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(71) Applicant: **SAVIO S.p.A.**
Via Udine 105
I-33170 Pordenone(IT)

(72) Inventor: **Sartoni, Sandro**
Via Pendini 1/A
I-40026 Imola, Bologna(IT)

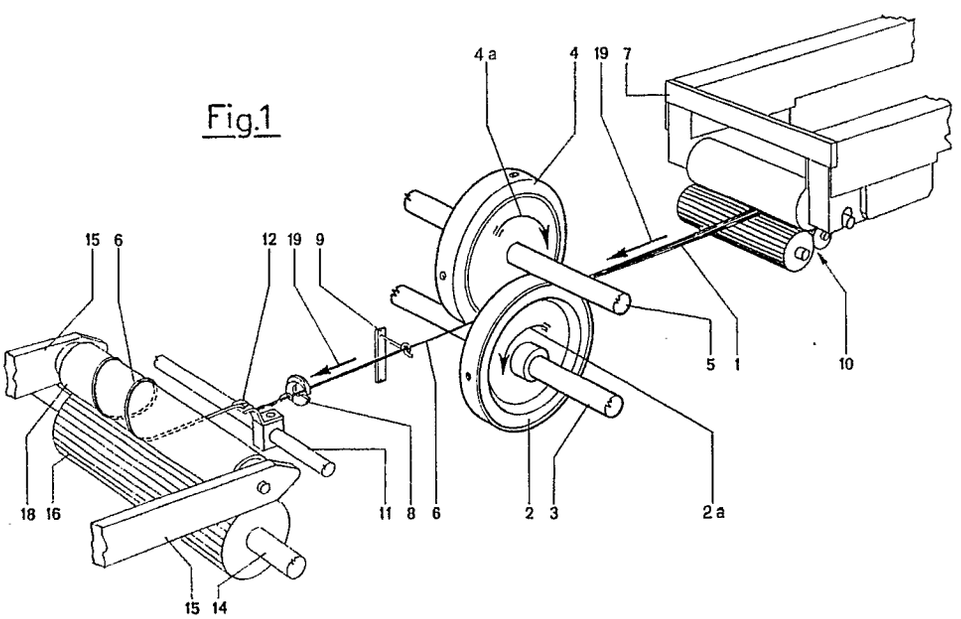
(74) Representative: **De Carli, Erberto et al**
ING. BARZANO' & ZANARDO MILANO S.p.A.
Via Borgonuovo, 10 10
I-20121 Milano(IT)

(54) Rubbing device comprising counter-rotating eccentric discs.

(57) This invention relates to a rubbing device in the form of eccentric counter-rotating discs, which is positioned downstream of the drafting unit in the finisher, which can be of the horizontally or vertically extending type.

Specifically, the invention relates to a textile sliver rubbing device comprising two discs (2,4) keyed eccentrically onto their drive shafts (3) and positioned a minimum distance in front of each other. Said discs (2,4) are subjected simultaneously to rotation in opposite directions and to continuous reciprocating movement approximately perpendicular to the direction of advancement of the fibre sliver (6). In sliding between the discs (2,4), said sliver is subjected to the action of friction, which causes it to twist about itself and proceed compacted to the bobin under formation, on which it is wound.

Fig.1



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RUBBING DEVICE COMPRISING COUNTER-ROTATING ECCENTRIC DISCS

This invention relates to a textile sliver rubbing device arranged downstream of a drafting unit of a horizontal finisher operating as the machine which effects the final step in the preparation for spinning by collecting the compacted sliver onto a package in the form of a bobbin which is then used as direct feed for a ring spinning machine.

A finisher is known to produce a sliver composed of a band of discontinuous fibres, which must have a sufficient consistency to withstand the subsequent spinning operation without suffering false twists or irregularities in cross-section, and without breakage in the feed to the ring spinning spindles. This consistency is given to the sliver by a rubbing action provided by pairs of rubbing sleeves of known structure. Said rubbing sleeves are positioned one above the other, each rubbing sleeve being rotatably mounted on rollers which as they rotate provide the sliver with its advancement speed and also move reciprocatingly in a transverse direction so that as the sliver passes between said rubbing sleeves it is twisted about itself firstly to the right and then to the left so as to generate a false twist in its constituent fibres, as has been long well known to the expert of the art.

The false twist provides the sliver passing between the outer surfaces of the upper and lower sleeves with a certain consistency, which is sufficient provided it receives on an average between 8 and 10 actions per linear metre by the rubbing sleeves . All this is also well known to the expert of the art.

The general tendency is to aim for higher machine productivity by increasing the sliver exit speed. With regard to the rubbing sleeves this tendency creates problems in that when the sliver exit speed exceeds a certain value, the reciprocating movement of the rubbing sleeves reaches a frequency which is too high and unacceptable in view of the mechanical strength of the rubbing unit itself. This is because the considerable reciprocating masses, if driven at the necessary rubbing frequency, would lead to totally unacceptable stresses.

The usual method of providing false twists to the sliver also suffers from other problems and drawbacks, which are easily imaginable. These include firstly the need for long shafts, generally composed of segments connected together by couplings and extending along the length of the machine within the context of a constructionally complicated structure, which can hardly be reconciled with the modern tendency to increase the machine length as much as possible to enable it to comprise the highest possible number of working units or so-called "heads".

In addition, replacing the rubbing sleeves, which represent the finishing members mostly subject to wear, involves lengthy procedures by highly qualified personnel.

The object of the present invention is to obviate said drawbacks in terms of considerably increasing the productivity of the finishing unit without mechanical restrictions, by providing a device for achieving sliver rubbing in a simple and low-cost manner which is also of small overall size and is readily accessible for all the procedures involved in checking and replacing worn parts.

This object is attained by the device of the present invention, which comprises two discs keyed eccentrically onto their drive shafts, these latter being rotated in opposite directions, said discs, positioned at a minimum distance apart one in front of the other, being subjected simultaneously to rotation and to a continuous reciprocating movement approximately perpendicular to the direction of advancement of the sliver, which in sliding between the discs becomes twisted about itself and compacted, to then proceed to the bobbin under formation about which it is wound.

Said distance between the discs positioned one in front of the other is less than the total sliver thickness, and the vertical reciprocating movement of the discs, which are under continuous simultaneous rotation, is substantially in opposite directions. This means that as one front surface of said discs rises the other descends and vice versa, in perfect periodic action.

The front surface of the discs are of substantially plane profile and are formed of a material which offers high friction towards the fibre sliver.

According to a modification of the device of the present invention, the front surfaces of the discs comprise at least one raised portion in the shape of a circular ring, against which the fibre sliver adheres.

According to a further modification of the device of the present invention, the front surfaces of the discs comprise projections or grooves or suitable added substances to provide a high friction relationship with the fibre sliver.

Further characteristics and advantages of the present invention will be apparent from the description given hereinafter with reference to the accompanying drawings, which show a non-limiting embodiment thereof, and in which:

Figure 1 is an axonometric perspective schematic view showing the two eccentric discs of the device of the present invention located downstream of the drafting unit and upstream of

the sliver collection unit;

Figure 2 is a schematic section through the discs on a vertical plane containing the longitudinal axes of the drive shafts, and substantially perpendicular to the travel direction of the sliver, the view representing the moment of maximum frontal coverage of the two discs;

Figure 3 is a schematic section through the discs on the same vertical plane as Figure 2, and representing the moment of minimum frontal coverage of the opposing surfaces of the two discs.

In the figures, equal elements or those of equal functions are given the same reference characters for simplicity. Of the finishing machine, ie the machine which prepares for spinning, those devices and mechanisms which operate in mutual cooperation with the device of the invention are not shown, neither is their operation described in that they are already known and are not concerned in the implementation of the present invention. For example, the overall drafting unit is not shown, neither are the drive sources for the various motorized shafts.

In the figures:

1 is the fibre band leaving the drafting unit 10 which has a support structure 7; 19 is an arrow indicating the direction of travel and movement of the fibre band 1 and sliver 6; 9 is any fixed eyelet for guiding the sliver 6; 2 is the lower disc keyed in an eccentric position on the drive shaft 3, said disc 2 rotating in the direction 2a; 4 is the upper disc keyed in an eccentric position on the drive shaft 5, said disc rotating in the direction 4a; 12 is the sliver guide element fixed rigidly on the shaft 11, which is driven with periodic reciprocating motion by means known to the art; 6 is the fibre sliver which is twisted and compacted in the interspace between the friction discs 2 and 4, which give it the false twists to make it less voluminous and more resistant with the intention of ensuring perfect winding during its collection, with consequent perfect unwinding for subsequent feed to the spinning spindles; 8 is a spiral sliver guide, already known in the art, which helps to reinforce the sliver by giving it a sight false twist before its collection on the bobbin under formation. Said sliver guide 8 is rigid with the reciprocating element 12; 16 is a grooved roller keyed onto the drive shaft 14, said roller 16 rotating the bobbin under formation 18 located between the support arms 15; 20 and 22 are the elements on the front surfaces of the discs 4 and 2 of substantially flat profile. Said friction elements 20 and 22 are the fundamental elements in the provision of twist to the sliver, and are therefore those which by their form and the nature of their material are the most important in the strengthening of the sliver. The friction elements 20 and 22 can therefore have special surface shapes, such as surfaces comprising several projections, grooves or notches, and can also be formed of the most varied materials (steel, plastic or rubber membranes of a greater or lesser elasticity or rigidity); A1 and B1 are arrows indicating respectively the upward vertical movement of the upper disc 4 and the simultaneous downward vertical movement of the lower disc 2. Said vertical movements are generated by the eccentricity with which the discs 4 and 2 are keyed onto their respective drive shafts 5 and 3; A2 and B2 are arrows indicating the downward vertical movement of the upper disc 4 and the simultaneous upward vertical movement of the lower disc 2. Said vertical movements are simultaneous with and superposed on the continuous rotation 2a and 4a of the discs 2 and 4.

The operation of the device of the present invention is easily understandable with reference to the figures of the accompanying drawings.

The fibre band 1 leaving the drafting unit 10 is fed via supporting guide and condensation elements (not shown) into the space between the front surfaces 20 and 22 of the discs 4 and 2. The friction action exerted on the fibre band by the front friction surfaces 20 and 22 driven simultaneously with both rotary and translational movement impresses on said fibre band a rotary oscillating movement such that it undergoes alternating false twist in the two directions.

After said rubbing action, a fibre sliver is present at the exit of the discs 2 and 4 which is both compact and strengthened, and is therefore suitable for collection in bobbin form.

It is apparent that variations, modifications and additions can be introduced by anyone skilled in the art without departing from the scope of this invention.

Claims

1. A textile sliver rubbing device positioned in a finisher operating as the machine which effects the final step in the preparation for spinning by collecting the sliver onto a package in the form of a bobbin which is then used as feed for a ring spinning machine, said rubbing device being characterised by comprising two discs keyed eccentrically onto their drive shafts, these latter being rotated in opposite directions, said discs, positioned at a minimum distance apart one in front of the other, being subjected simultaneously to rotation and to a continuous reciprocating movement approximately perpendicular to the direction of advancement of the sliver, which in sliding between the discs rolls about itself and becomes compacted, to then proceed to the bobbin under formation about which it is wound.

2. A textile sliver rubbing device as claimed in claim 1, characterised in that the distance between the discs positioned one in front of the other is less than the total sliver thickness in order to ensure regular and firm adherence to the opposite ly rotating and simultaneously vertically reciprocating front surfaces, to generate on said fibre sliver false twist effects arising from the friction action of the front surfaces of the discs.

3. A textile sliver rubbing device as claimed in claims 1 and 2, characterised in that the vertical reciprocating movement of the discs, which are under continuous simultaneous rotation, is substantially in opposite directions, with the result that as one front surface of said discs rises the other descends and vice versa, in perfect periodic action.

4. A textile sliver rubbing device as claimed in claims 1 to 3, characterised in that the front surfaces of the discs are of substantially plane profile.

5. A textile sliver rubbing device as claimed in claims 1 to 4, characterised in that the front surfaces of the discs are formed of a material which offers high friction towards the fibre sliver.

6. A textile rubbing sliver device as claimed in claims 1 and 2, characterised in that the front surfaces of the discs comprise at least one raised portion in the shape of a circular ring, against which the fibre adheres.

7. A textile sliver rubbing device as claimed in claims 1 to 7, characterised in that the front surfaces of the discs comprise projections or grooves or suitable added substances to provide a high friction relationship with the fibre sliver.

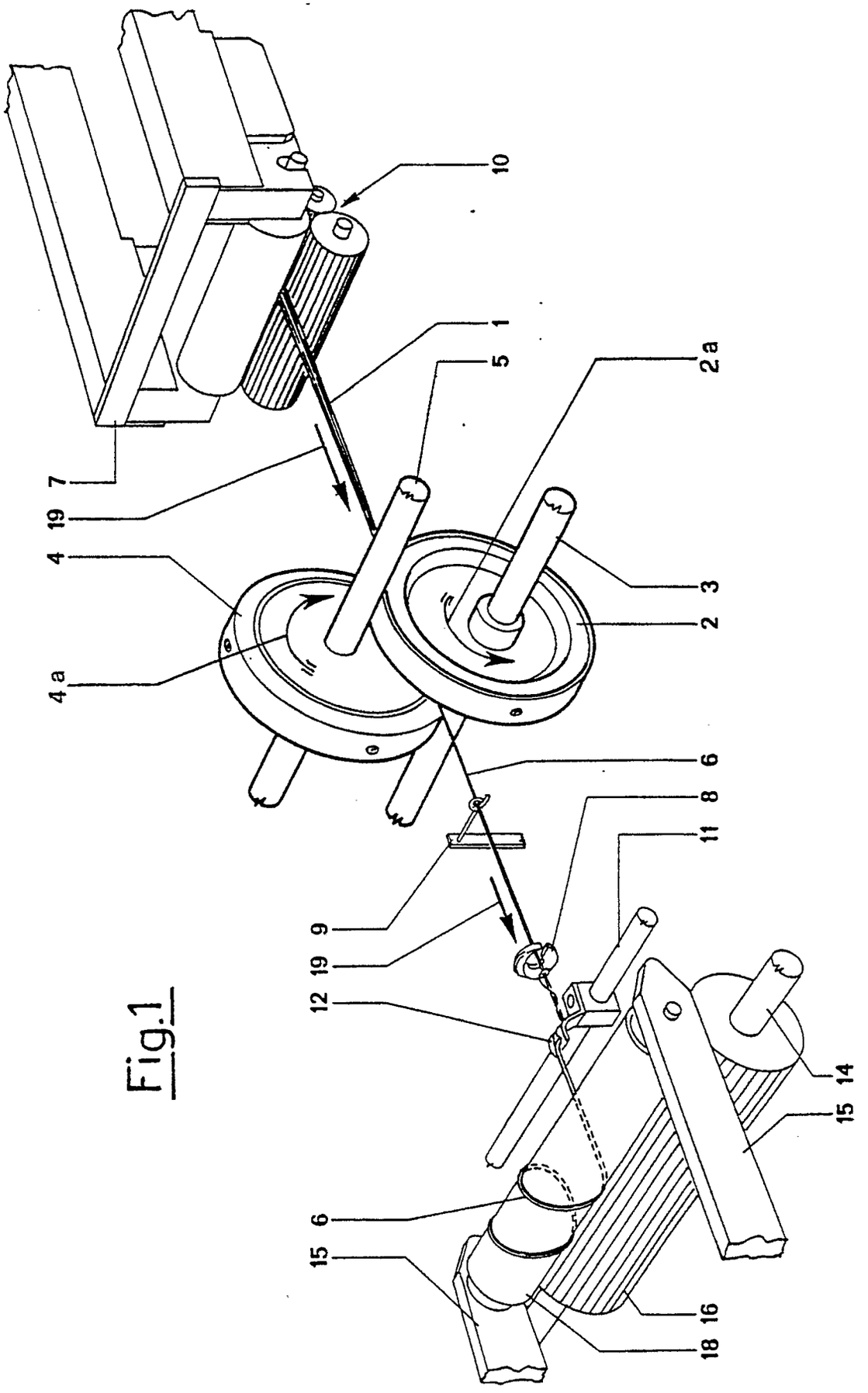


Fig.1

Fig.3

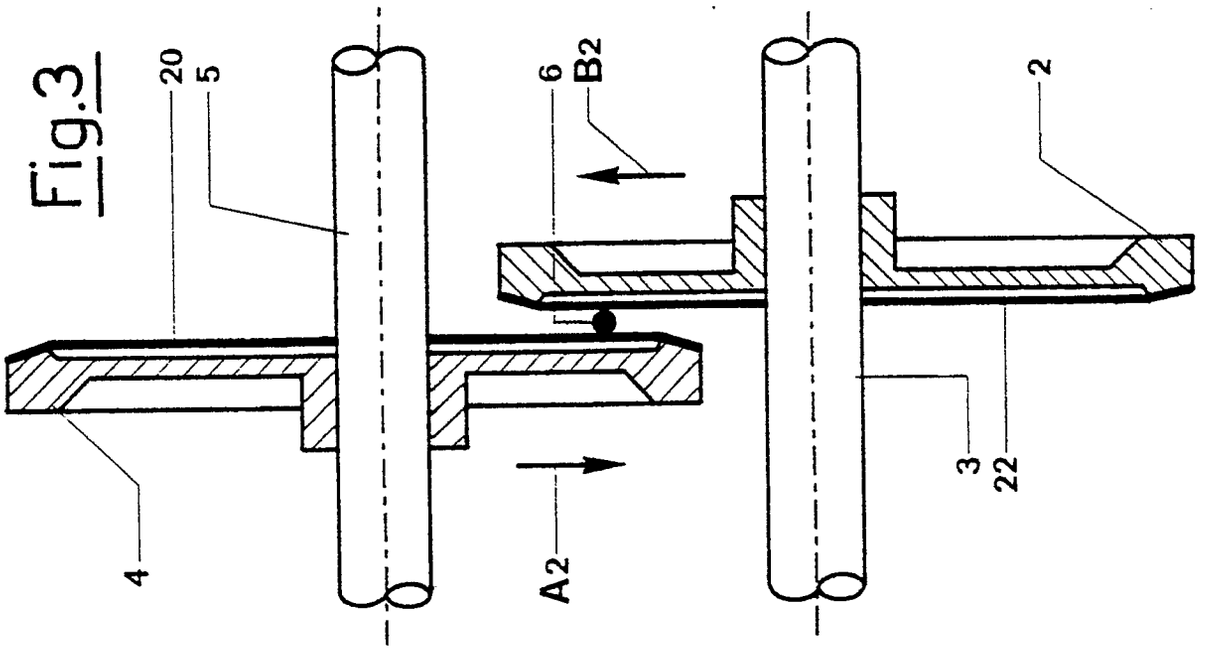
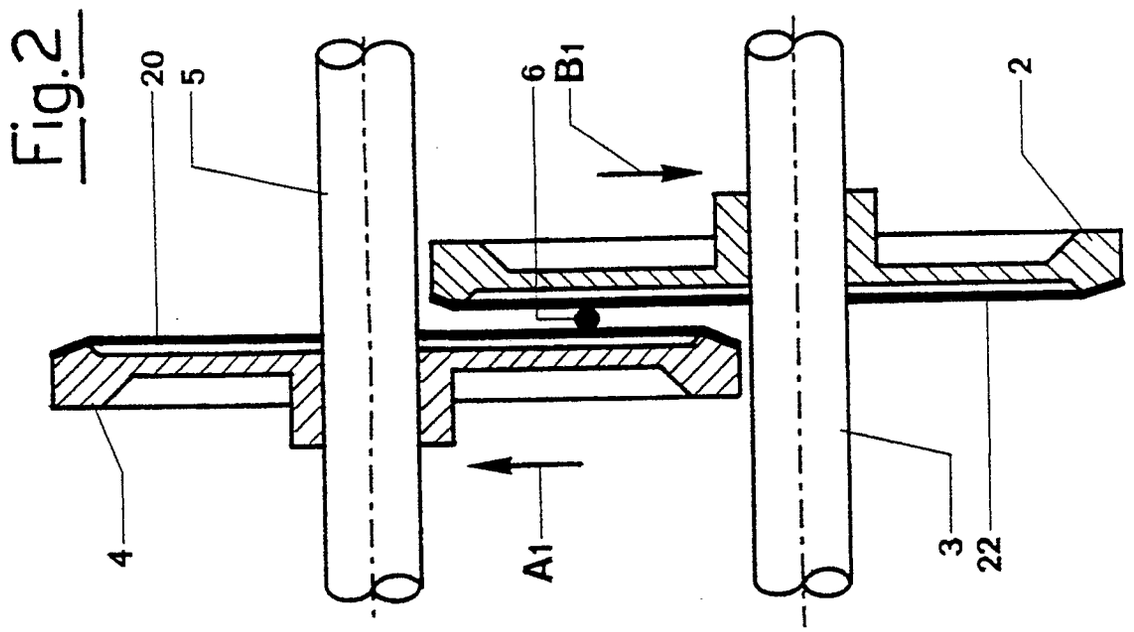


Fig.2



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EUROPEAN SEARCH REPORT

Application Number EP 90201872.0

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.5)
A	DE - A1 - 3 123 753 (BARMAG BARMER MASCHINEN-FABRIK AG) * Claims; fig. 1; page 20 * --	1	D 01 H 7/92
A	US - A - 4 561 244 (TURK et al.) * Totality * --	1	
A	US - A - 3 495 391 (FIONG H. NJO) * Totality * ----	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

D 01 H
D 02 G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	15-10-1990	NETZER

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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