

The invention relates to a thread brake having two preferably disc- or plate-shaped brake elements resiliently pressed against each other by loading means and adapted to allow at least one thread to be braked to
5 be passed therethrough, said brake elements being mounted on bearing means having a common bearing axis and being acted upon by a device which sets them into an oscillatory motion.

In such thread brakes which are widely used in
10 practice, for example, in the form of so-called disc or plate brakes, the brake discs or plates forming the brake elements are usually rotatably mounted on a guiding bolt having at one end a thread on which there is screwed an adjustment nut which forms the abutment of a compression
15 spring which presses the two brake discs or plates elastically against each other. These have the inherent, fundamental disadvantage that lubricants (paraffins, bobbin oil etc.) adhering to the surface of the thread running off form deposits on the brake discs or plates and
20 dirt particles and fluff settling in these produce a sticky, pasty mass which penetrates progressively between the brake discs or plates. In the course of time, these deposits which build up further and further during operation cause the brake discs or plates to be held apart
25 at some locations, which makes them less and less able to exert their braking action on the thread passing through. An irregular braking effect also occurs and results in undesired fluctuations in the thread tension. In addition, the brake plates or discs are impeded in their moveability
30 by this sticky mass, which causes the passing thread to start cutting into the brake surfaces of the brake plates or discs, a danger which is very pronounced particularly with synthetic threads. Once the braking surfaces are damaged to the extent that quite deep grooves or flutes
35 are cut in them, the thread passing through also suffers

damage.

These difficulties make it necessary for the thread brake to be cleaned and freed from undesired deposits or even exchanged altogether at certain time intervals.

5 To remedy this, it is known to make the brake discs or plates be driven via a gearing (DE-PS 27 58 334), but this involves relatively high expenditure and is only suitable for certain applications. Another known measure (DE-OS 30 29 509, DE-PS 29 30 641) consists in using an
10 ac-excited electromagnet instead of the conventional compression spring to press the two brake discs or plates against each other in the axial direction and simultaneously cause vibration or oscillatory motions with twice the excitation frequency of the electromagnet to be
15 imparted on the brake discs or plates consisting of magnetic material by the magnetic ac field. These oscillatory motions occur in the direction of the bearing axis and, independently of the oscillatory behaviour of the brake discs or plates, can result in a non-uniform
20 braking action on the thread passing through, which causes corresponding fluctuations in the thread tension. Also, in principle, such a thread brake is dependent upon an electric ac supply which, however, in many cases is not available.

25 It is the object of the invention to remedy this and to provide a thread brake of the kind mentioned at the beginning, which is distinguished by an improved self-cleaning action, i.e. effectively prevents the occurrence of undesired deposits of lubricant etc. and simultaneously
30 ensures uniform thread braking over long periods of operation.

To achieve this object the above-mentioned thread brake, according to the invention, is characterized in that the brake elements can be set into an oscillatory
35 motion by the oscillation generating device, said

oscillatory motion being orientated essentially transversely relative to the bearing axis.

Practical experience has shown that this measure not only ensures smooth working of the discs or plates over
5 long operating perios but does, in fact, effectively prevent build-up of undesired deposits.

In a preferred embodiment, the brake elements are mounted on an elongated guiding element containing the bearing axis, with the brake elements being adapted to be
10 set into an oscillatory motion together with the guiding element. In this case, the guiding element may be of rigid design, for example, a cylindrical bolt. Embodiments are, however, also conceivable in which the guiding element is elastic at least in sections, which can be implemented by,
15 for example, the guiding element being made of an appropriate plastic material. Another alternative consists in mounting the guiding element elastically in retaining means so it receives the necessary moveability at its bearing point.

20 Particularly simple structural relations are obtained by the assembly being designed such that the guiding element is connected with retaining means and that the retaining means can be set into an oscillatory motion together with the guiding element and the brake elements.
25 This embodiment has the additional advantage that the settling of fluff on the retaining means etc. is also prevented as these execute a vibratory motion which results in continuous "shaking off" of the deposit of fibre etc.

30 The brake elements themselves are advantageously mounted on the guiding element with radial play so they can execute a certain motion independent of the guiding element in the oscillating direction. Practical experience has, furthermore, shown that with the conventional thread
35 brakes of the kind in question it is expedient for the

oscillatory motions to have a frequency of approximately 40 to 500 Hz.

Excitation of the oscillations of the brake elements can be brought about in many different ways. The factors
5 determining the design of the device used for this purpose include the particular use of the thread brake and the drive means available at the operating site. It has been found advantageous for the oscillation generating device to have a driven member which carries out a reciprocating
10 motion and is directly or indirectly coupled with the brake elements. In the embodiment of the thread brake mentioned hereinabove wherein the retaining means carry out the oscillatory motion together with the brake elements, the retaining means can be mounted directly on
15 the member carrying out the reciprocating motion, which results in a further simplification of the structural relations.

When the new thread brake is used in connection with the feeding thread to textile machines which use thread,
20 for example, circular knitting machines, the thread brake can be located on a thread feeding device having a rotating shaft, with the member carrying out the reciprocating motion being coupled with the shaft via a gearing generating this motion. The rotating shaft of
25 these thread feeding devices usually drives a thread feeding element, for example, in the form of a thread storage roll or a thread winding element. This is, in turn, driven by a power source which in the case of a circular knitting machine, in practice, often consists of
30 an endless toothed belt with which the shafts of the individual thread feeding devices are each coupled via a toothed belt pulley and which, in its turn, is synchronously rotated with the needle cylinder.

Under certain circumstances, embodiments of the
35 thread brake are also advantageous in which the

oscillation generating device is designed to act directly on the brake elements by, for example, engaging with their circumference.

5 The gearing mentioned hereinabove can be a cam gear mechanism with a cam element seated on the shaft and with the reciprocating member held in contact with the cam surface thereof. All positive connection gearings which generate an oscillatory motion, for example, also eccentric gearings etc. are to be understood as "cam gear
10 mechanism".

Various other modifications of the new thread brake are the subject matters of further subclaims.

Embodiments of the subject matter of the invention are illustrated on the accompanying drawings, wherein:

15 Figure 1 shows a side view of a thread supplying device with a thread brake according to the invention;

Figure 2 shows a plan view of the assembly according to Figure 1;

Figure 3 shows a side view of the thread brake of the assembly according to Figure 1 in a partial illustration
20 taken along line III-III of Figure 1 on a different scale;

Figure 4 shows an illustration of a modified embodiment of the assembly according to Figure 3;

Figure 5 shows an illustration of a modified
25 embodiment of the assembly according to Figure 4;

Figure 6 shows a side view of a portion of the thread supplying device according to Figure 1, with a modified embodiment of a thread brake according to the invention;

Figure 7 shows a plan view of the thread brake of the assembly according to Figure 6, in a partial illustration
30 taken along the line VII-VII of Figure 6, on a different scale;

Figure 8 shows a side view of a modified embodiment of the thread brake of the assembly according to Figure 6;

35 Figure 9 shows a view of a further modified

embodiment of the thread brake of the assembly according to Figure 6;

Figure 10 shows a view of a third modified embodiment of the thread brake of the assembly according to Figure 6;

5 Figure 11 shows a side view taken from the rear of the thread brake according to Figure 10;

Figure 12 shows a view of a fourth modified embodiment of the thread brake of the assembly according to Figure 6;

10 Figure 13 shows a side view taken from the rear of the thread brake according to Figure 12; and

Figure 14 shows a plan view of the thread brake of Figure 13, taken along the line XIV-XIV of Figure 13, on a different scale.

15 The thread feeding device illustrated in Figures 1 and 2 is known in its basic design. It comprises a holder 1 which can be attached by a clamping screw 2 to a carrier ring indicated at 3 of, for example, a circular knitting machine. Mounted for rotation in the holder 1 is a
20 continuous shaft 4 which is orientated in the vertical direction when the holder 1 is mounted in the operating position. At its one end, the shaft 4 is rotationally fixedly connected to a thread drum 5 in the form of a bar cage arranged below the holder 1. At its top end, the
25 shaft 4 carries a toothed belt pulley 7 which can be rotationally fixedly coupled via a coupling 6 and via which the thread drum 5 can be rotated from an endless toothed belt not illustrated herein.

A plate-type thread brake 8 is arranged on the end
30 face of the holder 1 opposite the clamping screw 2. The plate-type thread brake 8 comprises two substantially disc-shaped brake plates 9 of identical design between which the thread indicated at 10 runs through. The thread runs from a thread bobbin (not shown) through a thread
35 eyelet 11 attached to the holder 1, a knot catcher 12 and

the thread brake 8 to a thread intake eyelet 14 which is attached to the holder 1 via an angular part 13 and from which the thread 10 runs onto the thread drum 5 on which it forms a storage coil 15 and from which it runs via a
5 thread takeoff eyelet 16 also provided on the holder 1 to the thread consuming point. Thread feeler arms 17, 18 each mounted for pivotal motion about a horizontal pivot axis on the holder 1 and connected to thread breakage stopping devices arranged in the holder 1 monitor the course of the
10 thread on the intake and takeoff sides of the thread drum 5.

As is apparent, in particular from Fig. 3, the thread brake 8 comprises a guiding bolt 19 which forms a guiding element and is attached at one end to retaining means in
15 the form of an angled part 20 by a nut 21. The nut 21 is screwed onto a threaded part 22 of the guiding bolt 19 on which an intermediate bushing 23 made of ceramic material is placed on the side facing away from the angled part 20. The intermediate bushing 23 is supported at one end
20 against an annular shoulder on the guiding bolt 19 and at the other end via an annular disc 24 of larger diameter against the angled part 20. The two brake plates 9 are mounted on the intermediate bushing 23 by means of plastic bushings 25 for slight rotation and axial displacement
25 with a certain radial play. They are pressed against each other elastically in the axial direction by a compression spring 26 which is placed on the guiding bolt 19. The pressing force of the compression spring 26 acting on the brake plates 9 is selectively adjustable by a regulating
30 nut 28 which is screwed onto a threaded part 27 of the guiding bolt 19.

During operation, the thread brake 8 described hereinabove can be set into an oscillatory motion with its brake plates 9, the guiding bolt 19 and the angled part 20
35 forming the retaining means. The amplitude of the

oscillations is mainly orientated at a right angle to the common bearing axis 29 of the two brake plates 9, which is formed by the guiding bolt 19. An oscillation generating device in its entirety designated 30 in Fig. 3 is provided
5 for this purpose. The thread brake 8 is directly connected to this oscillation generating device.

The oscillation generating device 30 comprises a reciprocating member in the form of a driver rod 31 which is axially displaceably but non-rotatably mounted in a
10 bearing bush 32. The bearing bush 32, in its turn, is inserted in the associated end wall of the holder constituting a housing. The bearing bush 32 simultaneously supports the angular part 13 carrying the intake eyelet 14. It is provided with a radial pin 33 which engages with
15 a corresponding longitudinal groove 34 in the driver rod 31 and prevents it from rotating.

The thread brake 8 is screwed onto one end of the driver rod 31 by a nut 35 via the angled part 20. The driver rod 31 carries two counter nuts 36 which are
20 screwed on in the area between the angled part 20 and the bearing bush 32 and form an adjustable stop for delimiting the reciprocating stroke of the driver rod 31.

The driver rod 31 is driven by the shaft 4 via a cam gear mechanism 37 comprising a cam element, in this case,
25 in the form of a cam disc 38 with three surfaces which is rotationally fixedly positioned on the shaft 4. The driver rod 31 is supported against the cam surface of the cam disc 38 with a wear cap 39 interposed at the end face between these. A readjusting spring 40 arranged between
30 the wear cap 39 and the bearing bush 32 pre-stresses the driver rod 31 in the direction towards the cam disc 38 such that the driver rod 31 is held in permanent engagement with the cam surface of the cam disc 38 via the wear cap 39.

35 During operation of the thread feeding device, the

shaft 4 rotates at a rotational speed of from approximately 400 to approximately 4000 rpm and generates, dependent on the number of cam surfaces on the cam disc 38, a reciprocating oscillatory motion of the driver rod 5 31 which, taking into account the natural frequency of the entire moved assembly, usually lies in the range of from 45 to 150 Hz. This oscillatory motion is transmitted via the angled part 20 to the thread brake 8 with the result that the brake plates 9 which are mounted on the 10 intermediate bushing 23 for free movement to a limited extent carry out a constant vibratory motion, the amplitudes of which are mainly orientated transversely to the bearing axis 29. Since, as is apparent from Fig. 1, the thread 10 passes eccentrically between the brake 15 plates 9, these are rotated while the thread is running, which together with the vibration transmitted via the driver rod 31 as explained hereinabove results in an effective self-cleaning of the thread brake 8.

In the embodiment discussed hereinabove, the thread 20 brake 8 is directly attached to the driver rod 31 via the angled part 20 without any further connection to the holder 1 of the thread supplying device. Depending on the given conditions of use of the thread brake 8, it may sometimes prove expedient to mount or support the guiding 25 bolt 19 independently of the member generating the oscillations of the brake plates 9. Examples of this are shown in Figures 4 and 5.

In these figures, parts identical with those of the embodiment described with reference to Figures 1 to 3 bear 30 the same reference numerals and are not explained again. With reference to Figure 4:

The guiding bolt 19 is mounted on the housing 1 by means of a bearing bracket 41 which is rigidly connected to the housing 1. The bearing bracket 41 contains a ring- 35 shaped, rubber-elastic bearing part 42 which is, for

example, vulcanized therein and to which the guiding bolt 19 is screwed in such a way that it is held elastically moveable in its bearing point. On the rigid guiding bolt 19 consisting of steel, there is positioned in a slightly
5 displaceable manner, for example, between the brake discs 9 and the compression spring 26 a pressure bushing 43 against the outer circumferential surface of which there rests the driver rod 31 which is rounded off at the end and correspondingly lengthened.

10 Hence the reciprocating oscillatory motion of the driver rod 31 is directly transmitted to the guiding bolt 19 and the brake plates 9, while the rigid bearing bracket 41 itself remains vibration-free. In this case, the
15 guiding bolt 19 and the brake plates 9 carry out an oscillatory motion which is mainly orientated transversely to the bearing axis 29 but, owing to the tilting motion which occurs with centre of motion in the bearing point, also contains longitudinally orientated components.

The embodiments described hereinabove according to
20 both Figures 3 and 4 could also be modified in such a way that the guiding bolt 19 itself is made of an elastic material, for example, a suitable plastic material, which enables it to carry out a bending oscillation. In this
25 case, the rubber-elastic bearing element 42 in Fig. 4 could, in the given circumstances, be dispensed with.

The embodiment illustrated in Fig. 5 differs from
that according to Fig. 4 in that the oscillation
generating device 30 is designed to act directly on the
brake plates 9. For this purpose, the driver rod 31 is
30 arranged with its axis lying in the centre plane between the two brake plates 9. It carries at its end an approximately frustoconical-shaped drive member 43 with a flat base surface 44 approximately parallel to the bearing
axis 29. The dimensions of the longitudinal extent of the
35 base surface 44 in the direction of the bearing axis 29

are such that it extends beyond the two brake plates 9 on both sides in the manner apparent in Fig. 5.

The brake plates 9 are mounted with radial play on the intermediate bushing 23. The dimensions of their radial spacing from the base surface 44 of the drive element 43 are such that during the reciprocating motion of the driver rod 31 the drive element 43 periodically engages with the circumference of the brake plates 9 and thereby sets these into an oscillatory motion, the amplitudes of which are orientated substantially at a right angle to the bearing axis 29.

In this case, the guiding bolt 19 is rigidly screwed onto the bearing bracket 41. In principle, embodiments are, however, also conceivable in which the guiding bolt 19 is mounted via a rubber-elastic bearing part 42 in accordance with Fig. 3. The guiding bolt 19 * may, in the given circumstances, also consist of an elastic material.

Depending on its individual application, the compression spring 26 can also be replaced by other loading means such as an electromagnet or by means which are acted upon by the force of gravity. Examples for this will now be explained with reference to the embodiments according to Figures 6 to 11.

When describing these further embodiments of the thread brake, parts identical with those of the embodiments described above bear the same reference numerals and are not explained again. The details of the thread feeding device and of the vibration or oscillation generating device 30, as they are illustrated in Figures 1 to 3, are illustrated in Figures 6 to 14 only to such an extent as it is necessary for the understanding of the embodiments of the thread brake. Apart from that, the thread feeding device itself and the oscillation generating device 30 are designed according to Figures 1 to 3; therefore, reference is made to the associated

explanations.

While with the embodiments of the thread brake that have been explained with reference to Figures 1 to 5 the two brake discs 9 are supported on an elongated guiding element in the form of the guiding bolt 19, which includes the common bearing axis 29, the embodiments of the thread brake that are illustrated in Figures 6 to 14 use a guiding element 190 allowing the guiding bolt 19 transversing the brake discs or plates 9 to be dispensed with.

Practical experience has shown that when braking yarns with a strong tendency of shedding fluff, additional measures should be taken in order to avoid undesirable depositions of fluff and lint which depositions would impair the proper function of the thread brake after a certain time of operation.

When braking yarns showing a strong tendency for fluffing, fluff or lint depositions may build up in the vicinity of the guiding bolt 19 or of the intermediate bushing supported thereon (Fig. 3), because the path of the running thread 10 is angled at this point, as it is shown in Fig. 1. Any deposition of fluff or lint around the intermediate bushing 23, however, can eventually lead to a complete blocking of the rotational movement of the brake discs or plates 9.

In order to avoid such undesirable depositions of fluff or lint in the central zone of the brake plates 9 and the resulting consequences, no guiding bolt 19 is used with the embodiments of the thread brake that will be explained below with reference to Figures 6 to 14. The central area of the brake plates 9 is left void and, therefore, no fluff or lint can be deposited in this area.

In the first embodiment of this kind, which is illustrated in Figures 6 and 7, the guiding element 190 for the two brake plates 9 that are arranged on the common

bearing axis 29 in a concentric relation to one another is affixed to the driver rod 31 of the oscillation generating device 30 (see Fig. 3). The guiding element 190 is designed to partially embrace over an angular area of about 300° the circumference of the two brake plates 9. It comprises two semi-spherical bearing elements 50 essentially formed as semi-circular supporting elements arranged at an axial distance from one another (Fig. 7) and in a parallel relationship to one another. At their one end, the two bearing elements 50 are integrally moulded to a supporting block 51 that is screwed onto the driver rod 31. Each of the curved bearing elements 50 is provided with three integral bearing lugs 52, 53, 54 radially and inwardly projecting and distributed at substantially equal angular distances along the circumference of the bearing element 50. The bearing lug 53 is located approximately on the axis of the driver rod 31. As it is to be seen from Fig. 7, the bearing lugs 52 to 54 form discrete, localized, lateral supporting points for the two brake plates 9, thereby holding these brake plates 9 in an undetachable manner within the guiding element 190. The two brake plates 9 are radially supported on their circumference on two bearing points or locations 55, 56 that are provided in the area of the bearing lugs 53, 54.

In the guiding element 190, the two brake plates 9 are supported in a freely rotational manner around the common bearing axis 29; in the radial direction, they rest only on the two bearing points 55, 56 of which the bearing point 55 is located approximately on the axis of the driver rod 31, while the second bearing point 56 engages the circumference of the brake plates 9 in an area below the common bearing axis 29 (Fig. 6). Because of this particular arrangement the brake plates 9 will be frictionally driven by a driving force tending to rotate

the brake plates 9 in a first sense of rotation (counterclockwise) that is indicated by an arrow 58 in Fig. 6, when the driver rod 31 will make a reciprocating oscillatory movement, as it is indicated with a double-
5 arrow 57.

The two brake plates, which are only supported on their circumference on the two bearing points 55, 56 and are laterally held with axial tolerances by the bearing lugs 52 to 54, are each provided with a circular central
10 through-opening 59 in order to avoid any fluff depositions in this area.

Usually, the guiding element 190 will be made of plastics; as it is evidenced e.g. from Fig. 6, radial free spaces 61 are provided between the bearing lugs 52 to 54,
15 which extend over a major portion of the circumference of the brake plates 9 and enhance fluff removal.

At a lateral distance and parallel to the common bearing axis 29, a transverse pin 62 extends through the openings 59 of the brake plates 9. The transverse pin 62
20 is made of ceramic material and is affixed to an integral supporting arm 63 of the guiding element 190. It prevents the thread 10 from unintentionally being thrown out of the braking or clamping zone between the two brake plates 9. Moreover, adjacent to the lower bearing lug 54, a thread-
25 deviating bolt 64 is provided, which is orientated parallel to the common bearing axis 29 and which is used for diverting the thread 10 exiting the thread brake 8 towards the thread eyelet 14, as it is shown in Fig. 6. The thread deviating bolt 64 is also made of ceramic
30 material.

Fig. 6 shows that because of the particular locations of the thread eyelet 11, of the transverse pin 62 and of the yarn deviating bolt 64, a thread path is defined on which the thread 10 entering between the brake plates 9 in
35 the direction of the arrow (left-hand side of Fig. 6) runs

at a lateral distance from the common bearing axis 29, before leaving the space between the two brake plates 9 in an area close to the lower bearing point 56. Because of this eccentrically arranged thread path, the running
5 thread 10 will frictionally apply a torque onto the brake plates 9, which acts in the same direction of rotation (as indicated by an arrow 58) as the torque that is frictionally transmitted onto the brake plates 9 by the oscillation generating device 30 via the driver rod 31.

10 In the absence of the guiding bolt 19 of the embodiment according to Fig. 3, the compression spring 26 is dispensed with, too. The two braking plates 9 are pressed against one another by magnetic forces in an axial direction. To achieve this, annular permanent magnets 65
15 of opposite polarities are affixed to the outside of the brake plates 9 which are made of a non-magnetic material and are curved in a semi-spherical manner (Fig. 7).

The embodiment that is shown in Figure 8 is similar to the embodiment of the thread brake 8 explained with
20 reference to Figures 6, 7 in all parts, the only difference being that the transverse pin 62 is now arranged within the through-openings 59 on the opposite i.e. the right-hand side of the common bearing axis 29. The thread 10 passed on an eccentric path between the
25 brake plates 9 therefore applies to the brake plates 9 a torque in a direction indicated by an arrow 58a and directed in the opposite direction of the torque generated with the embodiment of Fig. 6.

In this way the resulting torque to which the brake
30 plates are subjected and that is generated by the running thread 10 and by the oscillating vibrational movement of the driver rod 31 is diminished resulting in a corresponding reduction of the rotational speed of the brake plates 9 around the common bearing axis 29. This
35 embodiment is preferable in cases where the rotational

speed of the brake plates 9 would otherwise be excessive resulting in the thread 10 being thrown out of the space between the two brake plates 9.

It should be mentioned that the transverse pin 62 can be dispensed with also. Embodiments of the thread brake 8 that are designed in this way are illustrated in Figures 9 to 14:

The embodiment according to Figure 9 is essentially identical with the embodiments that have been explained in connection with Figures 6, 8; therefore, like elements were given the same reference numerals and are not explained again.

The thread 10 running downwards and entering the space between the two brake plates 9 from their circumference is passed through the opening 59 on one side of the guiding element 190 and exits the space between the two brake plates 9, from where it passes on the outer side of the guiding element 190 via the thread deviating bolt 64 to the thread input eyelet 14. When passing between the two brake plates 9, the thread 10 frictionally engages the two brake plates 9, thereby subjecting the two brake plates 9 to a torque that serves to drive the brake plates 9 in the direction of rotation of the arrow 58, i.e. in the same direction as in the case of the oscillation generating device 30.

In order to facilitate threading of the thread 10 in the annular brake plates 9 of the thread brake according to Fig. 9, provisions can be made which will now be explained on two embodiments of thread brakes that are illustrated in Figures 10 to 14:

Of the two brake plates 9 of the embodiment according to Figures 10, 11, one brake plate 9a is stationary and affixed to the supporting block 51 of the guiding element 190. To this end, the guiding element 190 is provided with an integral protruding arm 66 to which the annular brake

plate 9a is fastened. At a location remote from the thread path, as it is illustrated in Figures 10, 11, this brake plate 9a is provided with the V-shaped thread slot 67 leading from the circumference of the brake plate into its opening 59.

The second brake plate 9 is, as in the embodiments according to Figures 6 to 9, supported in a freely rotatable manner on its circumference. Here too, the two bearing points have the reference numerals 55, 56. The bearing lugs 52, 53, 54 provide for the lateral support of this brake plate 9.

Here again, like elements have the same reference numerals and are not explained again.

For threading, the thread 10 is drawn beyond the knot catcher 12 and a yarn guiding hook 120 associated therewith into an area below the thread brake 8. Without releasing it, the thread is then passed in a radial direction from one side (right-hand side in Fig. 7) through the space between the two bearing elements 50 and into the space between the two brake plates 9, 9a. In the course of this, the thread 10 passes laterally out of the opening 59 of the stationary brake plate 9a and can then be threaded through the thread intake eyelet 14. Thus, the thread 10 leaves the opening 59 in a manner shown in Fig. 10 and passes over the appropriately rounded edge of the opening 59. In order to prevent the thread 10 from cutting into the stationary brake plate 9a, the edge of the opening 59 is, with a preferred embodiment, made of a ceramic material or of a material bearing a wear-resistant coating.

The mutual axial loading of the brake plates 9, 9a necessary for braking the thread is achieved, again, by means of annular permanent magnets 65 as shown in Fig. 6, the annular permanent magnet 65a of the stationary brake plate 9a being provided with a suitable cut-out in order

to accommodate the threading slot 67.

Apart from that, the torques transmitted onto the rotatably mounted brake plate 9 by the running thread 10 and by the oscillation generating device 30 act in the same direction of rotation (counterclockwise in Fig. 10).

Finally, the embodiment illustrated in Figures 12 to 14, where like elements already explained above in connection with other embodiment examples were given the same reference numerals, is provided, similar to the embodiment of Figures 10, 11, with a stationary brake plate 9a formed with a threading slot 67 located remote from the thread path (see Figures 12, 13).

The stationary brake plate 9a is annular and has central through-opening 59. Threading of the thread 10 is carried out as described in connection with Figures 10, 11.

Deviating from the embodiment according to Figures 10, 11, however, the second rotationally supported brake plate 9 is not provided with a central opening 59, but is closed in its centre area (see Fig. 14). The brake plate 9 has an integral cylindrical bearing pin 68 defining the common bearing axis 29 and serving to support this brake plate 9 in a freely rotatable manner on an elongate bracket 69. The bracket 69, in its turn, is pivotably supported at the opposite end via a bearing fork 60 on the supporting block 51 of the guiding element 190. It is acted upon by a compression spring 61 mounted on a threaded bolt 72 affixed to the supporting block 51. For adjusting the biasing force of the compression spring 71, an adjustment screw 73 is provided. Thus, the braking force applied by the brake plates 9, 9a to the thread 10 passing therebetween can be controlled by turning the adjustment screw 72.



Patent Claims

1. Thread brake having two preferably disc- or plate-shaped brake elements (9) resiliently pressed against each other by loading means and adapted to allow at least one
5 thread (10) to be braked to be passed therethrough, said brake elements (9) being mounted on bearing means having a common bearing axis (29) and being acted upon by a device (30) setting them into an oscillatory motion, characterized in that said brake elements (9) can be set
10 into an oscillatory motion by the oscillation generating device (30), said oscillatory motion being orientated transversely relative to said bearing axis (29).
2. Thread brake as claimed in Claim 1, characterized in that the brake elements (9) are mounted on a guiding
15 element (19, 190) containing the bearing axis and in that the brake elements (9) can be set into an oscillatory motion together with the guiding element (19).
3. Thread brake as claimed in Claim 2, characterized in that the guiding element (19) is rigid.
- 20 4. Thread brake as claimed in Claim 2, characterized in that the guiding element (19) is elastic at least in sections.
5. Thread brake as claimed in Claim 3 or 4, characterized in that the guiding element (19) is
25 elastically mounted in retaining means (41).
6. Thread brake as claimed in any one of Claims 2 to 5, characterized in that the guiding element (19) is connected with retaining means (20) and in that the retaining means (20) can be set into an oscillatory motion
30 together with the guiding element (19) and the brake element (9).
7. Thread brake as claimed in any one of Claims 2 to 6, characterized in that the brake elements (9) are mounted on the guiding element (19) with radial play.
- 35 8. Thread brake as claimed in any one of the preceding



claims, characterized in that the oscillatory motion has a frequency of approximately 40 to 500 Hz.

9. Thread brake as claimed in any one of the preceding claims, characterized in that the oscillation generation
5 device (30) has a driven member (31) which carries out a reciprocating motion and is directly or indirectly coupled with said brake elements (9).

10. Thread brake as claimed in Claims 6 and 9, characterized in that the retaining means (20) are mounted
10 directly on the member (31) carrying out the reciprocating motion.

11. Thread brake as claimed in Claim 9, characterized in that it is located on a thread feeding device having a rotating shaft (4), and in that the member (31) carrying
15 out the reciprocating motion is coupled with the shaft (4) via a gearing (37) generating this motion.

12. Thread brake as claimed in Claim 10, characterized in that the gearing is a cam gear mechanism (37) having a cam element (38) seated on the shaft (4), with the cam surface
20 of which said reciprocating member (31) is kept in contact.

13. Thread brake as claimed in any one of the preceding claims, characterized in that the oscillation generating device (30) is designed to act directly on the brake
25 elements (9) (Fig. 5).

14. Thread brake as claimed in Claims 9 or 13, characterized in that the member (31) carrying out the reciprocating motion is designed to engage with the circumference of at least one of the brake elements (9).

30 15. Thread brake as claimed in Claim 2 or 6, characterized in that at least one of the two brake elements (9) is mounted in the area of its circumferences on the guiding element (190).

16. Thread brake as claimed in Claim 15, characterized in
35 that the guiding element (190) is designed to embrace at



least partially at least one brake element (9) in its circumferential direction.

17. Thread brake as claimed in Claim 15 or 16, characterized in that at least one brake element (9) is
5 rotatably mounted on the guiding element (190) essentially around the common bearing axis (29).

18. Thread brake as claimed in Claim 17, characterized in that at least one rotatable brake element (9) is radially supported on the guiding element (190) at spaced-apart
10 localized bearing positions (55, 56).

19. Thread brake as claimed in Claim 17 or 18, characterized in that at least one rotatable brake element (9) is supported on the guiding element (190) in an axial direction with play.

15 20. Thread brake as claimed in any one of Claim 2 or Claims 15 to 19, characterized in that at least one brake element (9a) is non-rotatably mounted on the guiding element (190).

21. Thread brake as claimed in any one of the preceding
20 claims, characterized in that at least one brake element (9, 9a) has a central through-opening (59).

22. Thread brake as claimed in Claims 20 and 21, characterized in that the non-rotatably mounted brake element (9a) is provided with a threading slot (67)
25 extending from the circumference and into the opening (59).

23. Thread brake as claimed in Claim 22, characterized in that the rotatably mounted brake element (9) is designed to be centrally closed (Fig. 14).

30 24. Thread brake as claimed in Claim 21 or 22, characterized in that the guiding element (190) is provided with a thread guiding element (62) passing through the openings (59) of both brake elements (9).

35 25. Thread brake as claimed in any one of the preceding



claims, characterized in that at least one brake element (9) rotatably mounted on the guiding element (190) is driven by the oscillation generating device (30) in a first direction of rotation (58) about the common bearing
5 axis (29).

26. Thread brake as claimed in Claim 25, characterized in that the at least one brake element (9) is driven by the thread (10) passing between the brake elements (9; 9a) in a second direction of rotation (58; 58a) which is the same
10 as or opposite to the first direction of rotation (58).

27. Thread brake as claimed in any one of the preceding claims, characterized in that the brake elements (9; 9a) are axially pressed against each other by magnetic loading means (65).

Transl. note:

* should be 19