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(54) **Device to facilitate the fitting of abrasive belts to sanding machines,especially for wooden panels**

Vorrichtung zum Erleichtern das Montieren von Schleifbändern auf Schleifmaschinen, insbesondere für Holztafeln

Dispositif pour faciliter le montage de courroies abrasives sur des ponceuses, en particulier pour des panneaux de bois

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(56) References cited:
EP-A- 0 614 727 **US-A- 5 185 963**

- **PATENT ABSTRACTS OF JAPAN vol. 011 no. 205 (M-603) ,3 July 1987 & JP-A-62 024957 (TAKEGAWA TEKKO KK) 2 February 1987,**
- **PATENT ABSTRACTS OF JAPAN vol. 017 no. 275 (M-1418) ,27 May 1993 & JP-A-05 008166 (MITSUBISHI HEAVY IND LTD) 19 January 1993,**

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Description

The present invention relates to the fitting of abrasive belts to sanding machines, as per the preamble of claim 1. An example of such a device is disclosed in US-A-5 185 963.

At present, there are various types of sanding machines known to the trade; this invention is concerned with the so-called traverse sanders in which an endless abrasive belt is fitted over end pulleys which keep it tensioned and transmit drive motion to it. An example of this type of configuration is illustrated in Fig. 1 which shows a known type of double belt combination sander: the first belt N1 is fitted over a pair of end rollers or drums T1 and T2, whilst the second belt, N2, is fitted over three drums, two of which (T3 and T4) define a lower branch running parallel to the panel P to be worked, whilst the remaining drum T5 at the top acts as a tensioning element.

Inside the two lower drums (T3 and T4) of the second belt, there are a number of actuators or pushing shoes S which push the belt against the panel in order to improve the points or areas of contact between the abrasive and the work. A machine of this kind is described in patent publication US-4.651.474.

The most common problem encountered during operation of these machines is caused by the fact that the belts must be changed frequently, either because they are worn or because of differing work requirements. Changing may be necessary as often as ten or even more times a day. Each time the belt is changed, the operator must first slacken the belt rollers, remove the worn belt and fit a new belt from the spares department. The most critical stage in this operation is without doubt the placing of the belt over the drums, especially if it is considered that in some of the latter generation machines (superfine finishers), the belts are some metres long and wide and the upper drums are so high that the operator does not have direct access to them. This makes it difficult to handle the belts, creates hazardous situations for the operator and the possibility of damaging the abrasive surface of the belts themselves (extra fine grain), not to mention the downtime involved.

Various solutions have been devised to facilitate the belt changing operation, all based on the use of belt "guides" of various kinds. In one solution, the guides are fitted above and below the drums and, in practice, consist of fixed plates in the shape of cylinder or cone portions surrounding the visible end of the belt mounting drums. This solution does not, however, satisfy the aforementioned requirements and only partially facilitates belt changing.

Another solution, disclosed in patent publication US-5.185.963, envisages the use of an element formed by a "U" section hinged near the upper drum and driven by a pneumatic cylinder from a rest position, where the U section is vertical in such a way as to close the belt guards, to a work position, where it is at 90° to the previous position and with the cylindrical portion axially aligned with the generatrices of the upper drum. In this way, when removing the old belt and putting on the new one, the operator can rest the belt on the surface of the U section. The basic element of this solution, however, although it certainly facilitates belt changing, especially in the case of very tall machines, remains a passive element, in practice an appendage or guide of reducible size.

An improvement along the same lines is disclosed in patent publication JP-62-24957 where the supporting U section is no longer simply hinged to the machine frame but is mounted on an arm which can move vertically and rotate about the end of a first arm which is in turn hinged to the end of a second arm pivoted to the machine, all the said pivots being vertical. The U section can therefore assume a number of different configurations both in height and horizontally, while remaining parallel to itself, thus making it easier to manipulate the belt, even at considerable heights. In this solution, too, no automatic drive systems are envisaged and fitting the belt still depends on the operator's ability to manoeuvre the device using the handle.

Yet another disclosure is described in patent application IT-VI93A000019 where the supporting U section is hinged to a carriage which runs along a vertical rail attached to the machine frame. The carriage is equipped with a motor, which drives it along the rail in both directions, whilst the supporting U section can be turned on its hinge by a hydraulic cylinder linked to the carriage. This type of solution is expensive to make and must have at least two drive units, which, together with the front railing, unduly encumber the machine, making it difficult for the operator to gain access to the front of the machine itself.

The object of the present invention is to overcome the aforementioned disadvantages by providing a device for facilitating the fitting of abrasive belts to sanding machines that is at once simple and practical and that does not interfere with the other parts of the machine, allowing the abrasive belt to be rapidly changed thanks to a simple, economical mechanism structured in such a way as to also automate the handling of the abrasive belt.

The technical characteristics of the invention are laid out in the claims below and the advantages of the disclosure are apparent from the detailed description which follows, with reference to the accompanying drawings, which illustrate preferred embodiments of the invention by way of example and in which:

- Figure 1 is a schematic perspective view of the abrasive belts in a sanding machine of a known kind to which the present invention relates;
- Figure 2 shows a sanding machine equipped with the device disclosed by the present invention in a schematic front view with some parts cut away in order to better illustrate others;

- Figure 3 is a schematic front view, with some parts in cross section in order to better illustrate others, of the device shown in Fig. 2;
- Figure 4 is a side view of another embodiment of the device illustrated in Figs. 2 and 3;
- Figure 5 is a top, plan view, with some parts cut away in order to better illustrate others, of yet another embodiment of the device illustrated in the other drawings.

With reference to the above listed accompanying drawings, in particular, Fig. 2, the sanding machine equipped with the device disclosed by the present invention to facilitate the fitting of the abrasive belt is of the so-called "large-belt", traverse type. This kind of machine generally consists of a fixed frame 50 supporting one or more sanding units 1 for wooden panels 2; each of the said units 1 is made up of a plurality of parallel, end rollers or drums 4, over which an abrasive belt 3 is placed and of which one is motor-driven (usually the lower one 4i) while the other, 4s, is idle and acts as a tensioner. The rollers 4s and 4i are parallel to each other and mounted above a conveyor belt 5 which carries panels 2 in a direction F: the panel 2 therefore moves under the active branch of the belt 3 and its surface machined as it passes.

As shown schematically in Fig. 2, the top roller 4s is supported by a cradle 4c which is in turn linked to the stem of an actuating cylinder 4d which moves the cradle up and down in such a way as to tension and slacken the abrasive belt 3. The actuating cylinder 4d is located between the end rollers 4s and 4i and defines within the machine a hollow space 7 between said rollers 4s and 4i and said belt 3 whose size H (see Fig. 3) depends on the distance between the rollers themselves measured on a vertical axis Z of the machine from a horizontal reference plane (not illustrated) of the machine itself.

The rounded upper surface 6 of the top roller 4s over which the belt 3 runs corresponds to, and comes into alignment with, the U shaped upper surface 8s (in practice a U section) of a guide element 8 for the loading and unloading of the belt 3, the machine being equipped with one guide element 8 for each sanding unit 1 fitted.

In the solution disclosed by the present invention (again, see Fig. 2), the guide element 8 is axially parallel to the rollers 4s and 4i and is connected by a four-point linkage mechanism 12 to the frèe end of a supporting element 11 placed inside the aforesaid hollow space 7.

The four-point linkage mechanism 12 (described in more detail below) moves the guide element 8 between a plurality of intermediate positions in the two directions indicated by the arrow F1 in Fig. 2, while allowing the guide element itself to remain axially parallel to the end rollers 4s and 4i.

Fig. 2 shows the three main positions which may be assumed by the guide element 8, namely: a least extended rest position where the guide element 8 is completely inside the hollow space 7; a belt 3 loading/unloading position where the guide element 8 is partially outside the limits defined by the rollers 4s and 4i and at a height H1 less than the height of the top roller 4s from the aforesaid reference plane; and, lastly, a fully extended, work position where the guide element 8 is completely outside the limits defined by the rollers 4s and 4i and aligned with the top roller 4s in such a way that its upper surface 8s forms an extension of the roller itself.

Looking now in more detail, with reference also to Fig. 3, the four-point linkage mechanism 12 consists of a first arm 9 the ends of which 9a and 9b are pivoted to the aforesaid supporting element 11, which includes a second arm 10, and to the guide element 8, respectively. The arm 9 can rotate about its axis B, transverse to the axes of the rollers 4s and 4i, and located in the middle of the guide element 8. On the first end 9a of the first arm 9 pivoted to the second arm 10 there is envisaged a first sprocket-wheel 14 that meshes with a first endless chain 13 fitted over another first sprocket-wheel 15 that is driven by a known gearmotor unit 15m and located at the other end of the second arm 10.

Each of the first sprocket-wheels 14 and 15 is externally keyed through pins 14p and 15p to the first arm 9 and to the second arm 10, respectively, in such a way that, when the motor is activated, the first arm 9 can rotate about its axis B. Between the first arm 9 and the guide element 8 there is envisaged a second endless chain 16 fitted over second sprocket-wheels 17 and 18 (which, in the embodiment illustrated, have a double set of sprockets), one of which is internally keyed to the first arm 9 and attached to the corresponding sprocket-wheel 14 of the first chain 13, whilst the other is rotatably mounted on a pin 18p located inside the guide element 8 in such a way that, when the first arm 9 is rotated, the guide element 8 remains parallel to the end rollers 4s and 4i even when its position is changed in height.

In practice, the second chain 16 and the related sprocket-wheels 17 and 18 create a four-point linkage mechanism R-S-T-U forming a parallelogram-whose small sides RU and ST are defined by the diameter of the sprocket-wheels 17 and 18, whilst the long sides RS and UT are defined by the two branches of the second chain 16 (see Fig. 2).

During the rotation of the first arm 9, therefore, the two chains 13 and 16 rotate in opposite directions but the latter enables the axial position of the guide element 8 to remain unchanged irrespective of the angular position assumed by the first arm 9.

To avoid interference between the first arm 9 and the guide element 8 during the rotation of the first arm 9, a gap 8a is envisaged at the end of the arm nearest the pivot point B between the two elements (see Fig. 5 in particular).

With reference to Fig. 2 again, it may be noted that the aforesaid hollow space 7 contains a frame 19

formed partly by the aforesaid actuating cylinder 4d, which is connected to a first unit 20 that supports the top roller 4s, while at the bottom there is a vertical bar, constituting the aforesaid support element 11 and joining the first support unit 20 to a similar second unit 21 that supports the lower roller 4i; the vertical bar 11 is also linked to the second arm 10 which extends horizontally.

The hollow space 7 also contains means 22 for detecting the guide element 8 when the latter is at the aforesaid rest and work positions. The detecting means 22 may consist of microswitches 22i mounted on the vertical bar 11 inside the hollow space 7 and on one of the outer corners of the first support unit 20 of the top roller 4s. The microswitches 22i operate directly on the motor 15m so as to stop or start the four-point linkage mechanism 12 when the two positions are reached.

Fig. 4 illustrates an improved embodiment of the guide element 8, used preferably for tall machines, where the guide element 8 itself is equipped with means 23 for moving the abrasive belt 3 towards and away from the top roller 4s. The means 23 consist of a first endless conveyor belt 24 fitted over two transmission pulleys 25, one keyed at the end of the guide element 8 and the other at a point in the central portion of the guide element 8 near the pivot point B. The latter pulley, labelled 25a, is driven by a gearmotor 26 mounted by the guide element itself and designed to drive the conveyor belt 24 in both directions.

Another improved embodiment of the abovementioned solution is illustrated in Fig. 5, where the guide element 8 is again equipped with a first endless conveyor belt 24 fitted over the transmission pulleys 25 but where the first pulley 25a is driven indirectly through a first endless transmission belt 26 fitted over a second pair of pulleys 27 and 28: the first of these pulleys 27 is keyed to a first shaft 29 coaxially and directly to the aforesaid first pulley 25a, whilst the other pulley 28 is keyed to the end of a second shaft 30 passing through the guide element 8 at the linkage point B.

At the same end where the second pulley 28 is keyed, the second shaft 30, which is concentric with the pin 18p but separate from it, rotatably mounts a third pulley 31 over which there is a second endless transmission belt 32 driven by a fourth pulley 33 driven by a gearmotor 33m and keyed to the second arm 10 through a corresponding third shaft 34. This solution too is capable of automating the handling of the abrasive belt 3 but at the same time lightens the structure of the guide element 8.

The dashed line in Fig. 5 shows a constructional variation of the first conevyor belt 24. In this variation, the conveyor belt 24 may be divided into two smaller belts 24a and 24b (or toothed belts), both narrower but longer than those of the previous solutions, extending along the entire length of the guide element 8 and located on opposite sides of the first arm 9. Each belt 24a and 24b is endless and fitted over corresponding pairs of wheels 24r mounted on the vertical sides of the guide element 8, two of the said wheels being motor-driven in the same way described in the previous paragraph.

To fully automate the handling mechanism of abrasive belt 3 in the two embodiments just described, the device may be equipped with abrasive belt 3 loading means 40, placed above the top roller 4s and operating in both directions parallel and in contact with the upper surface 6 of the top roller. The loading means 40 consist of a second endless belt 41, which can run in both directions, hinged at one of its end pulleys 41a and driven by a cylinder 42 to rotate about the said pulley from a working position in which it is in contact with the upper surface of the roller 4s (see Fig. 2) to a rest position in which it is not in contact with the roller 4s, that is to say, it is in a raised position.

The device disclosed by the present invention can be used to change the abrasive belt 3 as follows, starting with the machine idle.

The machine guard or door is opened and the change routine started, using preferably a control unit CE located inside the hollow space 7. The routine runs as follows:

- the abrasive belt 3 is slackened by activating the cylinder 4d;
- the gearmotor 15m drives the first and second chains 13 and 16 so as to turn the guide element 8 from the rest position to the fully extended work position at which it is stopped by microswitch 22i;
- the loading means 40 are moved by the cylinder 42 into contact with the abrasive belt 3 and run in unloading direction in such a way as to slide the abrasive belt off the rollers 4 in the direction of the arrow labelled F2 (unloading) in Figs. 2 and 5;
- the first conveyor belt 24 is started to enable the abrasive belt 3 to slide onto the guide element 8;
- the belt 24 is stopped and the guide element 8 lowered to the intermediate loading/unloading position where the used abrasive belt 3 can be removed;
- the new abrasive belt 3 is placed over the guide element 8 partially rolled up so that it does not touch the floor and the guide element 8 is then raised so as to lift the abrasive belt to the level of the top roller 4s where the guide element 8 stops in the working position, while the abrasive belt 3 is unrolled towards the reference plane P;
- the first conveyor belt 24 starts running in direction F3 (loading) and, together with the second conveyor belt 41, enables the abrasive belt 3 to slide off the guide element and onto the top roller 4s;
- lastly, once the abrasive belt 3 is properly in place, the first conveyor belt 24 is stopped and the guide element 8 can be returned to the rest position.

Although the routine described above could be varied slightly and the various stages combined differently, it shows the basic operation of the device and the con-

siderable advantages for the operator in terms of safety and easy operation. These advantages are particularly evident when the abrasive belt to be changed is very wide and long and the top roller of the machine is so high up as to be out of the operator's reach.

Claims

1. A sanding machine, especially for wooden panels, comprising one or more sanding units (1) for wooden panels (2), each such unit consisting of an endless abrasive belt (3) fitted over at least one pair of parallel end rollers or drums (4) of which the top one (4s) is idle and at least one bottom one (4i) is motor-driven and mounted with its active surface over and parallel to a conveyor belt (5) carrying the said panels (2), the said active surface and conveyor belt (5) forming an area where the panel (2) is worked; the said abrasive belt (3) being fitted over the upper surface (6) of the said top roller (4s); there being defined between the said end rollers (4s, 4i) and said abrasive belt (3) a hollow space (7) whose size (H) depends on the distance between the rollers themselves measured on a vertical axis (Z) of the machine from a horizontal reference plane of the machine itself; each sanding unit (1) of the said sanding machine being equipped with a guide element (8) designed for the loading and unloading of the abrasive belt (3) and consisting of a U section with an upper surface (8s) to bring the abrasive belt into alignment, the device being characterized in that the said guide element (8) is axially parallel to the rollers (4s, 4i) and is connected by a four-point linkage mechanism (12) to the free end of a supporting element (11) placed inside the aforesaid hollow space (7), the said four-point linkage mechanism (12) being designed to allow the guide element (8) to remain axially parallel to the end rollers (4s, 4i) while moving it axially between a plurality of intermediate positions, at least the following positions being envisaged:

   - a least extended rest position where the guide element (8) is completely inside the hollow space (7);
   - a belt (3) loading/unloading position where the guide element (8) is partially outside the limits defined by the rollers (4s, 4i) and at a height (H1) less than the height of top roller (4s) from the aforesaid reference plane;
   - a fully extended, work position where the guide element (8) is completely outside the limits defined by the end rollers (4s, 4i) and aligned with the top roller (4s) in such a way that its upper surface (8s) forms an extension of the roller itself.

2. The device according to claim 1 characterized in that the said four-point linkage mechanism (12) consists of a first arm (9) the ends of which (9a, 9b) are pivoted to the aforesaid supporting element including a second arm (10), and to the guide element, respectively, the arm (9) being able to rotate about its axis (B), transverse to the axes of the rollers (4s, 4i); there being envisaged between the said first arm (9) and second arm (10) a first endless chain (13) that meshes with corresponding first sprocket-wheels (14, 15), one of which is motor-driven, externally keyed through pins (14p 15p) to the first arm (9) and to the second arm (10), respectively, and designed to enable the said first arm (9) to rotate about its axis (B) ; there being between the first arm (9) and the guide element (8) a second endless chain (16) fitted over second sprocket-wheels (17, 18) one of which is fixed and internally keyed to the first arm (9), whilst the other is rotatably mounted on a pin (18p) in the guide element (8) in such a way that, when the first arm (9) is rotated, the guide element (8) remains parallel to the end rollers (4s, 4i).

3. The device according to claim 1 characterized in that the said hollow space (7) contains a frame (19) consisting of a first unit (20) that supports the top roller (4s) and a vertical bar, forming the aforesaid support element (11) joining the said first support unit (20) to a similar second unit (21) that supports the lower roller (4i), a second arm (10) being linked to the said vertical bar (11).

4. The device according to claim 1 characterized in that the said hollow space (7) contains means (22) designed to detect the positions of the guide element (8) and start and stop the four-point linkage mechanism (12) when the guide element (8) reaches the said intermediate positions.

5. The device according to claim 1 characterized in that the said guide element (8) is equipped with means (23) for moving the abrasive belt (3) and consisting of a first endless conveyor belt (24) fitted over transmission pulleys (25), keyed to the ends of the guide element (8), one of which (25a) is driven by a gearmotor (26) mounted by the guide element itself and designed to drive the conveyor belt (24) in both directions.

6. The device according to claim 1 characterized in that the said guide element (8) is equipped with means (23) for moving the abrasive belt (3) and consisting of a first endless conveyor belt (24) fitted over first transmission pulleys (25) one of which (25a) is motor-driven and designed to drive the conveyor belt (24) in both directions; the said first pulley (25a) being driven by a first endless transmission belt (26) fitted over second pulleys (27, 28) one of

which is keyed coaxially to the aforesaid first pulley (25a) through a first shaft (29), whilst the other pulley (28) is keyed to the end of a second shaft (30) passing through the guide element (8) at the linkage point (B) of the four-point linkage mechanism (12); the said second shaft (30) being designed to rotatably support at its other end a third pulley (31) over which there is a second endless transmission belt (32) driven by a fourth pulley (33) which is motor-driven and keyed to the said support element (11) through a corresponding third shaft (34).

7. The device according to claim 1 characterized in that the said guide element (8) is equipped with means (23) for moving the abrasive belt (3) and consisting of a pair of small belts (24a, 24b) extending along the entire length of the guide element (8) and located on opposite sides of a first arm (9) ; each of the said belts (24a, 24b) being endless and fitted over corresponding pairs of wheels (24r) which are rotatably mounted on the guide element (8) and two of which are motor-driven in such a way as to enable the said pair of small belts (24a, 24b) to run in both directions.

8. The device according to claim 1 characterized in that it comprises means (40) for loading the abrasive belt (3), the said means being placed above the top roller (4s) and operating in both directions parallel and in contact with the uppèr surface (6) of the top roller in conjunction with the said guide element (8); the said loading means (40) consisting of a second endless belt (41), which can run in both directions, hinged at one of its end pulleys (41a) and driven by a cylinder (42) to rotate about the said pulley from a working position in which it is in contact with the upper surface (6) of the roller (4s) to a rest position in which it is not in contact with the roller (4s).

Patentansprüche

1. Schleifmaschine, insbesondere für Holztafeln, enthaltend eine oder mehrere Schleifeinheiten (1) für Holztafeln (2), wobei jede solcher Einheiten aus einein Endlos-Schleifband (3) besteht, das über wenigstens ein Paar von parallelen Endrollen oder Trommeln (4) gezogen ist, von denen die obere (4s) leerlaufend ist und wenigstens eine untere (4i) angetrieben und mit ihrer aktiven Oberfläche oberhalb und parallel zu einein Förderband (5) montiert ist, welches die genannten Tafeln (2) trägt, wobei die genannte aktive Oberfläche und das Förderband (5) den Bereich bilden, in dem die Tafel (2) bearbeitet wird; wobei das genannte Schleifband (3) über die obere Oberfläche (6) der genannten oberen Rolle (4s) gezogen ist; wobei zwischen den genannten Endrollen (4s, 4i) und dein genannten Schleifband (3) ein Hohlraum (7) beschrieben wird, dessen Grösse (H) von dein Abstand zwischen den Rollen selbst abhängig ist, gemessen an einer vertikalen Achse (Z) der Maschine von einer horizontalen Bezugsebene der Maschine selbst aus; wobei jede Schleifeinheit (1) der genannten Schleifmaschine mit einem Führungselement (8) ausgestattet ist, bestimmt zum Aufziehen und Abziehen des Schleifbandes (3) und bestehend aus einem U-Profil mit einer oberen Oberfläche (8s), um das Schleifband auszurichten, wobei die Vorrichtung **dadurch gekennzeichnet** ist, dass das genannte Führungselement (8) axial parallel zu den Rollen (4s, 4i) verläuft und durch einen Gelenkviereck-Mechanismus (12) an das freie Ende eines Trägerelementes (11) angeschlossen ist, angeordnet im Inneren des vorgenannten Hohlraumes (7), und wobei der genannte Gelenkviereck-Mechanismus (12) dazu bestimmt ist, es dein Führungselement (8) zu erlauben, axial parallel zu den Endrollen (4s, 4i) zu verbleiben, während es sich axial zwischen einer Anzahl von Zwischenpositionen bewegt, wobei wenigstens die nachstellenden Positionen vorgesehen sind:

- wenigstens eine zurückgezogene Ruheposition, in welcher sich das Führungselement (8) vollkommen innerhalb des Hohlraumes (7) befindet;
- eine Position zum Aufziehen/Abziehen des Bandes (3), in welcher das Führungselement (8) zum Teil über die von den Rollen (4s, 4i) beschriebenen Abgrenzungen hinausgeht und sich auf einer Höhe (H1) befindet, die niedriger ist als die Höhe der oberen Rolle (4s) im Verhältnis zu der vorgenannten Bezugsebene;
- eine voll ausgefahrene Arbeitsposition, in welcher sich das Führungselement (8) vollkommen ausserhalb der von den Endrollen (4s, 4i) beschriebenen Abgrenzungen befindet und zu der oberen Rolle (4s) auf solche Weise ausgerichtet ist, dass seine obere Oberfläche (8s) eine Erweiterung der Rolle selbst bildet.

2. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet**, dass der genannte Gelenkviereck-Mechanismus (12) aus einein ersten Arm (9) besteht, dessen Enden (9a, 9b) jeweils an das einen zweiten Arm (10) enthaltende Trägerelement und an das Führungselement angelenkt sind, wobei der Arm (9) in der Lage ist, sich um seine Achse (B) zu drehen, die quer zu den Achsen der Rollen (4s, 4i) verläuft; wobei zwischen dein genannten ersten Arm (9) und dem genannten zweiten Arm (10) eine erste Endloskette (13) vorgesehen ist, welche in entsprechende erste Zahnräder (14, 15) greift, davon eins angetrieben, die von aussen durch Zapfen (14p, 15p) jeweils auf den

ersten Arm (9) und auf den zweiten Arm (10) aufgezogen und dazu bestimmt sind, den genannten ersten Arm (9) in die Lage zu versetzen, sich um seine Achse (B) zu drehen; wobei zwischen dem ersten Arm (9) und dem Führungselement (8) eine zweite Endloskette (16) vorgesehen ist, die über zweite Zahnräder (17, 18) läuft, von denen eins fest und innen auf den ersten Arm (9) aufgezogen ist, während das andere drehbar auf solche Weise auf einem Zapfen (18p) in dem Führungselement (8) montiert ist, dass, wenn der erste Arm (9) gedreht wird, das Führungselement (8) parallel zu den Endrollen (4s, 4i) verbleibt.

3. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet**, dass der genannte Hohlraum (7) einen Rahmen (19) enthält, der aus einer ersten Einheit (20) besteht, welche die obere Rolle (4s) und eine vertikale Stange trägt, die das vorgenannte Trägerelement (11) bildet und die genannte erste Trägereinheit (20) mit einer ähnlichen zweiten Einheit (21) verbindet, welche die untere Rolle (4i) trägt, wobei ein zweiter Arm (10) an die genannte vertikale Stange (11) angelenkt ist.

4. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet**, dass der genannte Hohlraum (7) Mittel (22) enthält, die dazu bestimmt sind, die Positionen des Führungselementes (8) abzutasten und den Gelenkviereck-Mechanismus (12) auszulösen und anzuhalten, wenn das Führungselement (8) die genannten Zwischenpositionen erreicht.

5. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet**, dass das genannte Führungselement (8) mit Mitteln (23) zum Bewegen des Schleifriemens (3) versehen ist, die ans einem ersten, ringförmig geschlossenen Förderband (24) bestehen, das über Riemenscheiben (25) läuft, aufgezogen auf die Enden des Führungselementes (8), von denen eine (25a) durch einen von dem Führungselement selbst getragenen Getriebemotor (26) angetrieben wird und dazu bestimmt ist, das Förderband (24) in beiden Richtungen zu bewegen.

6. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet**, dass das genannte Führungselement (8) mit Mitteln (23) zum Bewegen des Schleifriemens (3) versehen ist, die aus einem ersteil, ringförmig geschlossenen Förderband (24) bestehen, das über erste Riemenscheiben (25) läuft, von denen eine (25a) angetrieben wird und dazu bestimmt ist, das Förderband (24) in beiden Richtungen zu bewegen; wobei die genannte erste Riemenscheibe (25a) durch einen ersten, ringförmig geschlossenen Übertragungsriemen (26) angetrieben wird, der über zweite Riemenscheiben (27, 28) läuft, von denen eine durch eine erste Welle (29) koaxial zu der vorgenannten ersten Riemenscheibe (25a) getragen wird, während die andere Riemenscheibe (28) auf das Ende einer zweiten Welle (30) aufgezogen ist, die an dem Anlenkpunkt (B) des Gelenkviereck-Mechanismus (12) durch das Führungselement (8) verläuft; wobei die genannte zweite Welle (30) dazu bestimmt ist, an ihrem anderen Ende drehbar eine dritte Riemenscheibe (31) zu tragen, über welche ein zweiter ringförmig geschlossener Übertragungsriemen (32) läuft, angetrieben von einer vierten Riemenscheibe (33), die motorgetrieben und durch eine entsprechende dritte Welle (34) an dem genannten Trägerelement (11) befestigt ist.

7. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet**, dass das genannte Führungselement (8) mit Mitteln (23) zum Bewegen des Schleifbandes (3) versehen ist, die aus einem Paar von schmalen Bändern (24a, 24b) bestehen, die sich über die gesamte Länge des Führungselementes (8) erstrecken und an den entgegengesetzten Seiten eines ersten Armes (9) angeordnet sind; wobei jedes der genannten Bänder (24a, 24b) ringförmig geschlossen und über entsprechenden Paaren von Rädern (24r) befestigt sind, welche drehbar an dem Führungselement (8) montiert und zwei von diesen auf solche Weise angetrieben sind, dass sie das genannte Paar von schmalen Bändern (24a, 24b) befähigen, in beiden Richtungen zu laufen.

8. Vorrichtung nach Patentanspnich 1, **dadurch gekennzeichnet**, dass sie Mittel (40) zur Montage des Schleifbandes (3) enthalten, wobei die genannten Mittel oberhalb der oberen Rolle (4s) angeordnet sind und in beiden Richtungen parallel und im Kontakt mit der oberen Oberfläche (6) der oberen Rolle in Verbindung mit dem genannten Führungselement (8) arbeiten; wobei die genannten Montagemittel (40) aus einem zweiten ringförmig geschlossenen Band (41) bestehen, angelenkt an eine seiner Endscheiben (41a) und angetrieben durch einen Zylinder (42), um sich um die genannte Scheibe aus einer Arbeitsposition, in welcher es sich im Kontakt mit der oberen Oberfläche (6) der Rolle (4s) befindet, in eine Ruheposition zu drehen, in welcher es sich nicht im Kontakt mit der Rolle (4s) befindet.

Revendications

1. Ponceuse, en particulier pour des panneaux en bois, comprenant une ou plusieurs unités de ponçage (1) pour des panneaux de bois (2), chaque unité consistant en une courroie abrasive sans fin (3) montée sur au moins une paire de rouleaux ou tambours d'extrémité (4) à axes parallèles, avec le rouleau supérieur (4s) libre et au moins un rouleau

inférieur (4i) motorisé et monté avec sa surface active au contact d'une bande transporteuse (5), et parallèlement à celle-ci, ladite bande transporteuse (5) transportant lesdits panneaux (2) et définissant avec ladite surface active une zone dans laquelle le panneau (2) est usiné ; ladite courroie abrasive (3) étant montée sur la surface supérieure (6) du rouleau supérieur (4s) susmentionné ; une zone creuse (7), dont la taille (H) dépend de la distance entre ces mêmes rouleaux, mesurée selon un axe vertical (Z) de la machine par rapport à un plan de référence horizontal de cette dernière, étant définie entre lesdits rouleaux d'extrémité (4s, 4i) et ladite courroie abrasive (3) ; chaque unité de ponçage (1) de ladite ponceuse étant équipée d'un élément de guidage (8) pour le chargement et le déchargement de la courroie abrasive (3) et consistant en une section en forme de U avec une surface supérieure (8s) destinée à aligner la courroie abrasive, le dispositif étant caractérisé en ce que ledit élément de guidage (8) se trouve dans l'axe des rouleaux (4s, 4i), et parallèle à ces derniers, et est relié à l'extrémité libre d'un élément de support (11), placé à l'intérieur de la zone creuse (7) susmentionnée, par l'intermédiaire d'un mécanisme de tringlerie à quatre points (12), ledit mécanisme de tringlerie à quatre points (12) étant destiné à maintenir l'élément de guidage (8) dans l'axe des rouleaux d'extrémité (4s, 4i) et parallèle à ces derniers lors d'un déplacement axial de ce même élément de guidage entre une pluralité de positions intermédiaires, parmi lesquelles les positions suivantes sont envisagées :

- une position de repos, d'extension minime, dans laquelle l'élément de guidage (8) se trouve complètement à l'intérieur de la zone creuse (7) ;
- une position de chargement/déchargement de la courroie (3) dans laquelle l'élément de guidage (8) se trouve en partie en dehors des limites définies par les rouleaux (4s, 4i) et à une hauteur (H1) inférieure à l'hauteur du rouleau supérieur (4s) par rapport au plan de référence susmentionné ;
- une position de travail, d'extension maximale, dans laquelle l'élément de guidage (8) se trouve complètement à l'extérieur des limites définies par les rouleaux d'extrémité (4s, 4i) et aligné avec le rouleau supérieur (4s) de sorte que sa surface supérieure (8s) soit le prolongement du rouleau en question.

2. Dispositif selon la revendication 1, caractérisé en ce que ledit mécanisme de tringlerie à quatre points (12) consiste en un premier bras (9) dont les extrémités (9a, 9b) sont respectivement tournées vers l'élément de support susmentionné comprenant un second bras (10), et vers l'élément de guidage, le bras (9) pouvant tourner autour de son axe (B), de façon transversale par rapport aux axes des rouleaux (4s, 4i) ; une première chaîne sans fin (13), qui engrène les premières roues dentées correspondantes (14, 15), étant prévue entre ledit premier bras (9) et le second bras (10), l'une de ces roues dentées étant motorisée et respectivement fixée, de façon externe et au moyen de goupilles (14p, 15p), au premier bras (9) et au second bras (10)) et destinée à permettre a ce premier bras (9) de tourner autour de son axe (B) ; une seconde chaîne sans fin (16), montée sur des deuxièmes roues dentées (17, 18), étant prévue entre le premier bras (9) et l'élément de guidage (8), l'une de ces roues dentées étant fixe et fixée de façon interne au premier bras (9), l'autre étant montée, de façon à pouvoir tourner, sur un pivot (18p) de l'élément de guidage (8) pour que ce même élément de guidage (8) reste parallèle aux rouleaux d'extrémité (4s, 4i) quand le premier bras (9) est tourné.

3. Dispositif selon la revendication 1, caractérisé en ce que ladite zone creuse (7) contient un châssis (19) consistant en une première unité (20) qui supporte le rouleau supérieur (4s) et en une poutre verticale, constituant l'élément de support (11) susmentionné qui relie ladite première unité de support (20) et une seconde unité similaire (21) supportant le rouleau inférieur (4i), un second bras (10) étant relié à ladite poutre verticale (11).

4. Dispositif selon la revendication 1, caractérisé en ce que ladite zone creuse (7) contient des moyens (22) destinés à détecter les positions de l'élément de guidage (8) et à actionner et stopper le mécanisme de tringlerie à quatre points (12) quand l'élément de guidage (8) atteint lesdites positions intermédiaires.

5. Dispositif selon la revendication 1, caractérisé en ce que ledit élément de guidage (8) est doté de moyens (23) permettant le mouvement de la courroie abrasive (3) et consistant en une première bande transporteuse sans fin (24) montée sur des poulies de transmission (25), fixées aux extrémités de l'élément de guidage (8), dont l'une (25a) est actionnée par un motoréducteur (26) monté sur l'élément de guidage lui-même et destiné à actionner la bande transporteuse (24) dans les deux directions.

6. Dispositif selon la revendication 1, caractérisé en ce que ledit élément de guidage (8) est doté de moyens (23) permettant le mouvement de la courroie abrasive (3) et consistant en une première bande transporteuse sans fin (24) montée sur des premières poulies de transmission (25), l'une de ces poulies (25a) étant motorisée et destinée à

actionner la bande transporteuse (24) dans les deux directions ; ladite première poulie (25a) étant actionnée par une première courroie de transmission sans fin (26) montée sur des deuxièmes poulies (27, 28), l'une de ces poulies étant fixée de façon coaxiale à la première poulie (25a) en question par l'intermédiaire d'un premier arbre (29), et l'autre poulie (28) étant fixée à l'extrémité d'un deuxième arbre (30) traversant l'élément de guidage (8) au niveau du point de liaison (B) du mécanisme de tringlerie à quatre points (12) ; ledit deuxième arbre (30) étant destiné à supporter, au niveau de son autre extrémité et de façon rotative, une troisième poulie (31) sur laquelle se trouve une seconde courroie de transmission sans fin (32) actionnée par une quatrième poulie (33) qui est motorisée et fixée à l'élément de support (11) susmentionné par l'intermédiaire d'un troisième arbre (34).

7. Dispositif selon la revendication 1, caractérisé en ce que ledit élément de guidage (8) est doté de moyens (23) permettant le mouvement de la courroie abrasive (3) et consistant en une paire de petites bandes (24a, 24b) qui s'étendent sur toute la longueur de l'élément de guidage (8) et situées sur les côtés opposés du premier bras (9); chacune de ces petites bandes (24a, 24b) étant sans fin et montées sur des paires de roues correspondantes (24r) qui sont elles-même montées sur l'élément de guidage (8) de façon à pouvoir tourner, deux d'entre elles étant motorisées de façon à permettre à ladite paire de petites bandes (24a, 24b) de se déplacer dans les deux directions.

8. Dispositif selon la revendication 1, caractérisé en ce qu'il comprend des moyens (40) pour le chargement de la courroie abrasive (3), lesdits moyens étant placés sur le rouleau supérieur (4s) et fonctionnant dans les deux directions à la fois parallèlement et en contact avec la surface supérieure (6) de ce même rouleau supérieur conjointement avec ledit élément de guidage (8) ; lesdits moyens de chargement (40) consistant en une deuxième bande sans fin (41), pouvant se déplacer dans les deux directions, articulée au niveau de l'une de ses poulies d'extrémité (41a) et actionnée par un cylindre (42) pour pouvoir tourner autour de ladite poulie d'une position de travail dans laquelle elle est en contact avec la surface supérieure (6) du rouleau (4s) à une position de repos dans laquelle elle n'est pas en contact avec le rouleau (4s).

FIG 1

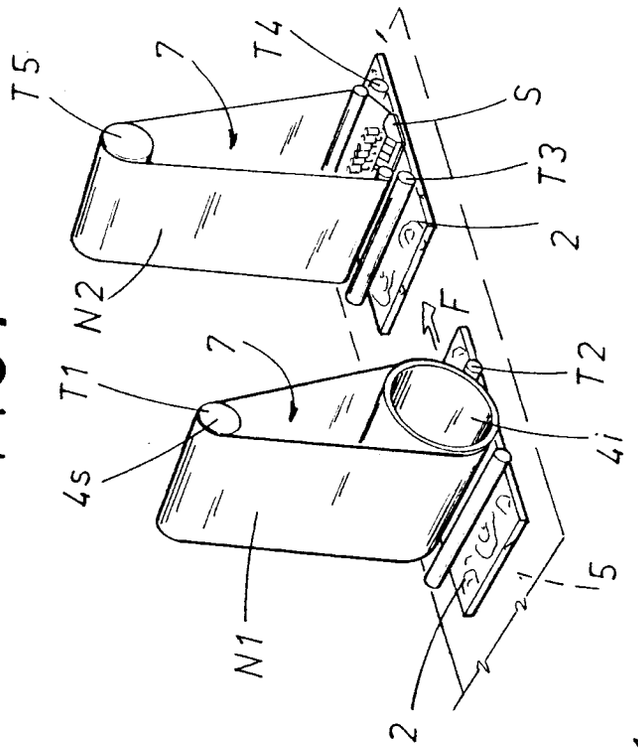


FIG 4

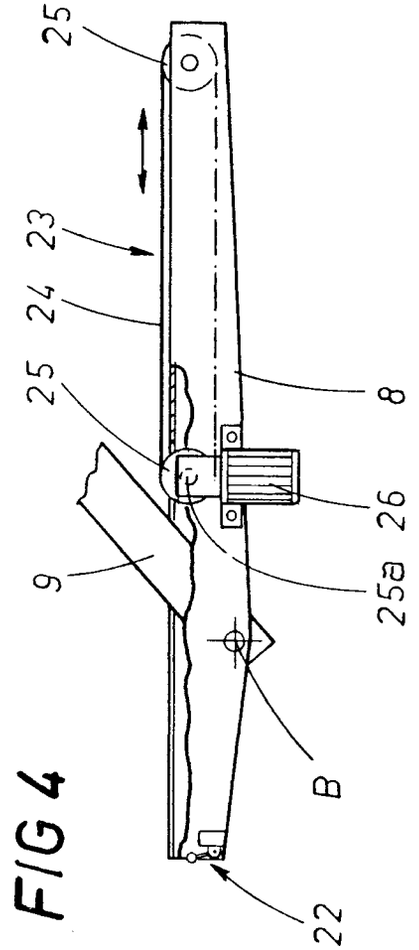
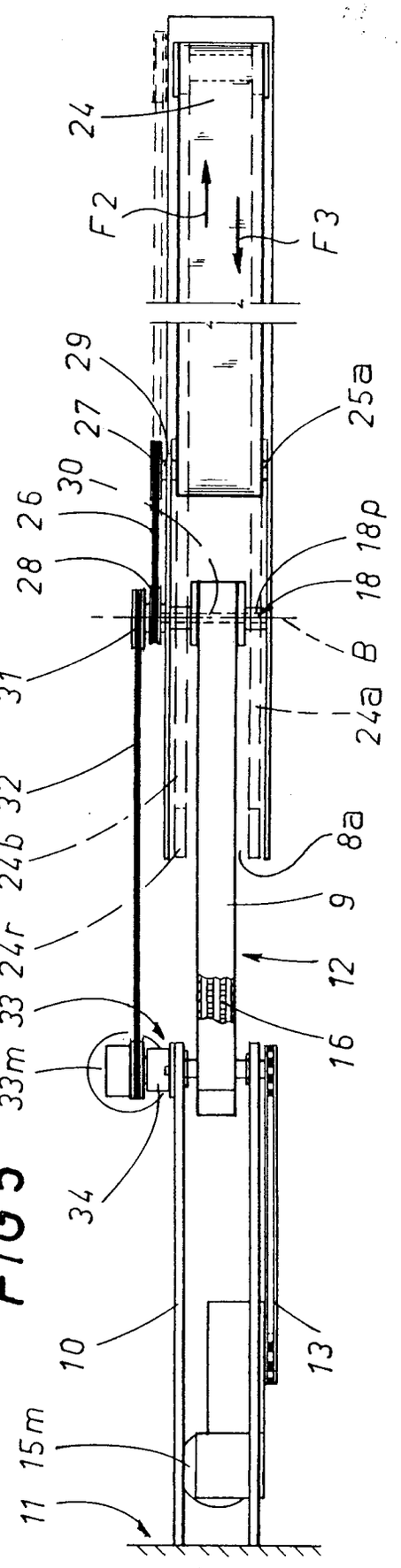


FIG 5



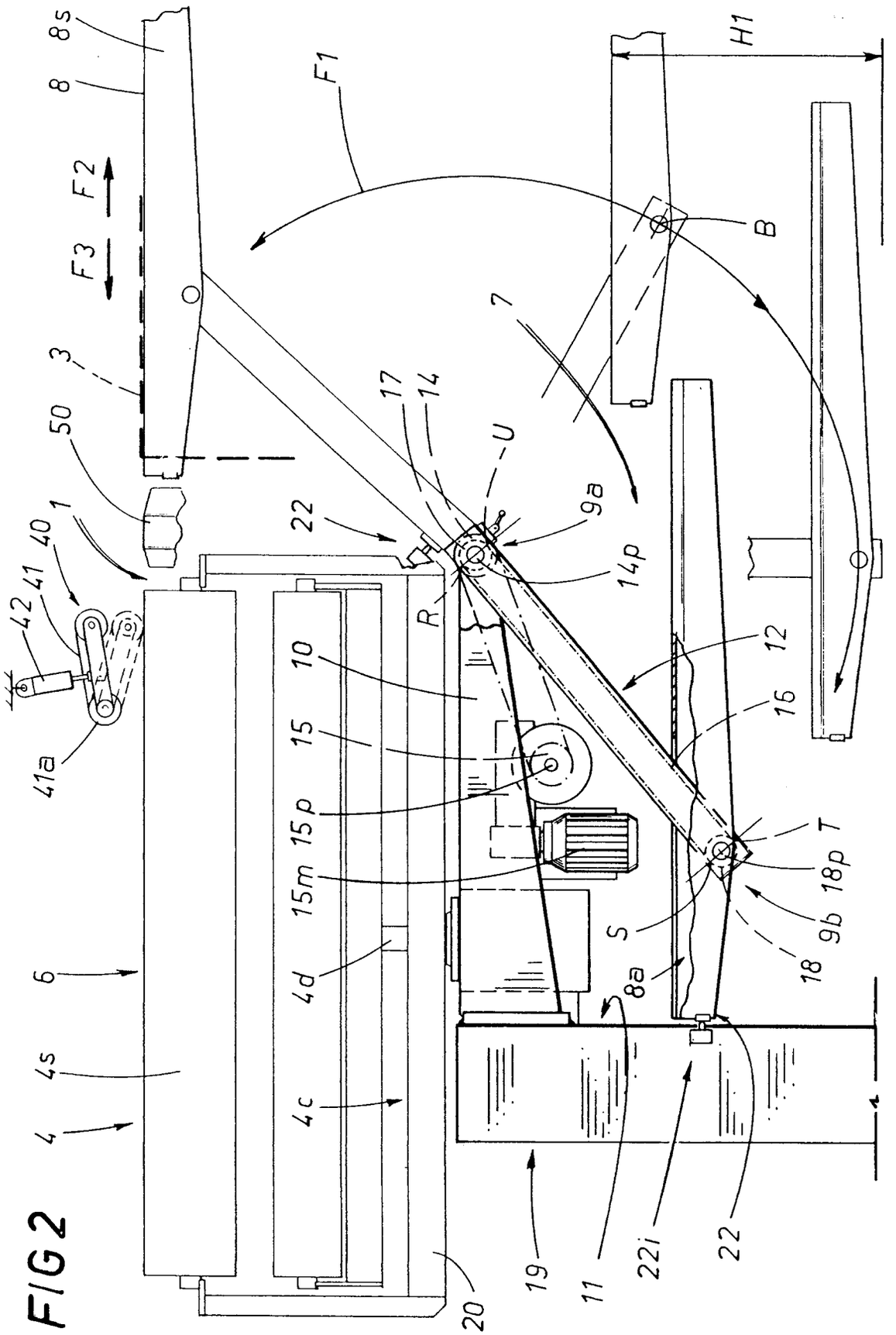

8s
8
F1
H1
F2
F3
B
3
7
50
17
14
U
1
9a
22
40
41
42
14p
R
12
10
16
15
41a
15p
T
15m
18p
9b
S
18
6
4d
8a
4s
4
4c
19
11
22i
22
20

FIG 2

FIG 3