

The invention relates to a brush head for trimming and brushing machines, having: a baseplate which is connected with the same torque to a driven shaft and in which a plurality of finger-like brushes are replaceably held parallel to the axis of rotation; and having a guide plate parallel to the baseplate, connected thereto and adjustable with respect thereto in the axial direction, and through which the brushes are guided.

Such a brush head driven in operation at a high speed of rotation of for example 1,500 rev/min is known from DE-U 78 07 217. In this brush head, the finger-like brushes, which comprise for example wire bristles, abrasive nylon or other materials, are held, axially parallel with respect to a drive shaft of the machine, on a baseplate mounted on this shaft. These brushes project through a guide plate. The two plates are adjustable relative to one another in the axial direction of the operating shaft. The guide plate prevents the individual bristles or the like from splaying out during rotation of the brush head, which rotates at high speed. The free bristle length can be altered by moving the baseplate, if for example a "soft brushing effect" is desired. The bristle material located at the outgoing side of the machining direction can bend out, especially during operation of such a brush head with a relatively long free bristle length and a high speed of rotation, since the rear bristles located at the outgoing side are no longer supported by bristles located behind. This results in different machining angles between the front and rear bristles. These different machining angles, which arise during a relatively long period of use of the brush head, in dependence on bristle material, free bristle length and contact pressure, produce different qualities of machining.

DD-PS 145 453 discloses a brush head for a trimming or brushing machine, in which a plurality of paintbrush-like brushes mounted rotatably on a base body of a gear housing are each driven individually at high speed. The base body of the gear housing performs a slow rotational movement during this rotation of the brushes driven at high speed. Such a brush head is thus to be used preferably for trimming recessed workpiece contours.

Since the paintbrush-like brushes are not supported laterally, the individual bristles spread pronouncedly outward owing to the centrifugal forces occurring, so that the bristle tips only strike the surface to be trimmed to a limited extent. A brush head of this type is therefore unsuitable for trimming relatively large surfaces and surface edges. The trimming result is inevitably uneven and unsatisfactory.

CH-A-652 065 describes a brush head with at least two brushes, but the constructional design thereof is not disclosed in this printed specification. Each brush is drivable by way of a planet gear on the one hand for a self-rotation about an operating shaft and on the other hand for a planet movement on a circular path about a drive shaft. Consequently, each brush of this known brush head performs two rotational movements, that is to say firstly a self-rotation and secondly a planet revolution. This measure on the one hand is to help to ensure more complete machining of a workpiece, i.e. an enlargement of the surface which may be reached by the brushes. On the other hand, more even wear of the brushes is also to be effected. However, the individual bristles cannot of course be thereby prevented from bending out.

The object of the invention, taking as a starting point the disclosed prior art, is to provide a brush head in which both an even wear of the brush bristles is ensured and the bristles are prevented from bending out, so that consistently good machining results can be achieved.

According to the invention, this is achieved with a brush head having the features of Claim 1. Advantageous further developments of the invention are contained in sub-claims 2 to 5 which are dependent thereon.

The brush head according to the invention is thus distinguished by in total three superimposed rotational movements. Firstly, the baseplate with the finger-like brushes performs a self-rotation about the operating shaft. Secondly, the baseplate also moves - effected by the planet drive - on a planet path about the drive shaft. Thirdly, according to the invention each finger-like brush is individually rotatably

mounted in the baseplate and is in this connection driven at a speed of rotation whereof the ratio to the speed of rotation of the baseplate is at most approximately 1:50. The additional, third rotational movement of the brushes according to the invention is not a cutting movement. The actual velocity of cutting is achieved by the rotary movement of the brush head. As a result of the additional, superimposed rotation of the brushes rotating at a very low speed, for example 1 - 2 rev/min, about their own axes, during operation of the brush head it is ensured that the individual bristles of the finger-like brushes are worn evenly, since during operation the bristles of one brush respectively adopt different positions or rotational positions with respect to the workpiece to be processed. A constant bending-out of the bristles is as a result effectively prevented ("compensated"). The machining angles within the brush remain constant. Even wearing of the brushes ensures uniform trimming or brushing treatment with correspondingly consistent surface quality. In addition, the useful life of the brushes is considerably increased.

In a preferred embodiment of the invention, the brush head is characterized in that a preferably even number of brushes is held evenly distributed in the baseplate concentrically on a common part-circle, at a small spacing from one another and are mutually in rotary entraining connection with respect to one another, at least one of these brushes being driven. Here, a brush can be driven indirectly by way of the drive shaft of the machine, it being possible to mount a toothed wheel with the same torque on the drive shaft, this toothed wheel being in torque-transmitting connection with a gear shaft of the driven brush. The even-numbered arrangement of brushes prevents counter-running movements of adjacent brushes, so that the bristles of adjacent brushes cannot become entangled in one another in disruptive manner.

The invention will be described in detail below by way of an illustrated example embodiment, in which:

Fig. 1 shows a front view, partly in section, of a brush head for a trimming or brushing machine, and

Fig. 2 shows a section along line I - I in Fig. 1.

Projecting from a machine housing 1 is a drive shaft 2, driven by a motor (not illustrated), for the brush head which is designated as a whole by the numeral 4 and which in addition to the rotation about the drive shaft 2 performs a planet movement about a connection piece 11 of the housing. For this, an eccentric housing 3 is rotatably mounted on the connection piece 11 of the housing surrounding the drive shaft 2. The brush head 4 is mounted in this eccentric housing 3 by means of an operating shaft 43. Non-rotatably mounted at the end of the drive shaft 2 is a toothed wheel 7 which engages by means of a first toothed ring 71 in a toothed wheel 8 on the operating shaft 43.

Mounted on the outer end of the operating shaft 43 is the brush head 4. It comprises a baseplate 41 on which there is concentrically arranged, evenly distributed on a common part-circle and at a small spacing from one another, a preferably even number of finger-like brushes 5 coaxial with respect to the operating shaft 43. Parallel to the baseplate 41, there is provided on the operating shaft 43 a guide plate 42 through which the brushes 5 are guided and project outwards with an adjustable free length. Here, the baseplate 41 is seated on a pin 422 of the guide plate 42 so as to be movable in the axial direction of the operating shaft 43. Between baseplate 431 and guide plate 42, which has bores 421 for penetration by the brushes, there is movably arranged a support plate 10 which, during operation, prevents the bristles 51 of the brushes 5 from curving outward owing to centrifugal forces, as a result of which there is a risk of their being pulled out of the bores 421.

Each individual one of the finger-like brushes 5 has a sleeve-shaped end part 52 by means of which it is secured detachably, by being pushed on, on a rotationally symmetrical holding part 53 seated in the baseplate 41. These holding parts 53 are in turn mounted in the baseplate 41 so as to be rotatable about the longitudinal axis of the brush 5. For example, on the outside they each have a toothed ring 531 by means of which they are mutually in rotary entraining connection.

Acting on at least one of the toothed rings 531 of one of

the holding parts 53 is a drive pinion designated by the numeral 9. This drive pinion is mounted on the corresponding guide section 62 of a gear shaft 6 for driving the overall block of brushes 5 and is movable with the same torque in the axial direction. This gear shaft 6 is mounted on the one hand in the guide plate 42 and on the other hand on a bearing plate 44 which is held parallel to the baseplate 41 at the end of the pin 422. Projecting through this bearing plate 44 is a bearing shaft section 61 of the gear shaft 6. Mounted on this section is a toothed wheel 63 which is connected by way of an intermediate wheel 64 to a second toothed ring 72 of the toothed wheel 7 on the drive shaft 2, the second toothed ring 72 having a different diameter from the first toothed ring 71.

With a suitable gear setting, the rotational movement of the brush head 4 about the axis of the operating shaft 43 and driving of the individual brushes 5 about their own respective axes is in this case achieved by way of the drive shaft 2. The brush head 4 is in this case driven at a speed of rotation of for example 1,500 rev/min, the individual brushes 5 being driven at a very low speed rotation of a few revolutions per minute. The ratio of the speed of the driven brushes 5 to the speed of the brush head 4 is to be at most approximately 1:50.

In addition, the baseplate of the brush head 4 also performs, at the same time as it rotates about its own axis, a planet movement, during which the eccentric housing 3 is driven. Other means of transmission are possible, for example flexible drives, instead of the gears shown by way of example.



Claims

1. Brush head (4) for trimming and brushing machines, having: a drive shaft (2) drivable by a motor of the machine (1); an operating shaft (43) driven by said drive shaft (2) by way of a planet drive (7, 8); a baseplate (41) which is connected with the same torque to the operating shaft (43) and in which a plurality of finger-like brushes (5), arranged on a circle concentric with respect to the operating shaft (43) and parallel to the operating shaft (43), are replaceably held; and having a guide plate (42) parallel to the baseplate (41), connected thereto and adjustable with respect thereto in the axial direction, and through which the brushes (5) are guided, the baseplate (41) being drivable by way of the planet drive (7, 8) on the one hand for a self-rotation about the operating shaft (43) and on the other hand for a planet movement on a circular path about the drive shaft (2), and each finger-like brush (5) being rotatably mounted in the baseplate (41) and being driven at a speed of rotation whereof the ratio to the speed of rotation of the baseplate (41) is at most approximately 1:50.
2. Brush head according to Claim 1, characterized in that the brushes (5) are evenly distributed in an even number on the circle which is concentric with respect to the operating shaft (43) and are arranged at a small spacing from one another and are each connected to a toothed wheel (53, 531) mounted in the baseplate (41), the toothed wheels (53, 531) of the respectively adjacent brushes (5) preferably being in rotary entraining connection and at least one of the toothed wheels (53, 531) being drivable.
3. Brush head according to Claim 1 or 2, characterized in that the rotation of the brushes (5) is effected indirectly by way of the drive shaft (2).
4. Brush head according to Claim 3, characterized in that the drive shaft (2) carries a toothed wheel (7) which is connected in torque-transmitting manner to a gear shaft (6) of the driven brushes (5).
5. Brush head according to one of Claims 1 to 4, characterized



by a support plate (10) which has openings penetrated in each case by the brushes (5) and is arranged axially displaceably between the baseplate (41) and the guide plate (42) and parallel thereto.