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

(11) Publication number: **0 142 655**
A2

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **84110752.7**

(22) Date of filing: **08.09.84**

(51) Int. Cl.⁴: B 24 B 5/44
B 24 B 41/06, B 24 B 27/00

(30) Priority: **18.11.83 IT 2377083**

(43) Date of publication of application:
29.05.85 Bulletin 85/22

(84) Designated Contracting States:
BE DE FR GB

(71) Applicant: **S.I.L.L.E.M. SOCIETA 'ITALIANA LAVORAZIONE LEGNO E METALLI S.P.A.**
Via Brunetti 9
I-20156 Milan(IT)

(72) Inventor: **Muffolini, Giannino**
Via Marconi, 121
I-20092 Cinisello Balsamo Milan(IT)

(74) Representative: **Luksch, Giorgio, Dr.-Ing. et al,**
Ing. A. Giambrocono & C. S.r.l. Via Rosolino Pilo, 19/b
I-20129 Milano(IT)

(54) An apparatus for abrading machining of the welding zone for the rims of bicycle and motor vehicle wheels.

(57) A snap rotary table carries thereon rims for abrading machining at the welding zone, which are subsequently moved to positions where the abrading tools, such as grinding wheel and abrasive bands, are operative.

The rim supporting means comprise two cantilever facing spaced apart lower bearings and an upper clamping device. Thus, the zone to be machined is exposed on all sides and the abrading tools located at the various operative positions are allowed to machine the entire zone.

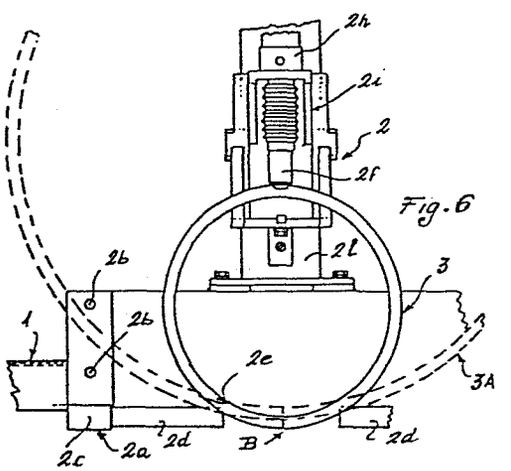

Fig. 6

EP 0 142 655 A2

0142655

"AN APPARATUS FOR ABRADING MACHINING OF THE WELDING ZONE FOR THE RIMS OF BICYCLE AND MOTOR VEHICLE WHEELS".

This invention relates to an apparatus for abrading machining of the welding zone for the rims of bycicle and motor vehicle wheels, and comprises a snap rotary table, a series of operative units arranged around the rotary table and provided with abrading tools, and chuck means on such a table for supporting the rims at working or machining position.

The rims, referred to by the invention, are rims obtained by end-to-end welding of a cut down size of suitable circle curved section.

Following welding, internal and external discontinuities occur at the end zone which, by jeopardizing the rim appearance and functionality, are removed by abrading machining.

The prior art automatic apparatuses, designed for the machining of the welding zone of rims for bicycles,morotcycles and the like, an example of which is shown and described in the Italian Patent No. 959.631, generally comprise three sets, that is a first set for the machining of the side edges and outside of the welding zone, a second set for rim transfer from the first set to the third set, which carries out the machining of the inside of the rim welding zone and compri-

ses a snap rotary table, chuck means on such a table for rim support and a series of operative units arranged along the table perimeter for machining the inner side of the rim.

The provision of such three sets makes the prior art apparatus cumbersome, also hazardous and in any case complicated.

Surprisingly, it has been found that all of the workings involving the welding zone can be carried out by a reduced apparatus having only one set provided with a snap rotary table and a series of operative units for the machining of the whole welding zone, according to the invention it being provided that the rim chuck means to the table comprise at the bottom two opposite, pretruding, stationary and spaced apart bearings, and at the top a controlled clamping element which is applied on the rim and clamps the latter on the two underlying bearings.

By arranging the rim so that the welding zone is located within the spacing between two protruding spaced apart bearings, the inside of the welding zone is clear and accordingly the zone can be machined on each side thereof by the operative units located along the table periphery.

The invention will be more clearly understood from the following detailed description, as given be mere way of unre-

strictive example, of a preferred embodiment thereof, which has been shown in the accompanying drawings, in which:

Fig. 1 is a schematic plan view, with some parts having been omitted, of the apparatus according to the invention;

Fig. 2 is a schematic side elevational view showing one of the abrading units associated with the snap rotary table only partly shown;

Fig. 3 is a side partly cutaway view of the device unloading the rims as machined by the snap rotary table;

Fig. 4 is a fragmentary plan view showing the handling of the device of Fig. 3;

Fig. 5 is a side elevational view showing the means clamping the rim and forming part of the unloading device shown in Figs. 3 and 4;

Fig. 6 is a front view showing a chuck means with the mounted rim arranged on the snap rotary table;

Fig. 7 is a side view of the object shown in Fig. 6;

Fig. 8 is a plan view of the object shown in Figs. 6 and 7; and

Fig. 9 is a cross-section showing a portion of a possible rim as machined on the apparatus shown in the preceding figures.

Referring to the figures of the accompanying drawings, reference numeral 1 denotes as a whole a snap rotary table by conventional drive means, not shown. At regular intervals or spacings along the periphery thereof, said table has a series of chuck means, denoted as a whole at 2, and designed to support rims 3, 3A at suitable position for machining of the welding zone B of the abutted ends of the circle bent section comprising the rim.

Conventional operating units I, II, III, IV, V, VI, VII and VIII are arranged around the table, at angular intervals corresponding to the chuck means 2 and for machining with the respective abrading tool(s), such as grinding wheels M arranged thereon, said units being provided with tool driving means, feed thereof in accordance with the rim contour being machined, which feed is controlled by copying devices, if required.

Said chuck means 2, which are all identical to one another, comprise a pair of elements 2a of L-shape as sidewise seen, which are vertically adjustably secured by means of screws 2b, and cantilever projecting by the lower side 2c from the table periphery.

At the free end of side 2c and transversely thereto, a pin

2d extends to the other element 2a of the pair and is chamfered at its projecting end 2e. The two pins of the pair are spaced apart from each other and an axis there between. At the bottom, said rim 3, 3A bears thereon from opposite sides of zones B, and therefore the latter is accessible from all sides.

The chuck means 2 include an upper pressing member of 2f, made for example of plastics material, which is arranged on the rim at a vertical diameter midway between the two supporting pins 2d. This member 2f is secured to the stem 2g of a pneumatic jacket 2h, which is mounted on a bracket 2i that can be displaced and secured along a column 21 in accordance with the diameter of a rim 3, 3A being machined. Said column 21 is secured by screw means 2m to the upper face of table 1.

After being machined, the rims arrive one by one at an unloading station, at which the operative unit is located for rim transfer parallel to itself from the associated chuck to an unloading location.

This unloading unit, denoted as a whole at 100, comprises a stationary column 101, along which a shaft 102 is slidably mounted and operated by a pneumatic jack 103.

The shaft 102 is integral with a ring nut 104 having a straddle or extension 105 to which a guide pin 106 is secured, the latter being downward facing and guided in a bushing 107. Such a bushing is integral with a straddle or extension 108 of said column 101. Thus, said shaft 102 can only move in vertical direction.

This shaft 102 has secured thereon a gear wheel 108', one for each chain 111. By means of axial and radial bearings 109, the shaft rotatably carries an arm 110 suitably provided with a bushing 112. For rotation of arm 110, said bushing 112 is connected bya further arm 113 and articulated joint 114 to a pneumatic jack 115, which is pivoted at 116 to a support 117 integral with shaft 102, for example by said arm 105.

At its free end, said arm 110 has a bushing 118 rotatably carrying by axial and radial bearings 119 a unit for gripping the rim 3, 3A at the welding zone B. This unit comprises a pneumatic jack 120, the stem 121 of which extends in a bushing 123 having the jack cylinder connected thereto.

Secured to this bushing is a gear wheel 122 on which said chain 111 is entrained. Thus, said bushing 123 andjack 120 are allowed to rotate about the vertical axis thereof.

A platform 124 is secured to bushing 123 and has two sides 125 between which a block 126 is slidably mounted.

A connecting rod 127 is pivoted at 128 to said block and operates on a pin 129 of a lever 130 pivoted at 131 to said sides 125.

The lever carries an adjustable jaw 132 which, under the control of said jack 120, clamps the rim against a pair of parallel horizontal pins 133 projecting from the sides 125.

Therefore, the described unloading unit can cause vertical displacements, horizontal rotations about two axes (that of column 101 and that of bushing 123) and closing and opening of the clamp gripping the rim 3, 3A and comprising the members 132,133.

In this example, the apparatus has eight operative units or stations I, II, III, IV, V, VI, VII and VIII, provided with abrading tools, such as grinding wheels, in the case of different granulation.

The apparatus has a manual loading station K and an unloading station IX for the finished rim, at which the unloading device of Fig. 6,7 and 8 is arranged.

For instance, assume that the rim section is that shown in Fig. 9.

After rim loading at the station K by the operator, as described in connection with Figs. 6,7 and 8, the table car-

ries such a rim in front of unit I, which is also shown in Fig. 2. The grinding wheel M of this unit rough-shapes the welding zone along the inner central portion of rim corresponding about to the section or length R-R' of Fig. 9.

At the next unit or station II, the two grinding wheels rough-shape the sides R-R" and R'-R''' of the rim. Then, at unit or station III, the inclined grinding wheel therein located provides for rough-shaping of one half of the outer side or channel of the rim, that is the section or length a, while at the next unit or station IV the other half a' is rough-shaped.

The unit or station V finishes the tips or crests P and Q outside of the rim. The unit or station VI is for prefinishing of the section or length R-R', and unit or station VII is for sides R"-R and R'-R''', and finally the unit or station VIII is for trimming the section or length R-R'. Unit or station IX is for unloading a finished rim as follows.

Assume that the unloading device 100 is at the retracted position shown by broken line in Fig. 1 and denoted at F. When said table stops, pressure fluid is supplied to the double acting jack 115, which causes the arm 110 to rotate to the position of Fig. 1, shown by full line, with the lever 130

moving the jaw 132 to open position (shown by broken line in Fig. 5).

Under these conditions, the rim zone B is between the pins 133 and open jaw 132.

The jacks 132, 103 and 2b are operated, so that the jaw 2f is lifted and leaves or releases the rim 3, 3A and the jaw 132 is closed and lifted and the rim is thereby lifted from the two lower bearings 2d. Then, the jack 115 is reversely controlled,which causes the arm 110 to rotate to the position F of Fig. 1, and then the jack 103 is lowered and jaw 132 opens, whereby the rim can be removed. The cycle is repeated with a new stop of the table.

CLAIMS

1. An apparatus for abrading machining of the welding zone in rims for bicycle and motorbicycle wheels, comprising a snap rotary table, a series of operative units provided with at least one abrading tool and arranged about the table, and chuck means on said table for supporting the rims at working position, characterized in that said chuck means (2) comprise at the bottom two stationary, protruding, facing and spaced apart bearings (2d), and at the top a movable clamping element (2f), which is driven for application to the rim (3, 3A) and clamps the latter on the two underlying bearings (2d).

2. An apparatus as claimed in Claim 1, characterized in that said bearings comprise a pair of substantially coaxial pins (2d).

3. An apparatus as claimed in Claim 1, characterized in that the pressure fluid operated clamping element (27) is connected to the table (1) for adjustment in height in accordance with the diameter of the rim (3, 3A) being machined.

4. An apparatus as claimed in any of the preceding claims,

characterized in that all of the units (I, II etc.) provided with abrading tools (M) as required for the machining of the welding zone (B) are arranged about the rotary table(1).

5. An apparatus as claimed in any of the preceding claims, characterized by the prevision of an automatic unloading unit (IX) comprising controllable clamping means (130,132,133), which are rotatably mounted and vertically and horizontally displaceable.

6. An apparatus as claimed in any of the preceding claims characterized in that said unloading unit (IX) comprises means (108,111,112) for maintaining said rim (3, 3A) parallel to itself during transfer operation.

7. An apparatus as claimed in any of the preceding claims, characterized in that said unloading unit (IX) comprises a vertically movable shaft (102), an arm (110) rotatably carried by said shaft (102) and carrying at the free end thereof said clamping means (130, 132, 133) and the means (120) controlling said last mentioned means.

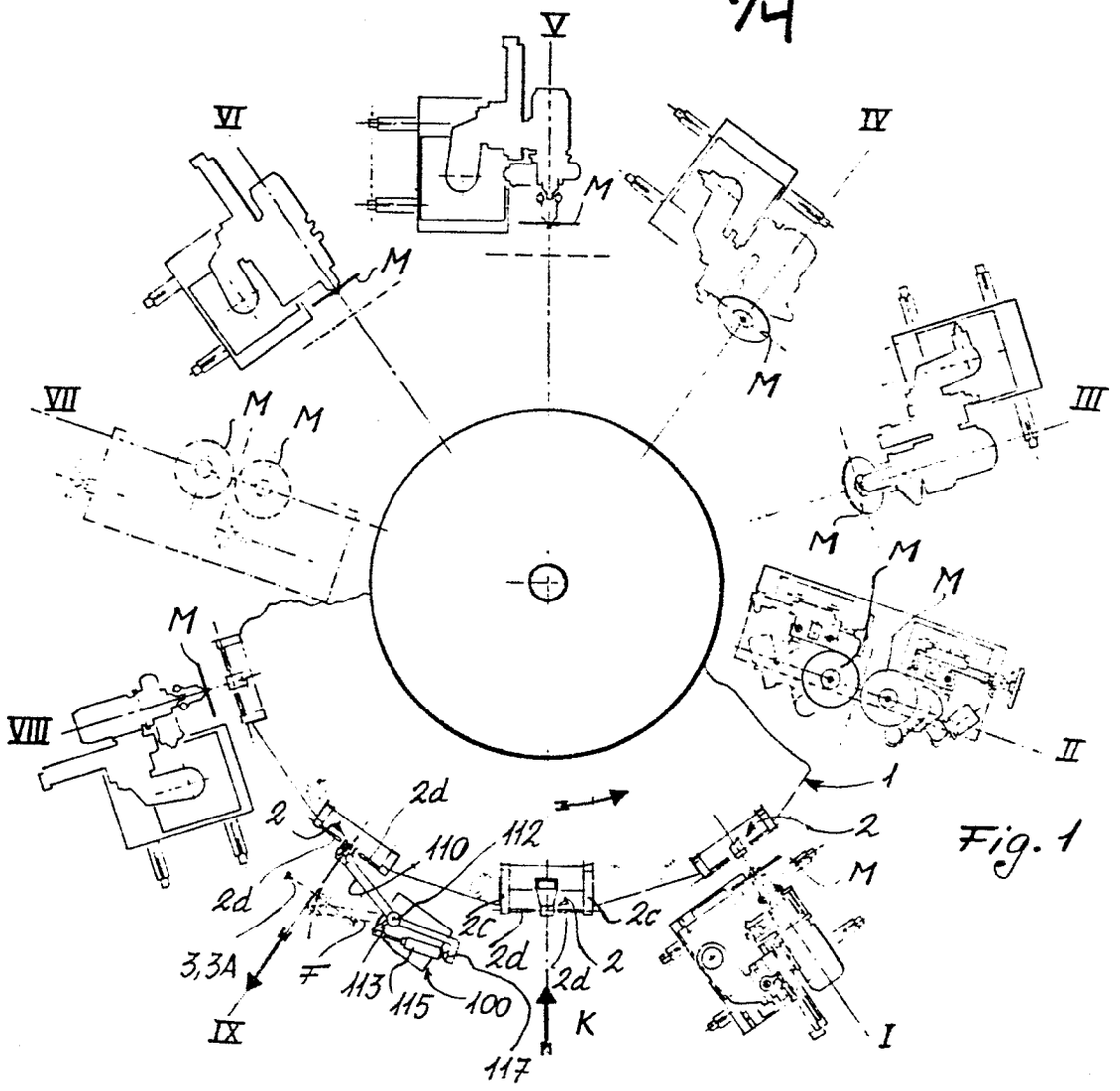
V
VI
IV
M
M
M
VII
III
M
M
M
M
M
VIII
II
1
2
2d
110
112
2
M
2d
2c
2c
2d
2d
2
3,3A
F
113
115
100
2d
K
IX
117
I

Fig. 1

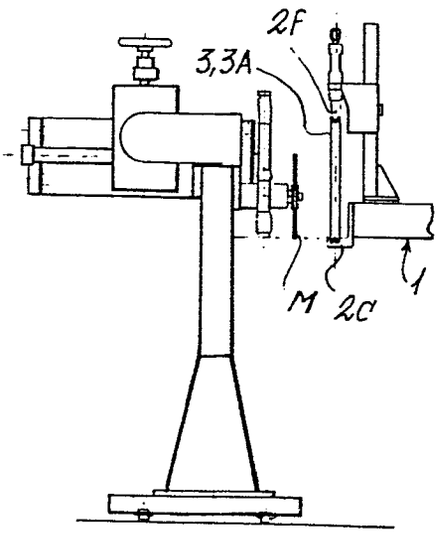
2F
3,3A
M
2c
1

Fig. 2

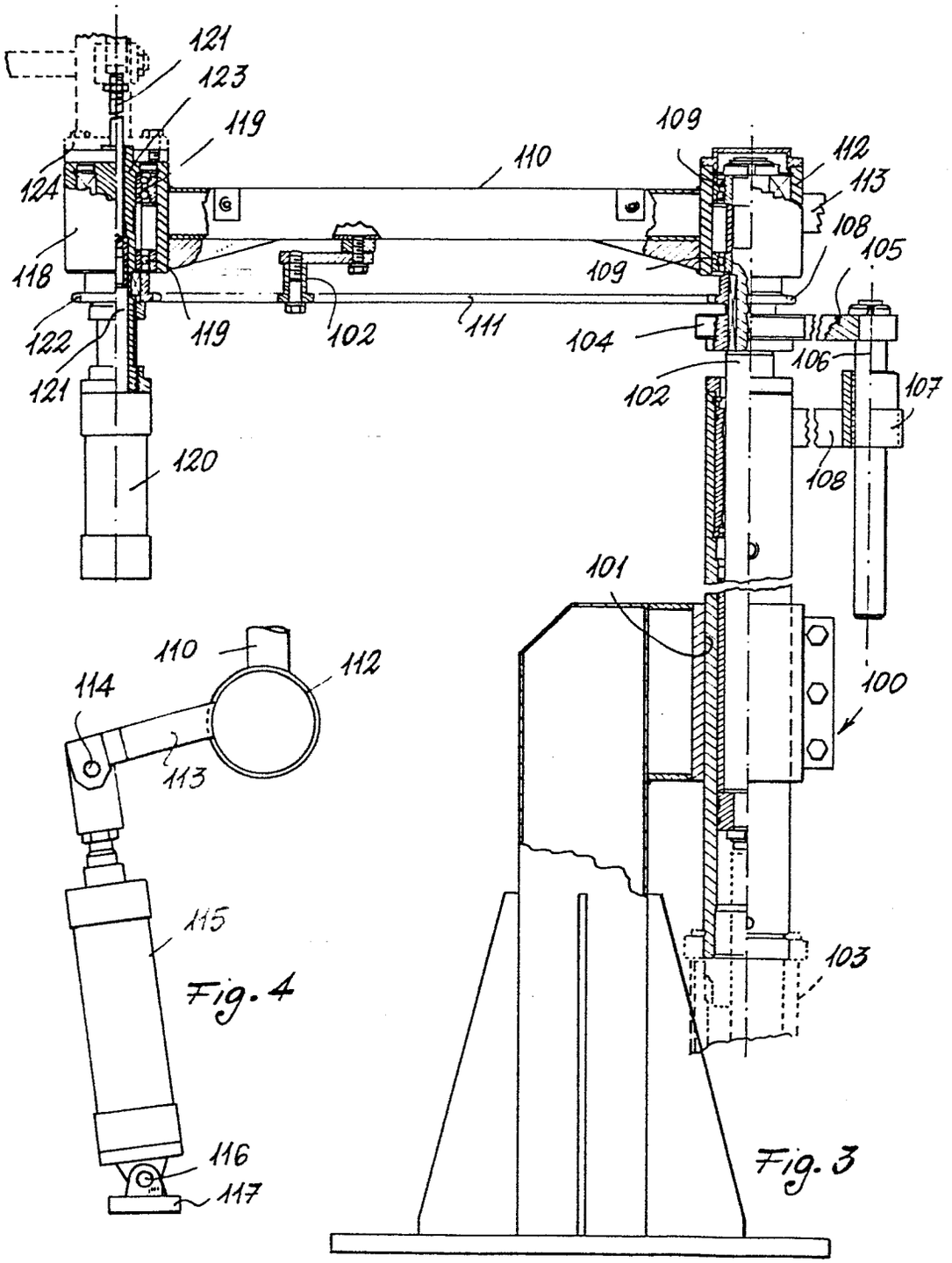
121
123
119
124
118
122
121
120
110
109
112
113
108
105
109
119
102
111
104
106
102
107
108
101
100
103

Fig. 3

110
112
114
113
115
116
117

Fig. 4

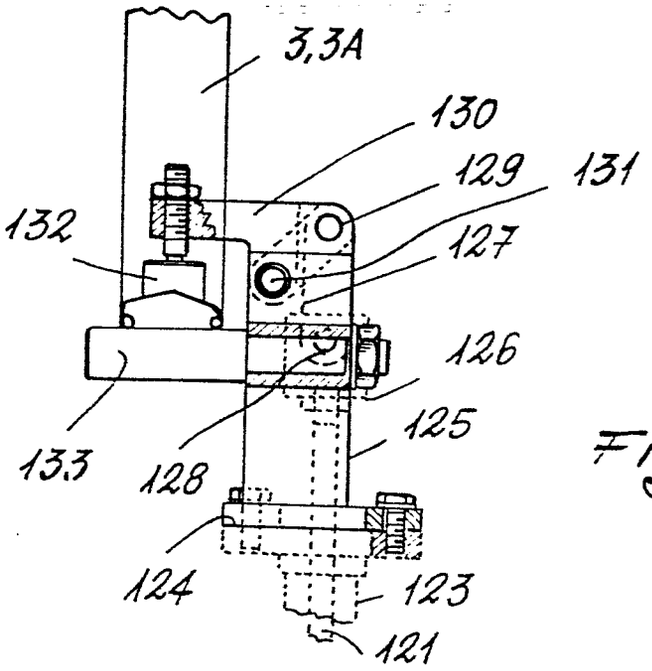
3,3A
130
129
131
132
127
126
125
133
128
124
123
121

Fig. 5

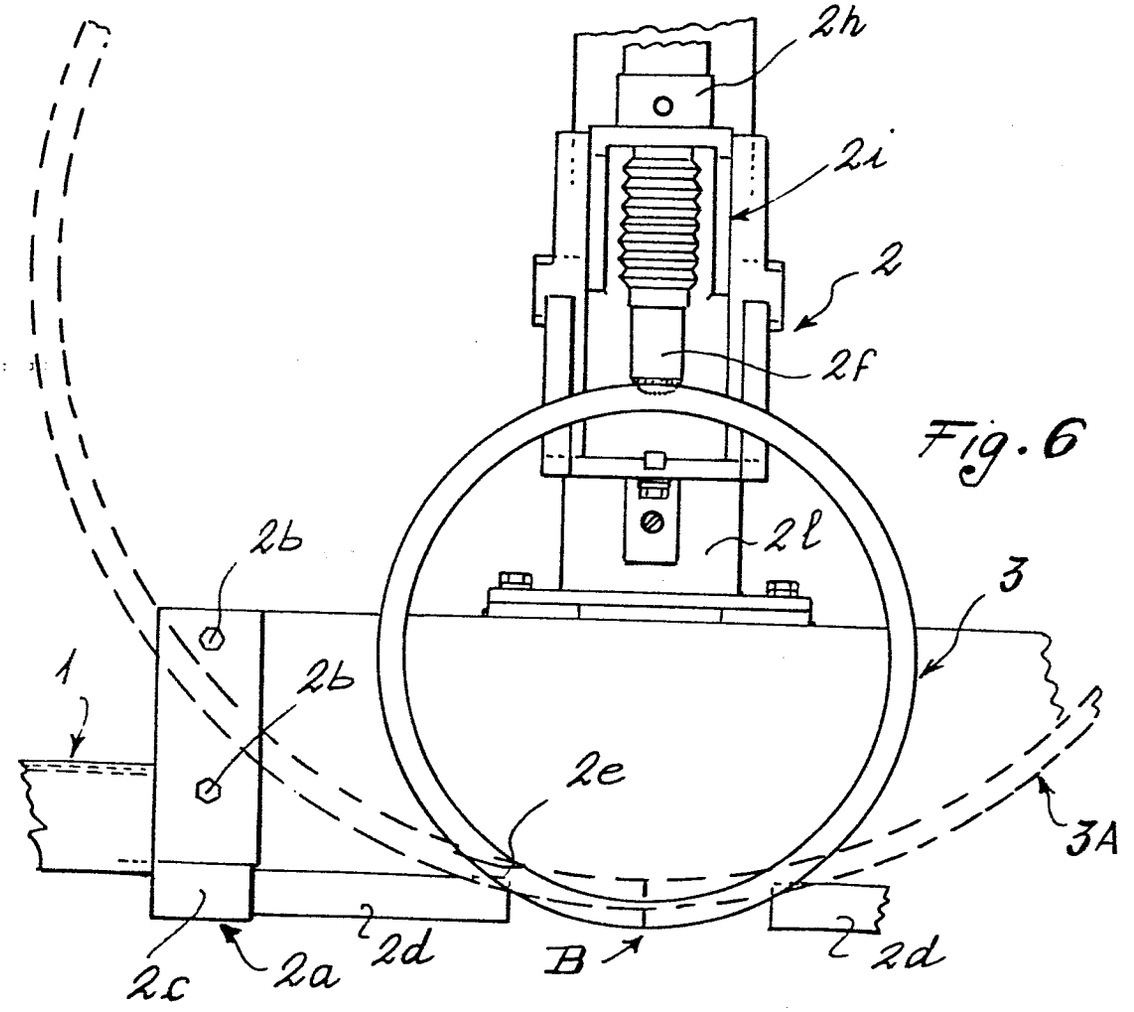
2h
2i
2
2f
2l
3
2b
2b
1
2e
3A
2c
2a
2d
B
2d

Fig. 6

0142

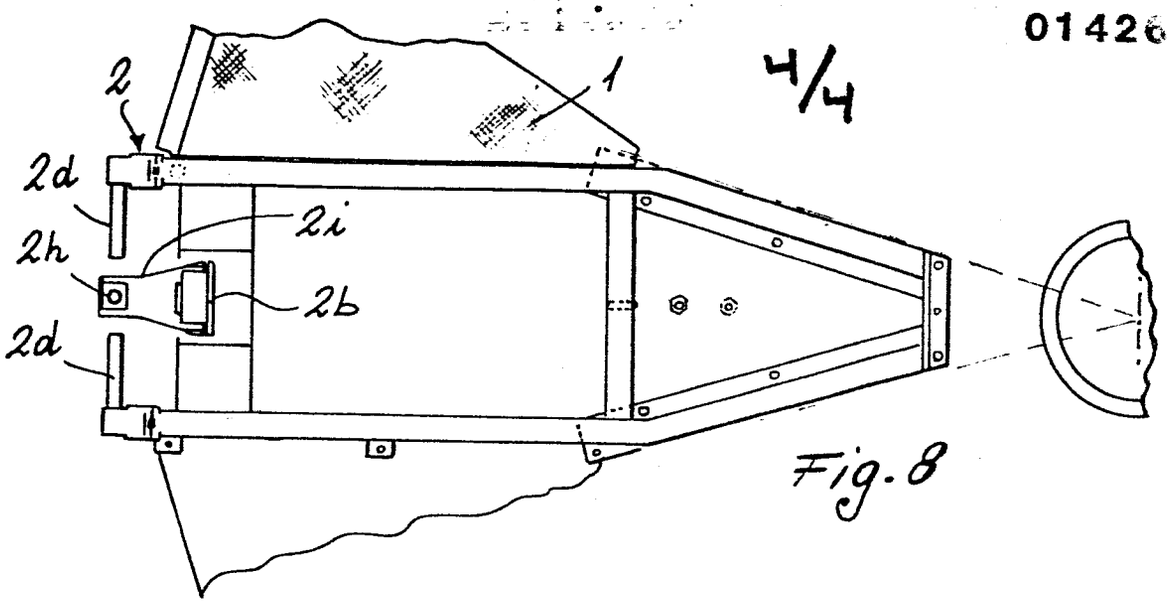

Fig. 8

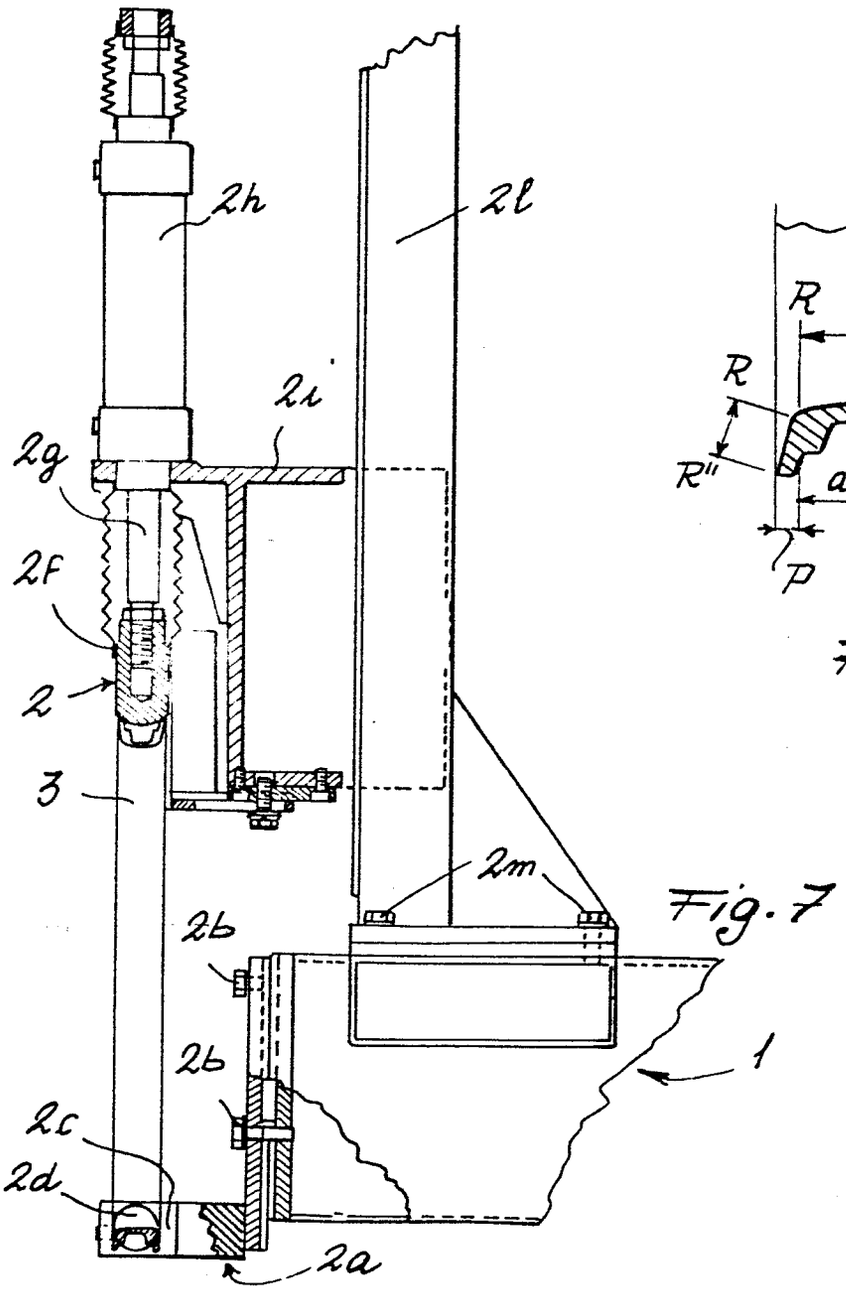

Fig. 7

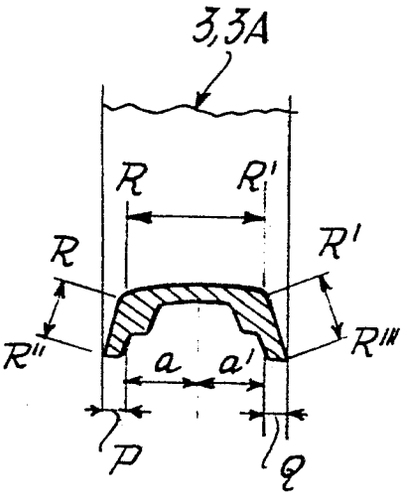

Fig. 9