselves, are immediately compensated

for by the pivoted guide element 26 the outer end of which is moved upwardly or downwardly so that this end is maintained continuously in contact with the last signature fed to the stacking cage 12.

The element 26 is so to speak "floating" on the pile of signatures and is thus able to achieve its guiding and regulating function even during momentary variations in the speed of formation of the pile itself.

This result could not be achieved with the use of a guide element fixed to the structure 2. Momentary increments in the speed of supply of the signatures, or the supply of signatures having a slightly greater thickness would in fact give rise to jamming of the next signature in the stacking cage 12 with the consequent stoppage (spontaneous or controlled) of the machine. The stoppage of the machine has serious consequences in the production cycle in which the machine takes part which provides for the daily stacking of a very high quantity (tens of thousands) of signatures.

The lowering movement of the slide member 21 continues until the blade 18 is brought into a position in which it is substantially coplanar with the plate located on the lower platform 19.

At this point the jack 22 is actuated to return the blade 18 to the retracted position.

As a result of this withdrawal of the blade 18, the pile of signatures formed in the cage 12 is transferred on to the platform 19 which starts to move downwardly towards its lowered position D.

The mounting arrangement of the blade 18 and its drive mechanism are such that the return movement of the blade 18 occurs toward the interior of the structure 2 avoiding danger to operators controlling the stacking machine.

The rate of lowering of the lower platform 19 is synchronised with the rate of stacking of the signatures in complete analogy with the lowering movement of the blade 18 described above.

Again in this case, the fact that the pile being formed is pressed down upon from above by a movable or floating element avoids blockages of the signatures at the mouth of the stacking cage 12.

While the pile-forming operation proceeds on the lower platform 19 as the latter is lowered, the slide member 21 is gradually returned from its lowered position B to its raised position A, the blade 18 being kept in its retracted position.

When the counter S indicates that the number of signatures constituting a pile has been fed to the machine 1, the stop member 10 is brought into its lowered position, momentarily interrupting the advance of signatures along the conveyor 5.

A gap or void is thus created in the flow of signatures, the presence of this gap being detected by the optical sensor 34 located above the blade 18.

In fact, immediately the last signature of the pile has passed over the blade 18 on its way towards the stacking cage 12, the sensor 34 senses a large increase in the reflectivity of the upper face of the blade 18 due to the strip of reflecting material 35.

After a short delay immediately following the passage of the final signature over the blade 18, this delay being intended to allow supply of the signature to the stacking cage 12, the jack 22 is again operated to return the blade 18 to its extended position A_1.

Simultaneously, the stop member 10 is returned to its raised position whereby signatures are again advanced towards the stacking cage 12 to start a new stacking cycle similar to the preceding one described.

In the meantime, the lower platform 19 is rapidly lowered to its lower position D and the pile of signatures supported thereon is placed on the rollers 23.

The pile thus formed may then be moved laterally on the rollers 23 and 24 after a plate has been put on the top of the pile itself, this plate being substantially similar to the base plate previously placed on the platform 19. The two plates are intended to facilitate the binding and strapping of the pile.

Immediately the formed pile is removed from its position of alignment with the stacking cage 12, the lower movable platform 19 is returned to its raised position C. Another plate is then placed on the platform itself to act as a base for a new pile of signatures the lower portion of which is beginning to be formed within the stacking cage 12 on the upper face of the blade 18.

CLAIMS

1. A signature stacking machine characterised in that it comprises:

- a support structure (2) attached to which are an approximately vertical-axis cage (12) for the stacking of signatures, and conveyor means (3) arranged to receive a continuous stream of signatures and to advance these signatures towards the stacking cage (12),

- two platforms (18, 19) located one above the other and aligned in the longitudinal direction of the stacking cage (12), the upper platform (18) being intended to receive signatures fed to the cage (12) and being lowerable towards the lower platform (19) from a position (A) of substantial alignment with the conveyor means (3) in a movement synchronised with the advancing movement of the signatures whereby to cause the formation of a pile of signatures on its upper face, the upper platform being withdrawable selectively from the stacking cage (12) to transfer the pile of signatures on to the lower platform (19), and

- a guide element (26) for guiding movement of the signatures, the element (26) being located above the stacking cage (12) and being at least partially movable relative to the structure (2) in the direction of stacking of the signatures, the arrangement of the guide element (26) being such that it is kept constantly in a position of substantial contact with the last signature fed to the cage (12), its position being varied as a result of momentary variations in the speed of stacking of the signatures in order to prevent jamming of the signatures themselves.

2. A machine according to Claim 1, characterised in that a conveyor device (23, 24) for discharging the stacked signatures is provided on the structure (2) below the

stacking cage (12), and in that, after withdrawal of the upper platform (18) of the stacking cage, the lower platform (19) is arranged to be lowered towards the said conveyor (23, 24) in a movement which, at least for part of its travel, is synchronised with the advancing movement of the signatures towards the stacking cage (12).

3. A machine according to Claim 1 or Claim 2, characterised in that the guide element (26) includes a pivoted body which can pivot around a horizontal axis (36) located adjacent the discharge end of the conveyor means (3).

4. A machine according to any one of Claims 1 to 3, characterised in that the guide element (26) has associated rotary bodies (28a - 28d; 29a - 29d) for displacing the signatures, the rotary bodies being arranged in groups each of which includes rotary bodies mutually aligned in the direction of advance of the signatures, and in that each group of rotary bodies has associated support elements (30, 31) which are independently adjustable in order to enable the overall arrangement of the groups of rotary bodies (28a - 28d) to be adapted to the transverse profile of the signatures.

5. A machine according to any one of Claims 1 to 3, characterised in that it comprises motor-driven belts (4, 5) arranged to advance the signatures towards the stacking cage (12), and a horizontal-axis shaft (36) which is located downstream of the motor-driven belts (4, 5) in the direction of advance of the signatures, and is rotated by the belts (5) themselves; in that the guide element (26) is pivotally mounted about the said shaft (36) and projects over

the stacking cage (12); and in that the guide element (26) has associated further belts (28, 29) which are driven by the said shaft (36) and serve to feed the signatures to the stacking cage (12).

6. A machine according to Claim 5, characterised in that the position of at least some of the further belts (28, 29) is independently adjustable in order to adapt the overall arrangement of the belts (28, 29) themselves to the transverse profile of the signatures.

7. A machine according to Claim 1 or Claim 5, characterised in that balancing suspension means (37 to 41) are interposed between the guide element (26) and the support structure (2) for the purpose of keeping the guide element (26) in equilibrium conditions within its said position of substantial contact with the last signature fed to the stacking cage (12).

8. A machine according to Claim 7, characterised in that the balancing suspension means comprise at least one element (37), in the form of a sector of a circle, having an outer peripheral groove and a central mounting hub (40) with a horizontal axis, the element being attached to a first flexible tensioning member (38) which at one end passes around the said groove and at its opposite end is provided with a counterweight (39), and a second flexible tensioning member (41) which is wound at one end on the said hub (40) and is connected at its opposite end to a region of the guide member (26) offset relative to the said horizontal-axis shaft (36).

9. A machine according to any one of Claims 1 to 8, characterised in that the said upper platform (18) has an associated operating mechanism disposed towards the interior of the support structure (2) relative to the stacking cage (12) whereby withdrawal of the upper platform (18) from the cage (12) takes place towards the interior of the structure (2).

10. A machine according to Claim 9, characterised in that the upper platform (18) is mounted on the operating mechanism (17) in an arrangement which allows limited translational movement of the upper platform (18) itself towards the guide element (26), and in that resilient means (44) are interposed between the upper platform (18) and the operating mechanism (17) which urge the upper platform (18) itself towards the guide element (26) whereby, at least during its initial phase of lowering towards the lower platform (19), the upper platform (18) can, in addition to this lowering movement, fulfill translational movements relative to the guide element (26) such as to prevent jamming of the signatures.

11. A machine according to Claim 9 or Claim 10, characterised in that the said operating mechanism comprises:

- first guides (20) fixed to the structure (2) substantially parallel to the side (13) of the stacking cage (12) facing the interior of the structure (2) itself,

- a slide member (21) movable longitudinally on the first guides (20) and having second slide guides (21a) for the upper platform (18), the second guides being substantially orthogonal to the first guides (20) and being oriented in a radial direction relative to the stacking cage (12), and

- drive means (21b, 22) acting on the slide member (21) and on the upper platform (18) in order to effect, cyclically, a sequence of operations comprising:

- the raising of the slide member (21) to the upper end of the first guides (20) with the upper platform (18) in its position of withdrawal towards the interior of the structure (2),

- the advance of the upper platform (18) towards the interior of the stacking cage (12),

- the gradual lowering of the slide member (21) towards the lower platform (19) with the upper platform (18) extended into the stacking cage (12), and

- the return of the upper platform (18) towards the interior of the support structure (2).

12. A machine according to any one of the preceding claims, characterised in that it comprises:

- a stop member (10, 11) associated with the conveyor means (4, 5) and arranged to momentarily interrupt the advance of signatures towards the stacking cage (12), and

- a sensor device (34) located above the upper platform (18) and arranged to detect the occurrence of an interruption of the feed of signatures to the stacking cage (12) in order, under these conditions, to cause the advance of the movable upper platform (18) into the cage (12) itself.

13. A machine according to Claim 11, characterised in that the sensor device comprises:

- a radiation source (34a) arranged to direct a beam of light at the upwardly-directed face of the upper platform (18), and

- a photo detector (34b) sensitive to radiation reflected from the said face.

14. A machine according to Claim 13, characterised in that a coating (35) of light-reflecting material is applied to the said face.

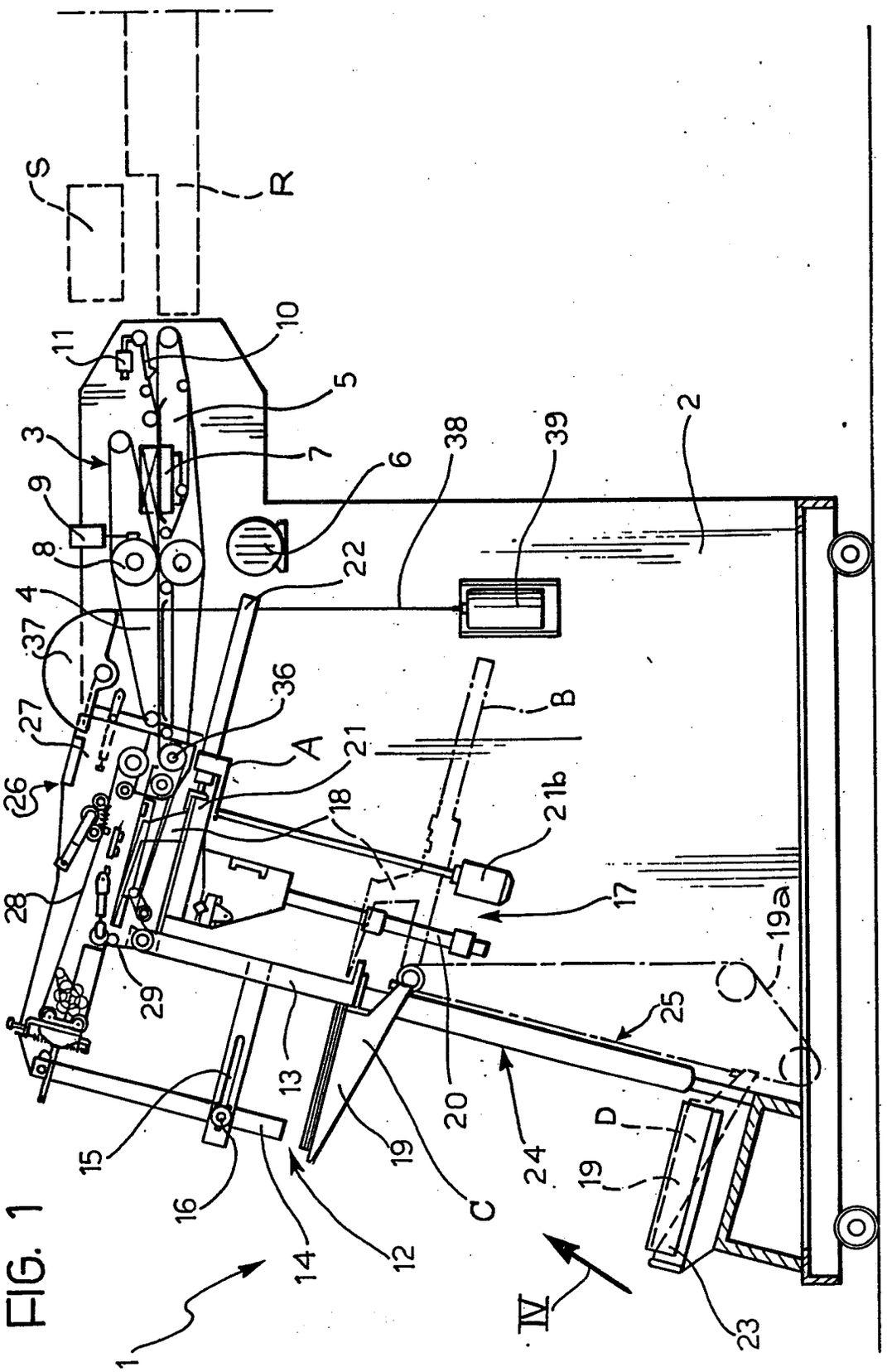
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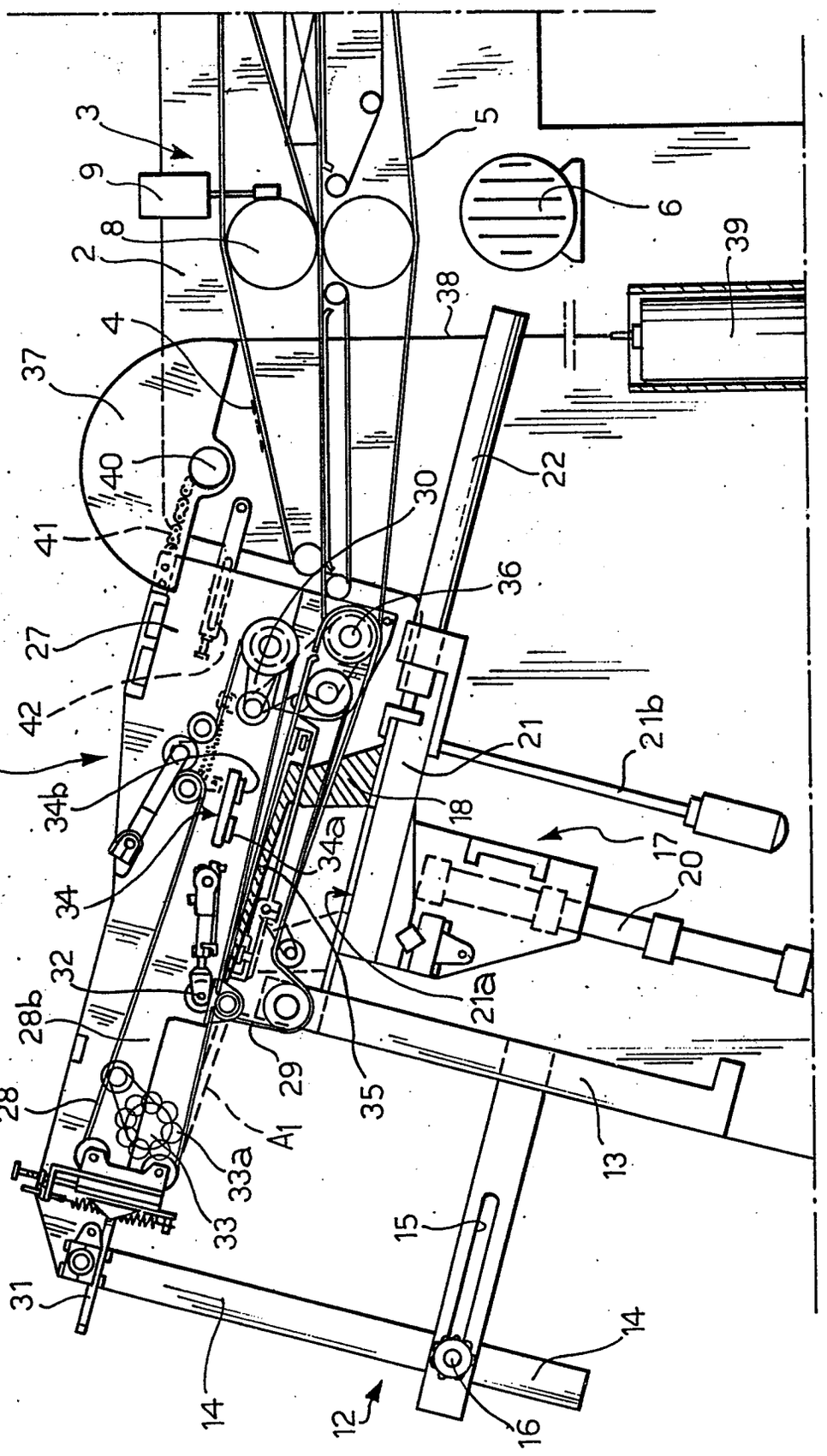
FIG. 1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34b
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32
28b
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33
33a
A1
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FIG. 2

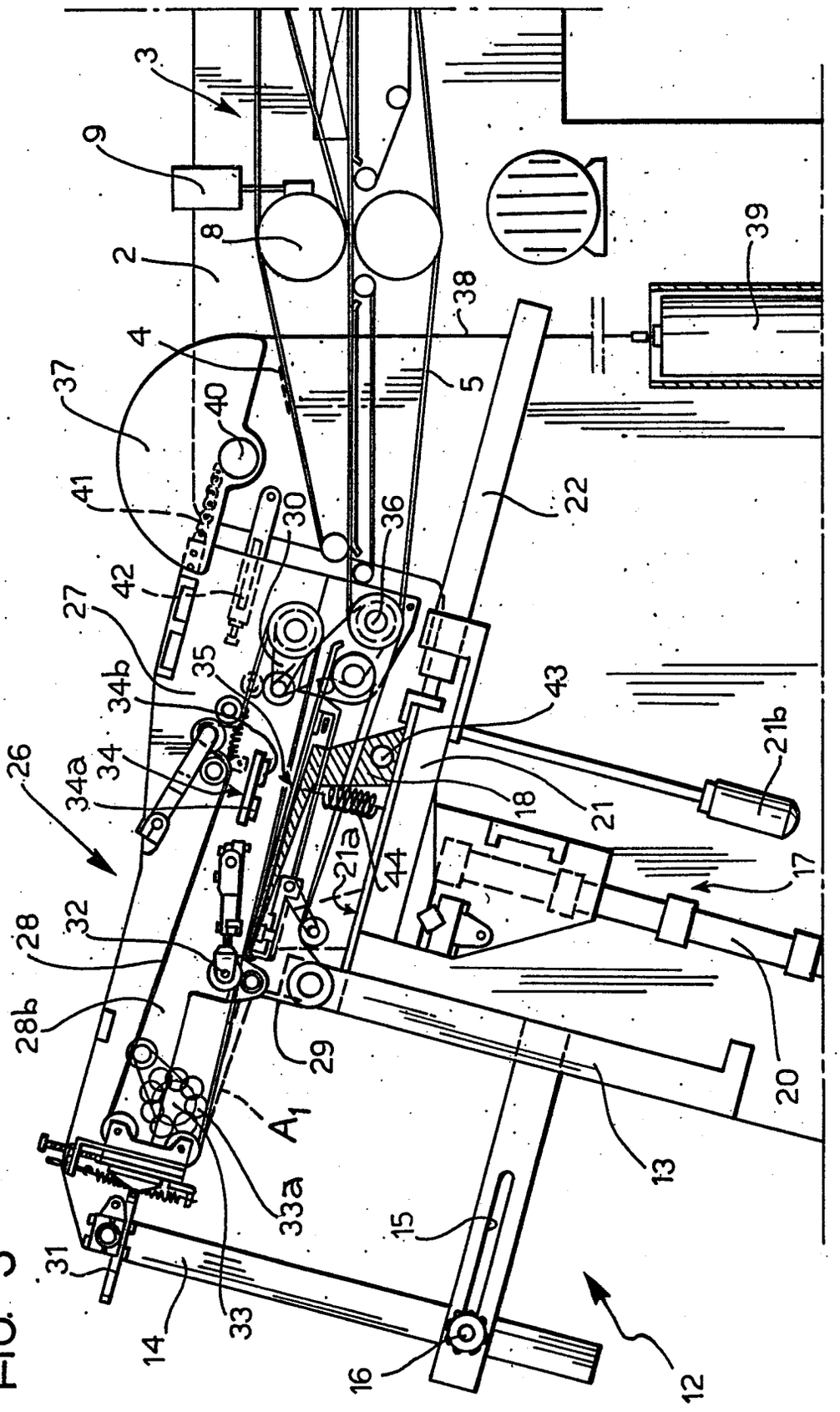
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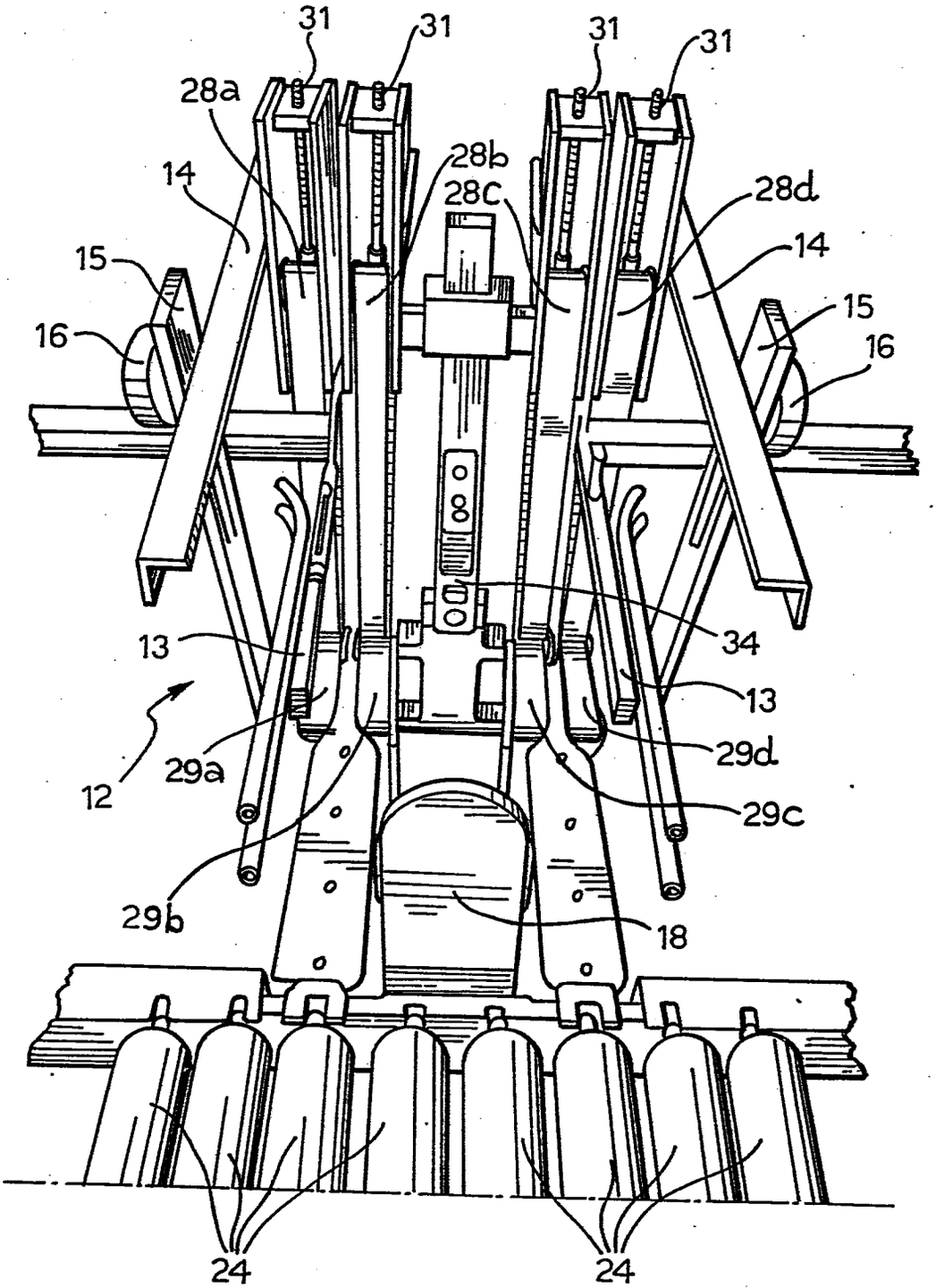
FIG. 3

FIG. 4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