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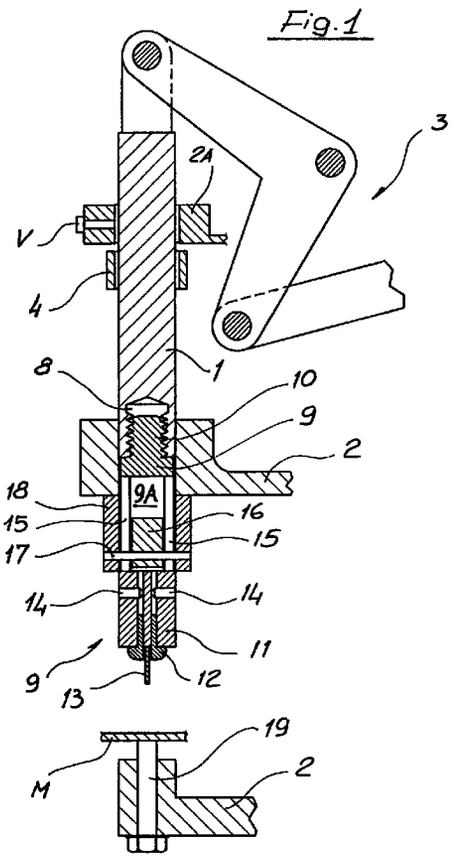
(54) Adaptor parts for a machine punch

(57) A tool-holder (9) has the upper end (10) screwable into a pre-existing threaded cavity (8) of the chuck (1) of a machine-punch (2), two opposite longitudinal slots (15) made in its lateral walls and an intermediate chamber (9A) in which an extractor cylinder (16) slides and is transversally crossed by a pin (17) that has each end sliding along a longitudinal slot (15) and serrated in a sleeve (18) sliding along the tool-holder (9), purpose of this sleeve (18) is to stop against a fixed or adjustable part of the machine-punch (4) at the end of the upstroke of the chuck, so that the spindle (13) is extracted from the bushing (12).

Fig.1



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Description

The present invention concerns a group of adaptor parts for a machine-punch suited to applying minute connecting pieces, especially eyelets, rivets and press-studs onto objects of textile, plastic, metal, leather, cardboard and similar materials, to be used in various and conventional manners.

Still more especially, the invention is suited for converting a riveting machine into an eyelet punching machine.

Machines for the application of these small pieces, generally made of metal, are divided into two main groups:

a) eyelet presses and perforating eyelet punches;
b) riveting machine-punches.

Most constructors of these machines commercialize separate machines for group a) and group b); other constructors offer eyelet punches that can be converted into riveting machines.

It must be clear that the main difference between the two groups of machines lies in the different system of feeding the piece to be applied, eyelet or rivet.

In these machines the term - chuck - defines the shaft that, having parts suited to operating on eyelets, rivets, press studs and similar, at its lower end, is provided with a down and upstroke movement.

In eyelet punching machines, a "spindle" that extends below a bushing set on the bottom of the chuck feeds one eyelet after the other from a convenient distributor; then, the spindle retracts into the bushing at the bottom of the chuck at the moment in which the eyelet is applied; the spindle must extend during the final part of the upstroke movement of the chuck; to this purpose, a device to extract the spindle from the eyelet comprising a cylinder sliding within the chuck and fixed to the body of the machine by means of a pin that transversally crosses the chuck along which a slot is set with length slightly more than the chuck's stroke (generally 50-60 mm). Perforating eyelet punches are called this way because in them the spindle also works in perforating the material onto which the eyelet must be applied.

In riveting machines, each rivet is fed from an appropriate box by means of a pincer-punch unit that accompanies it until its application.

Among the systems known for operating the conversion of a riveting press into an eyelet punch a first one replaces the chuck and a second replaces the terminal part of the chuck, the remaining parts already foresee the application, according to the case, of a system suited to feeding an eyelet or a rivet.

The disadvantages of both known systems are mainly of an economic and operative kind: with the first system it is necessary to build additional parts for the body of the machine and remove the chuck to replace it with another, employing expert personnel; with the second system it is necessary to prepare certain parts of the machine, such as, for example, a hole for the screw that crosses the chuck and a long lathe slit in the chuck to allow it to ascend and descend and, moreover, it is necessary to remove the spindle extraction device to install the new parts required.

The purpose of the present invention is to greatly simplify the conversion of one of these machine-punches, especially of a riveting press into an eyelet punch or of an eyelet punch into a riveting press, in order that the conversion may be conducted by not specially expert personnel.

Considering that the chuck of a riveting press is the more simple of the chucks of the two different types of machine in as much as the job of feeding and then applying the rivet is performed by a pincer bearing a punch screwed onto the bottom end of the chuck; it is therefore understood that the device invented is especially suited to being applied on a riveting machine.

The group invented, as characterized in the claims, comprises a main part that can be screwed into the threaded cavity existing in the bottom end of the chuck of said machine-punch and bears means to feed and apply an eyelet and means for extracting the spindle from the eyelet applied, such means comprising: a tool-holder with its upper end that can be screwed into said threaded cavity in the chuck, two opposite longitudinal slots made in its lateral walls and a chamber in which an extractor cylinder slides and transversally crossed by a pin each end of which slides along said slots and held in a sleeve sliding along the tool-holder, the purpose of the sleeve being that of resting against a fixed or adjustable part of the machine-punch at the end of upstroke of the chuck, in order to extract the spindle from the eyelet. A part of the group invented, conventionally defined as secondary, that operates to perforate the material to which the eyelet is applied, will be specified below with reference to figures 3 and 4.

It is therefore understood that the invention may also be realized for use on a pre-existing machine, given that the geometries of the parts to be connected are compatible.

The main advantages of the group invented consist in the extreme simplicity of the operation to achieve the conversion, being sufficient to unscrew one piece of the machine to be converted and hence screwing in another, and in the fact that the external control of the extractor cylinder allows, when required, also to stop the spindle's stroke by setting an adjustable stop means and fixing the spindle to the extractor cylinder, this last advantage is especially appreciable when applying very small eyelets that require very thin spindles; other advantages lie in the simpler construction of the chuck that no longer requires the costly working to create the long slots for the stroke of the extractor stud and the less costly construction of the machine-body that no longer requires precision boring to fix said extractor stud.

The invention shall be described more in detail below with examples concerning an adaptor group that converts a riveting press into a simple eyelet punch and

an adaptor group that converts a riveting press into a perforating eyelet punch, with reference to the figures attached in which

Fig. 1 is a first part elevated view and part section,
Fig. 2 is a part section view of a detail,
Fig. 3 is a second part elevated view and part section, and
Fig. 4 is a part section of a detail of Fig. 3.

Figure 1 shows part of a riveting press onto which the main part of the device invented to convert the riveting press into a simple eyelet punch, is fitted, that is an eyelet punch that does not previously perforate the material onto which the eyelet must be applied; a chuck 1 is conventionally fitted to a fixed part 2 of the machine in order to perform the necessary upstroke and downstroke movements under control of a leverage 3 run by a motor means that is not shown; to the chuck 1, in an intermediate position, a sleeve 4 is fixed that bears a roller 5 laterally that acts on a rectilinear cam 6 (roller 5 and cam 6 are only visible in Fig. 2) so as to laterally push distributor 7 at set intervals; the chuck 1 has a threaded cavity 8 in its bottom end into which the invented device is screwed, for the application of eyelets, instead of a conventional pincer and stud for the application of rivets; the device invented comprises: a tool-holder 9 with threaded top 10 screwed in said cavity 8 and with lower bore 11 bearing bushing 12 with the purpose of acting as a guide for a spindle 13 fixed into the tool-holder by means of two opposite transversal screws 14 that work by friction against the walls of the spindle; two longitudinal slots 15 diametrically opposite in the lateral walls of the tool-holder; an extractor cylinder 16 sliding within a chamber 9A of the tool-holder and connected, by means of a transversal pin 17 having its ends sliding within the two slots, to a sleeve 18 sliding along the tool-holder. The figure also shows: a conventional counterpoint 19 under the device, a piece of material M between the tip of the spindle 13 and the counterpoint 19 and a body 2A of the machine that is moved parallel to the chuck and fixed into the appropriate position by means of screw V to check the upstroke of the same chuck.

Fig. 2 shows the conventional eyelet distributor 7 fitted on the machine next to the chuck 1 and from which the spindle 13 conventionally takes an eyelet O at each cycle; the figure also shows the roller 5 rotating on sleeve 4 solid with the chuck, cam 6 fixed to distributor 7, tool-holder 9 and spindle 13.

The unit described above works as follows:
during the descending stage of the chuck, the point of spindle 13 hooks an eyelet O and firmly grips it thanks to the action of friction screws 14; then, roller 5 acts on cam 6 to laterally push away distributor 7 in order to avoid that the latter be hit by the descending tool-holder 9; further, the point of spindle 13 presses against material M and spindle 13 begins to slide along friction screws 14 thus retracting into bushing 12 that begins to press upon the head of the eyelet causing its punching against counterpoint 19; after this, the chuck ascends with spindle 13 completely retracted into bushing 12, in the last part of the upstroke the sleeve 18 is stopped by fixed part 2 of the machine so that the spindle is extracted ready for punching the next eyelet.

Figure 3 shows part of a conventional riveting press onto which the main part and the secondary part of the group invented have been applied to convert the riveting press into a perforating eyelet punch; a chuck 1 with a cavity, conventionally set to receive the parts relative to the perforating function, is fitted to a fixed part 2 of the machine and externally, as for the chuck described in Fig. 1, is fitted a sleeve 4 laterally bearing a rotating roller 5 that acts upon cam 6 to push away distributor 7; the sleeve 4 and body 2A that can be moved parallel to the chuck perform the functions already described with reference to Fig. 1; in a lower cavity of chuck 1 a thread has been applied into which the main part of the device invented is screwed as previously described with reference to Fig. 1, for the application of eyelets; the eyelets are fed, according to the known technique, from said distributor 7; to perforate the material M into which the eyelet is applied, the part defined as secondary, operating to perforate material M, comprises, according to the characteristics of the invention, a cam 21, hinged at 22 to the top of the chuck, by means of a cap C, on the head of an elastic unit, movable along the cavity of the chuck, essentially consisting of a shaft 23 that by means of a set of bucket springs 24 held between head H of shaft 23 and nuts N screwed to the bottom of the shaft; the bottom end of said shaft 23 rests on the extractor cylinder 16 that in turn acts on spindle 13; the bucket springs 24 allow the spindle 13 to penetrate the material M non violently, so as to not damage the perforation matrixes on counterpoint 19.

Also with reference to Fig. 4, the following is a description of the functioning of the unit above described; it differs from that illustrated with reference to Fig.s 1 and 2 in that, when spindle 13 reaches material M, the cam 21 in the position visible in Fig. 3 pushes said elastic unit 23/24 and consequently spindle 13, acting on cap C, causes the perforation of the material; in Fig. 4 the position assumed by the parts located at the top of chuck 1 after the material has been perforated is shown: the cam 21 was rotated by stop F1 that can be vertically adjusted so as to not act on cap C any longer and, consequently, on the elastic unit 23/24; after these operative stages, chuck 1 ascends in the already described manner, and in addition cam 21 returns to its initial position (Fig. 3) when its point P is pushed against the upper stop F2. Figure 3 shows the extractor cylinder 16 and spindle 13 separate from one another; these two parts may be in a single piece or else connected to one another when it is convenient to control the stroke of the spindle 13 externally, by means of sleeve 18.

Claims

1. A group of adaptor parts for a machine-punch (2) suited to applying minute connecting pieces (O), onto objects (M) of textile, plastic, metal, leather, cardboard and similar materials, bearing means to feed an eyelet (O) from a laterally mobile distributor (7) in a controlled manner, to apply the eyelet (O) and to extract the machine spindle (13) from the applied eyelet characterized in that a main part of the unit bearing the above means may be screwed into the threaded cavity (8) existing within the bottom end of the chuck (1) of said machine-punch (2), such means comprising: a tool-holder (9) that has the upper end (10) that can be screwed in said threaded cavity (8) of chuck (1), two opposite longitudinal slots (15) made in its lateral walls and an intermediate chamber (9A) in which an extractor cylinder (16) slides and is transversally crossed by a pin (17) that has each end sliding along a longitudinal slot (15) and serrated in a sleeve (18) sliding along the tool-holder (9), so that this sleeve (18), when it stops against the fixed part of the machine (2) at the end of the upstroke of the chuck, causes the extraction of the spindle (13) from the bushing (12).

2. A group according to claim 1 characterized in that it comprises a secondary part consisting of a cam (21) that is hinged to the top of the chuck (1) and that acts upon an elastic unit (23/24) suited to exerting an elastic action on the spindle (13) by means of the extractor cylinder (16) and the tool-holder (9) when the chuck runs the downstroke to perforate said object (M), cam (21) being controlled in its working position and its idle position by two stops (F1, F2) adjustable vertically along a fixed part of the machine.

3. A group according to claim 2 characterized in that the elastic unit (23/24) consists of a shaft (23) and a set of bucket springs (24) located in a longitudinal cavity of the chuck (1), shaft and bucket springs being concentric. 4. A group according to the previous claims characterized in that the spindle (13) and the extractor cylinder (16) are solid.

Fig.1

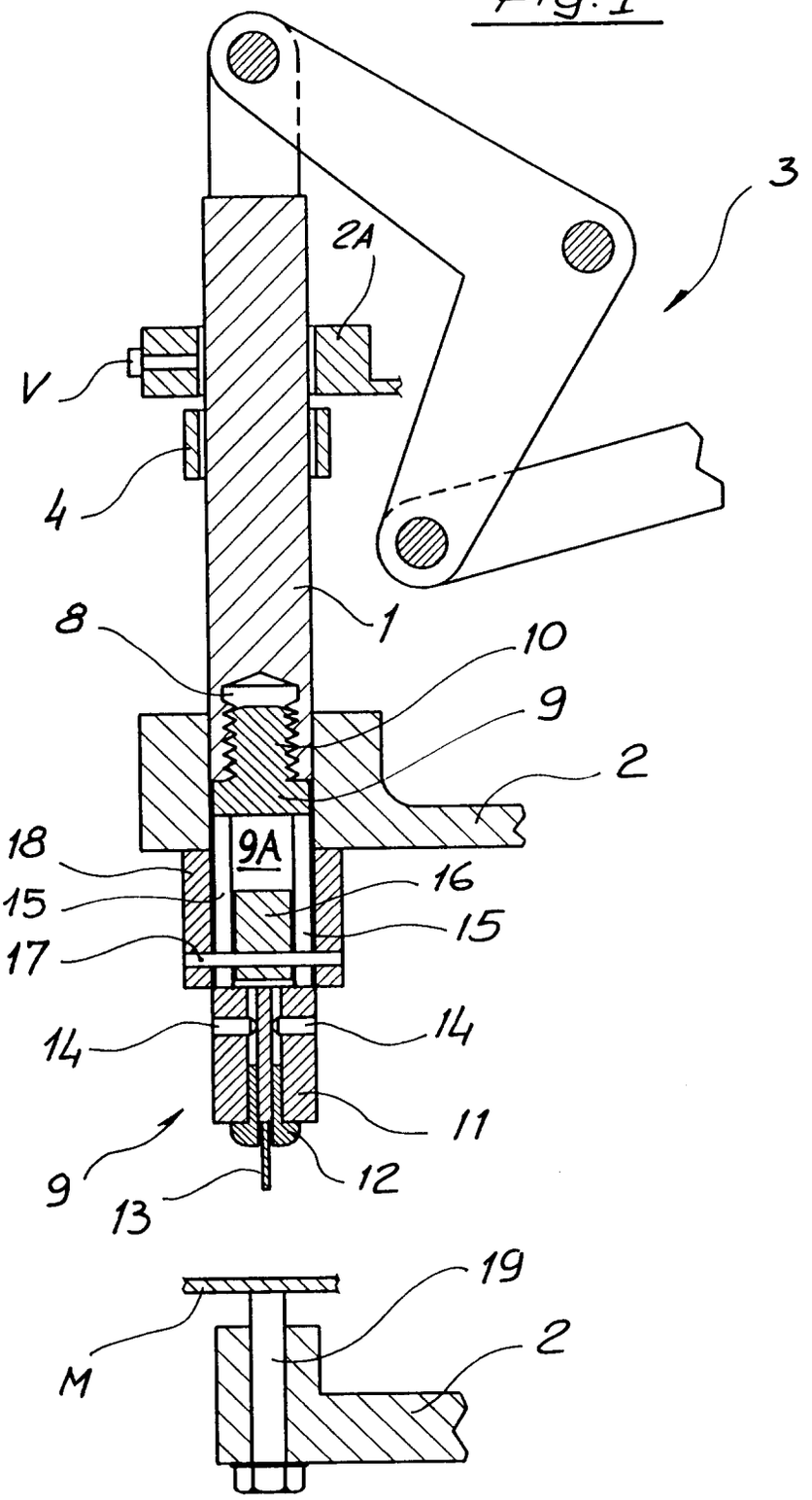


Fig.2

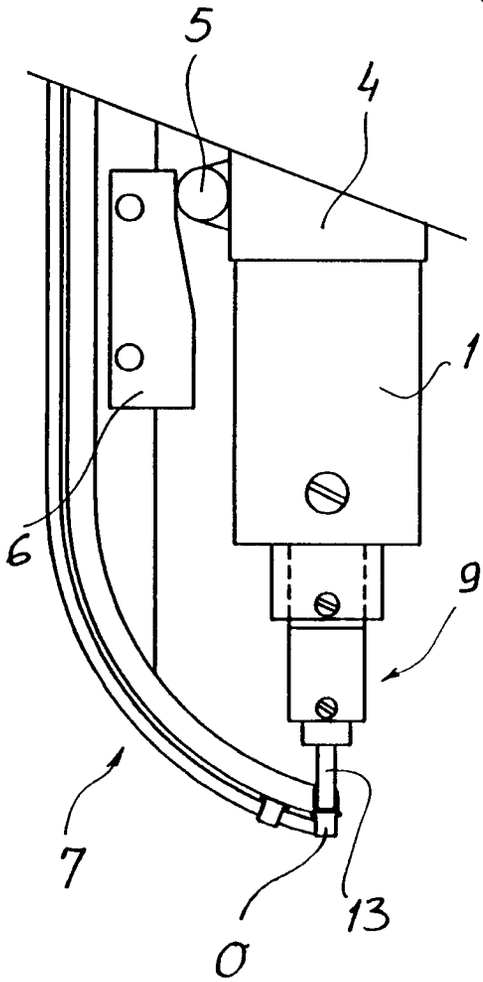


Fig.3

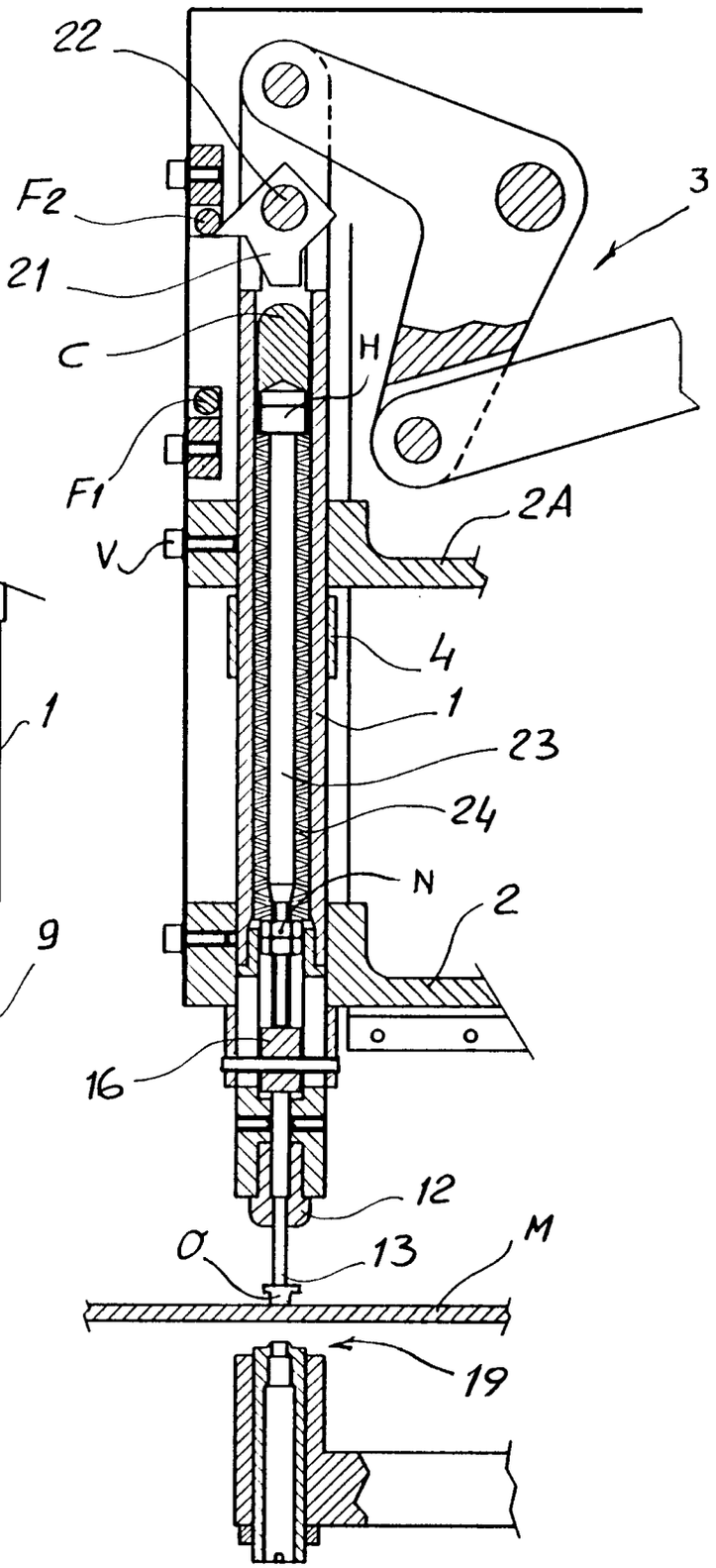
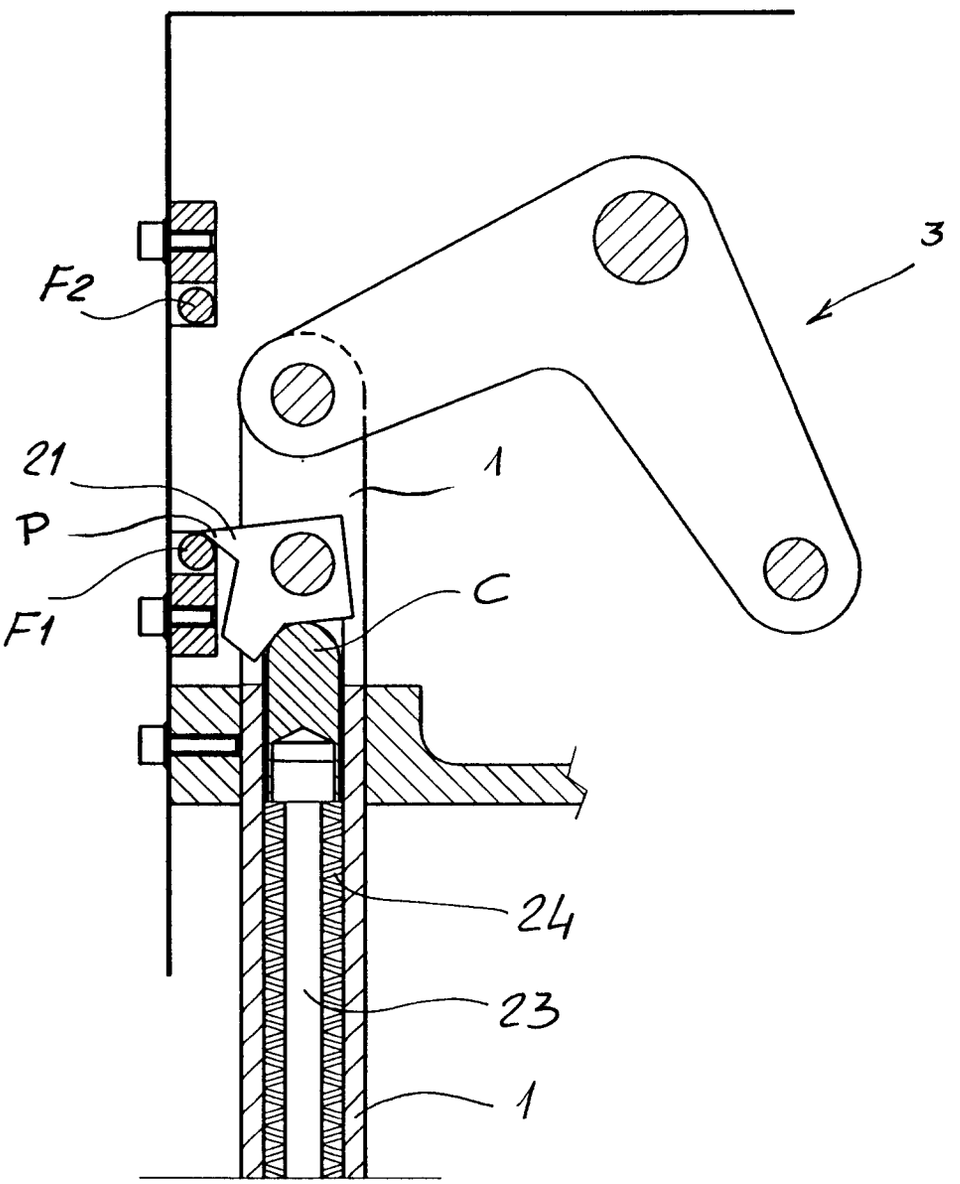


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 94 30 9440

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.6)
A	FR-A-2 356 386 (USM CORPORATION) * page 6, line 5 - page 7, line 32; figures 1-4 *	1,2	A41H37/02 A43D100/02
A	US-A-1 487 731 (ENNA) * page 1, line 97 - page 3, line 29; figures 1-7 *	1,4	
A	US-A-4 596 349 (WILLIAM PRYM-WERKE) * column 13, line 27 - column 16, line 53; figures 9-11 *	1,3,4	
A	EP-A-0 212 502 (YOSHIDA KOGYO K. K.) * column 3, line 5 - column 4, line 37; figures 1-4 *	1,2	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A41H
A43D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29 May 1995	Garnier, F

CATEGORY OF CITED DOCUMENTS

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