Aug. 20, 1968 F. GERST 3,397,559

SAFETY DEVICE FOR WIRE RUN-OFF MACHINES

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Fig. 1

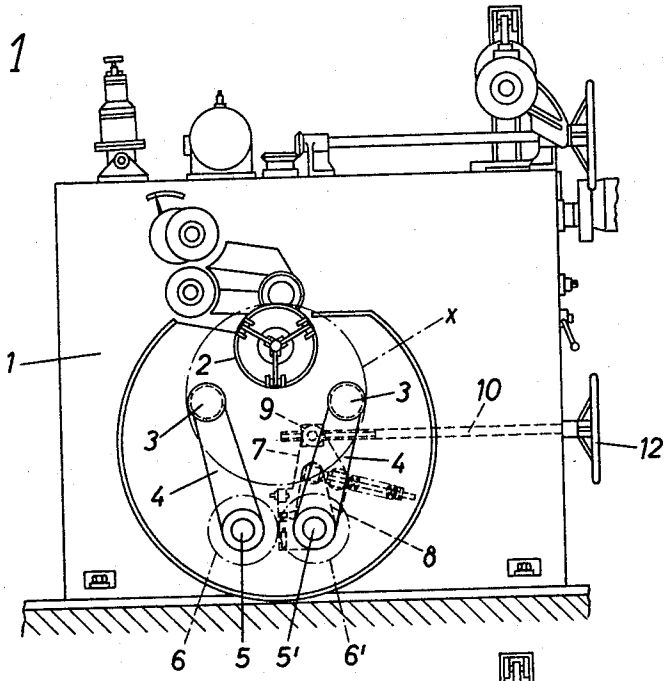
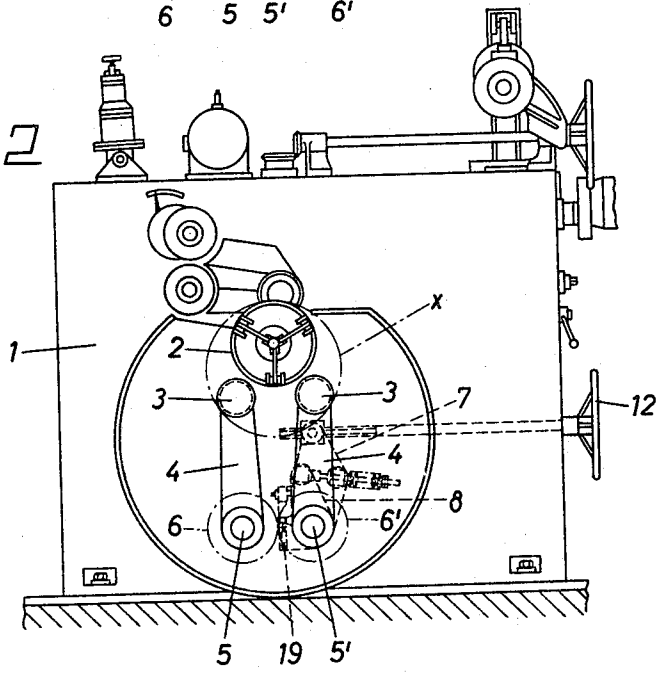


Fig. 2



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Fig. 3

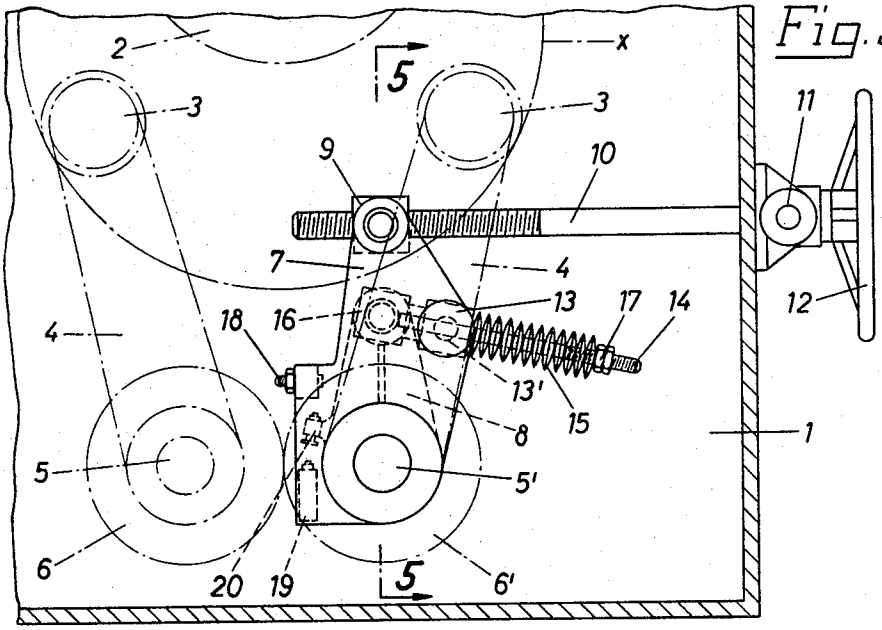
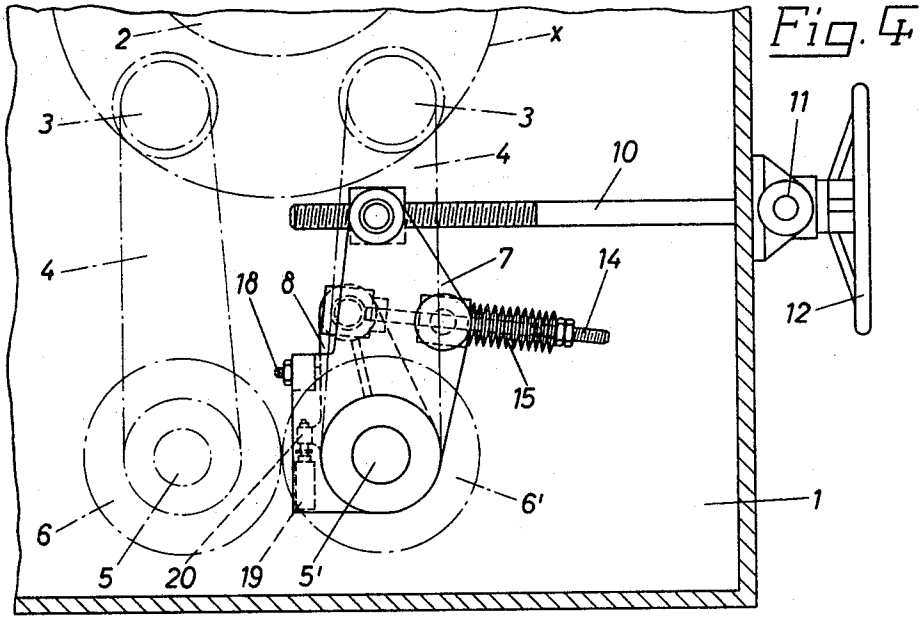


Fig. 4



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SAFETY DEVICE FOR WIRE RUN-OFF MACHINES

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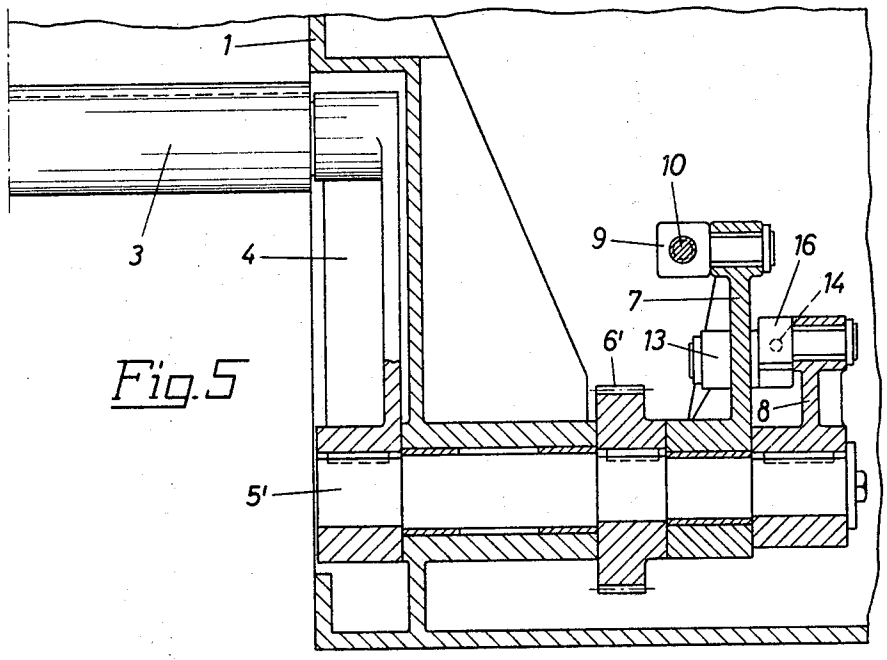


Fig. 5

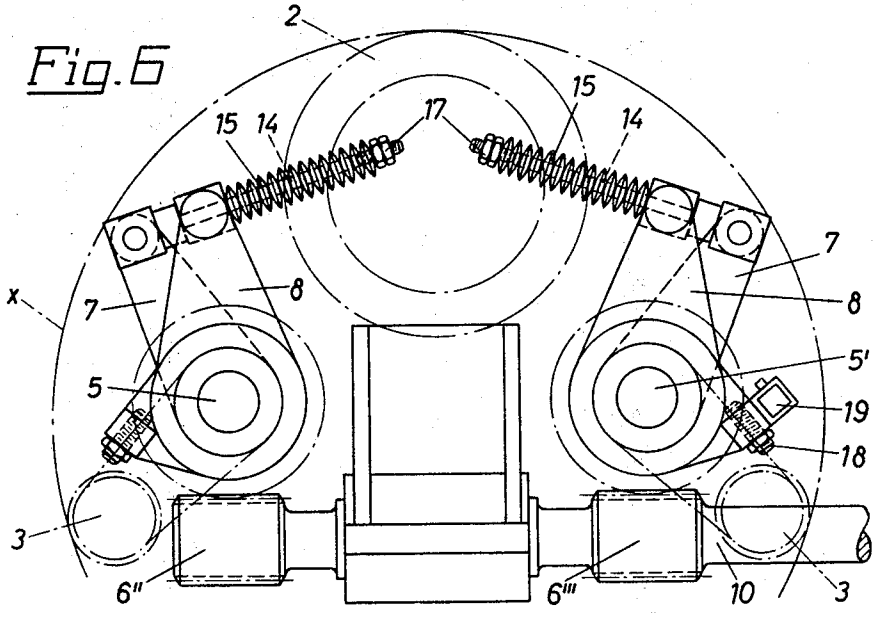


Fig. 6

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SAFETY DEVICE FOR WIRE RUN-OFF MACHINES

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Fig. 7

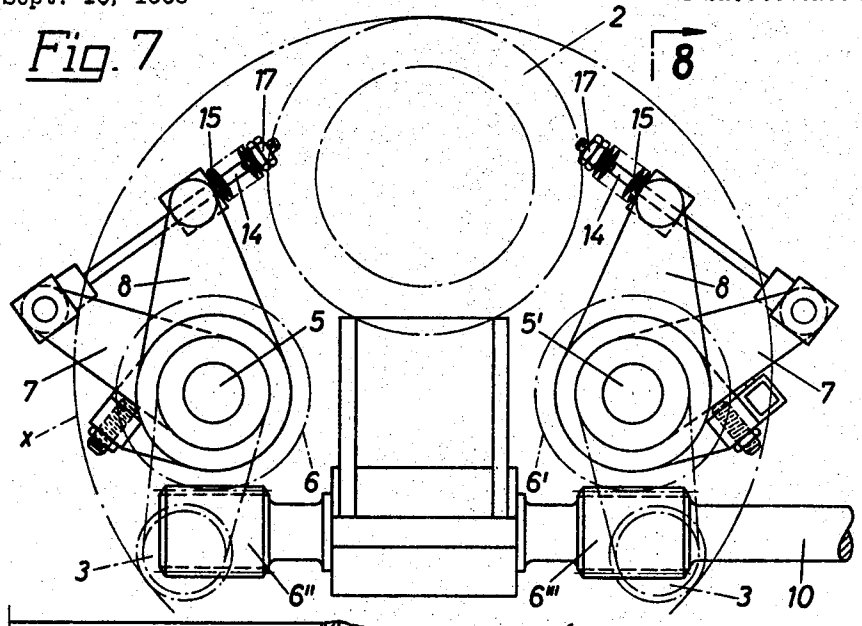
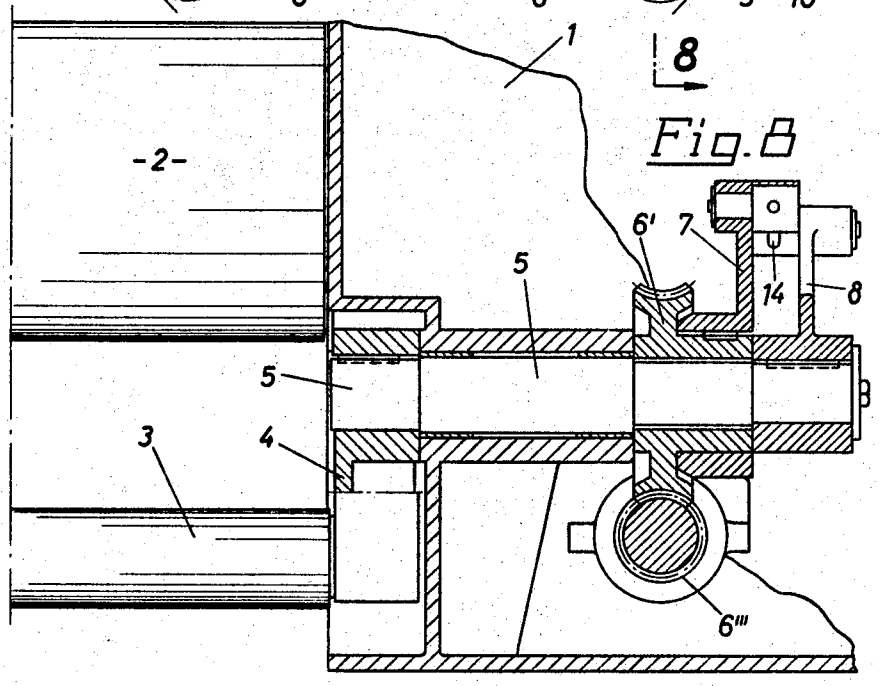


Fig. 8



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United States Patent Office 3,397,559 Patented Aug. 20, 1968

3,397,559

SAFETY DEVICE FOR WIRE RUN-OFF MACHINES

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Claims priority, application Germany, Sept. 17, 1965, G 44,707
2 Claims. (Cl. 72—5)

The present invention relates to a safety device for wire run-off machines for wound, hot rolled round steel of a thickness of over 10 mm, in which the annular wire body is carried by a horizontal discharging drum and is retained under tension by two supporting rollers mounted on levers forcibly swingable towards each other and disposed below the drum.

Wire run-off machines of this type are known. In these machines, the wire is discharged by means of discharging rollers and is guided by a group of straightening rolls following the discharging rollers. The advantage of these machines resides substantially in the fact that the large bending forces for straightening the windings are applied safely, the wire is straightened exactly and the running height of the wire into the working machine can be maintained precisely, which is of greatest essence for a continuous operation free from disturbances.

It has been the experience, however, that, even with such wire run-off machines of this type, operational disturbances occur under certain circumstances, which are the result of the fact that, upon simultaneous occurrence of unfavorable circumstances, for instance, unequal material hardness and non-round wire windings, one of a plurality of wire windings are rigidly tightened on the run-off drum. This leads to a bending of the supporting rollers and even to breakage of the latter, if the pulling force of the working machine is very large.

It is, therefore, one object of the present invention to provide a safety device for wire run-off machines, wherein the danger of rigid tightening of a wire winding on the run-off drum is avoid, prior to occurrence of such tightening.

It is another object of the present invention to provide a safety device for wire run-off machines, wherein an automatic safety device is provided on the wire run-off machine, which safety device stops the operation of the working machine pulling off the wire in case of danger.

It is still another object of the present invention to provide a safety device for wire run-off machines, wherein two leavers are disposed one behind the other and mounted on a swinging lever shaft carrying a supporting roller, one of the levers being keyed to the shaft, while the other of the levers is rotatably mounted on the shaft and is pivotally connected with a setting spindle. Both levers are equipped with switch contacts and carry pivot members, which are coupled with a common pulling bolt subject to the effect of a spring.

By this arrangement, a safety device is created, which operates in simplest and most reliable manner, which safety device stops the working machine pulling-off the wire by means of a fine-sensitive adjustable sensing effect by electric means in case of danger. The result is the avoidance of the time-consuming unwinding of the rigidly secured wire, since such occurrence is eliminated.

With these and other objects in view which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

FIGURE 1 is a front elevation of a wire run-off machine designed in accordance with the present invention, showing the normal operative position of the supporting rollers;

FIG. 2 is a corresponding front elevation showing the supporting rollers in thhe danger position;

FIG. 3 is a fragmentayr elevation of the supporting roller bearings, as disclosed in FIG. 1, shown at an elarged scale;

FIG. 4 is a fragmentary elevation similar to that of FIG. 3, yet showing the rollers in the position disclosed in FIG. 2;

FIG. 5 is a section along the line 5—5 in FIG. 3;

FIG. 6 is a fragmentary elevation disclosing another embodiment of a wire body of large diameter, and in particular, partly a front elevation with a run-off drum and supporting rollers in normal operative position;

FIG. 7 is an elevation similar to that of FIG. 6, however, the rollers being shown in danger position; and

FIG. 8 is a longitudinal section of the arrangement shown in FIG. 7.

Referring now to the drawings, and in particular FIGS. 1 to 5, the machine body I has a horizontal and rotatably mounted run-off drum **2**. Two supporting rollers **3** are provided in symmetrical arrangement below the wire-run-off drum **2**. The supporting rollers **3** are mounted at the ends of two swinging levers **4**, each of the levers **4** being keyed to a shaft **5** and **5'**, respectively, which shafts **5** and **5'** are mounted immovably, but rotatably, in the machine body **1**. The two shafts **5** and **5'** carry spur gears **6** and **6'**, respectively, which gears **6** and **6'** mesh with each other, so that the swinging levers **4** jointly with the supporting rollers **3**, can swing jointly in opposite directions.

Two levers **7** and **8** are disposed one behind the other on the swinging lever shaft **5'**, the lever **8** being keyed to the shaft **5'**, while the other lever **7** is rotatably mounted on the shaft **5'**, that means is loosely mounted thereon. The lever **7** is pivotally connected with a spindle nut **9**, which sits on a setting spindle **10**. The latter projects through a supporting bearing **11** secured to the machine body **1** and carries a hand wheel **10** adapted for the adjustment of the lever **7**.

The lever **7** has a counter bearing **13** provided laterally thereon by means of a rotary pin **13'** and on which counter-bearing **13** a plate spring package **15** supports itself, through which a pulling bolt **14** projects displaceably in axial direction, the end of the pulling bolt being secured to a pivot member **16** provided on the lever **8**. The other end of the pulling bolt **14** is equipped with setting nut **17** adjustable on a thread of the pulling bolt **14**, through which nuts an adjustment of the pretension force of the plate spring package **15** is brought about.

Furthermore, an adjustable abutment screw **18** is provided on the lever **7**, which abuts the lever **8** and limits the path of the plate spring package **15**.

Furthermore, an electric switch contact **19** is arranged on the lever **7**. The abutment member **20** for the switch contact **19** is disposed on the lever **8**. The switch contact **19** operating in the manner of an end switch, closes the circuit of the driving motor over a switching relay (not shown) of a wire working machine (likewise not shown), as long as it is not opened by the abutment member **20**.

The operation of the safety device is performed as follows:

As soon as the inner open diameter x of the mounted wire body (FIGS. 1 and 3) is reduced, for instance, to x' (FIGS. 2 and 4), the supporting rollers **3** are loaded and swing towards each other, whereby the pressure force of the plate spring package **15** must be overcome, since the latter supports itself against the non-yielding setting of the lever **7**. The swinging lever **4** carrying a supporting roller **3** moves thereby, turns the shaft **5'** jointly with the lever **8** and causes a compression of the plate spring package **15** by means of the pulling bolt **14**. During the

rotation of the lever **8**, which is eventually limited by the abutment screw **18**, the abutment member **20** advances to the switching contact **19** and operates the latter. The switching off obtained thereby of the driving motor of the working machine causes a stop of the latter and, thereby, of the wire run-off.

Since the windings have not been tightened yet, a removal of the disturbance is easily possible and achieved very fast.

Referring now again to the drawings, and in particular to FIGS. 6–8, another embodiment of the present invention is disclosed in which, merely for the purpose of tightening of wire bodies of a large open diameter, the swinging levers **4'** carrying a supporting roller **3'** are set off as to their angular position and, due to the greater distance between the shafts **5***a* and **5***a'* instead of the spur gear **6**, worm gears **6***a'* are provided, which are coupled in opposite directions by means of a right and left helical gear **6''** and **6'''**, respectively. The safety device is designed symmetrically.

A worm gear **6***a'* is mounted on the shaft **5**, as well as on the shaft **5'** (FIG. 8) and in particular loosely rotatable. The worm gear hub carries a lever **7'**, and the latter is connected by means of a pulling rod **14'** with a lever **8'** keyed to the shaft **5***a* and **5***a'*, respectively.

The pulling rod **14'** projects also in this embodiment through a plate spring package **15'**, which is adjustable as to its pretension force by the setting nut **17'**. For the purpose of adjusting of the supporting position of the rollers **3'**, the shaft **10'** of the worm gears **6''** and **6'''** is fed outwardly and is equipped with a hand wheel **12**, or the like.

The switch contact **19'** sits on a projection of the hub of the lever **7'**, the projection carrying the abutment screw **18'**, so that the arm **8'** forms with its edge an operational abutment for the switch contact **19'**.

The operation of this embodiment is the same as described above in connection with the first-described embodiment, and disclosed in FIGS. 6 and 7.

In both embodiments the supporting rollers **3** and **3'**, respectively, swing back automatically under the pressure of the plate springs upon removal of the disturbing tightening of the wire into the base position and free simultaneously the switching possibility for the working machine by means of the switch contact **19**, which working machine provides again the continued wire run-off by its pulling force.

While I have disclosed several embodiments of the present invention, it is to be understood that these embodiments are given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

I claim:

1. A safety device for wire run-off machines comprising

a machine body,

a wire run-off drum,

at least two supporting rollers disposed below said wire run-off drum,

two first levers carrying the corresponding of said supporting rollers,

means for swinging said first levers forcibly toward each other,

said wire run-off drum and said supporting rollers being disposed in said machine body and adapted to carry a wire ring,

a shaft provided for each of said two first levers,

two second levers disposed in succession on one of said shafts,

one of said second levers being keyed to said one of said shafts,

the other of said second levers being rotatably mounted on said shaft,

a setting spindle operatively mounted on said machine frame and pivotally connected with said other of said second levers,

each of said second levers having a switch contact such, that upon engagement of said switch contacts a motor circuit is opened and said switch contacts being adapted to stop a wire working device pulling said wire from said drum,

a pivot member secured to each of said second levers,

a draw bolt having one end thereof attached to said pivot member secured to said one of said second levers, and extending freely through said pivot member secured to the other of said second levers, and

spring means surrounding said draw bolt and tending to move said last mentioned pivot member toward said first mentioned pivot member.

2. The safety device, as set forth in claim **1**, which includes

at least one nut threadedly secured to the free end of said draw bolt, and

said spring means are disposed between said nut and said pivot member secured to said other of said second levers, so that upon adjustment of said nut the pretension of said spring means can be varied.

References Cited

UNITED STATES PATENTS

2,312,845	3/1943	Nichols et al.	192—125
2,434,406	1/1948	Herath et al.	72—4
3,277,682	10/1966	Kaestner	140—147
3,289,959	12/1966	Scher	242—45

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