June 24, 1952 G. W. BRUNER 2,601,499

ABRASIVE HEAD

Filed July 21, 1951 2 SHEETS—SHEET 1

FIG. 1

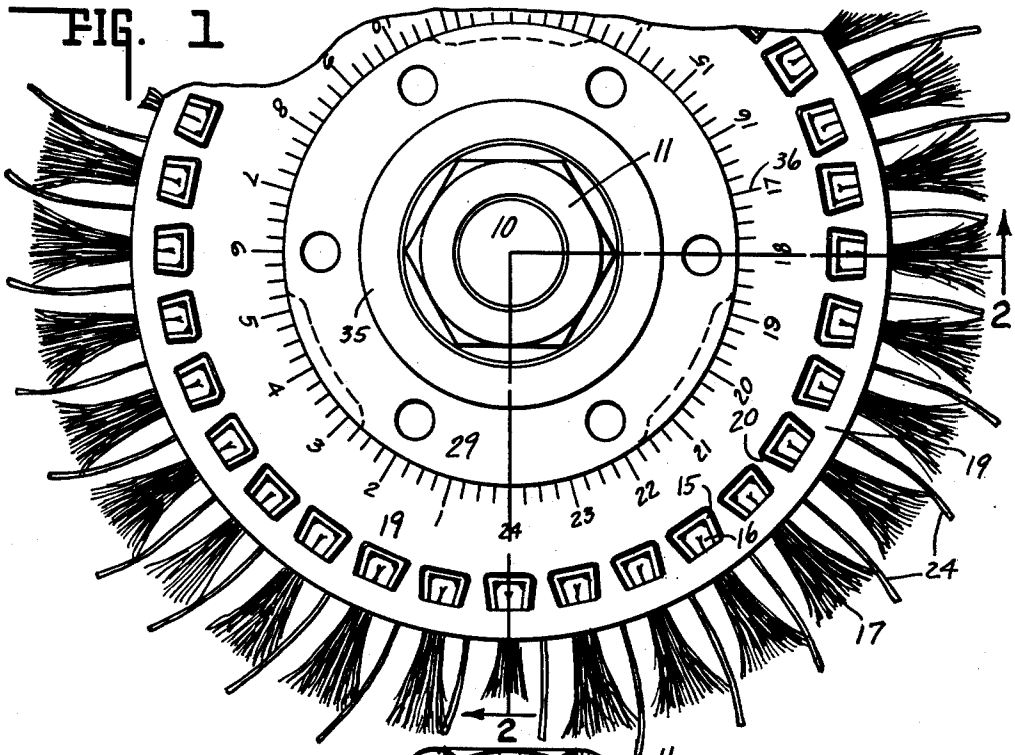
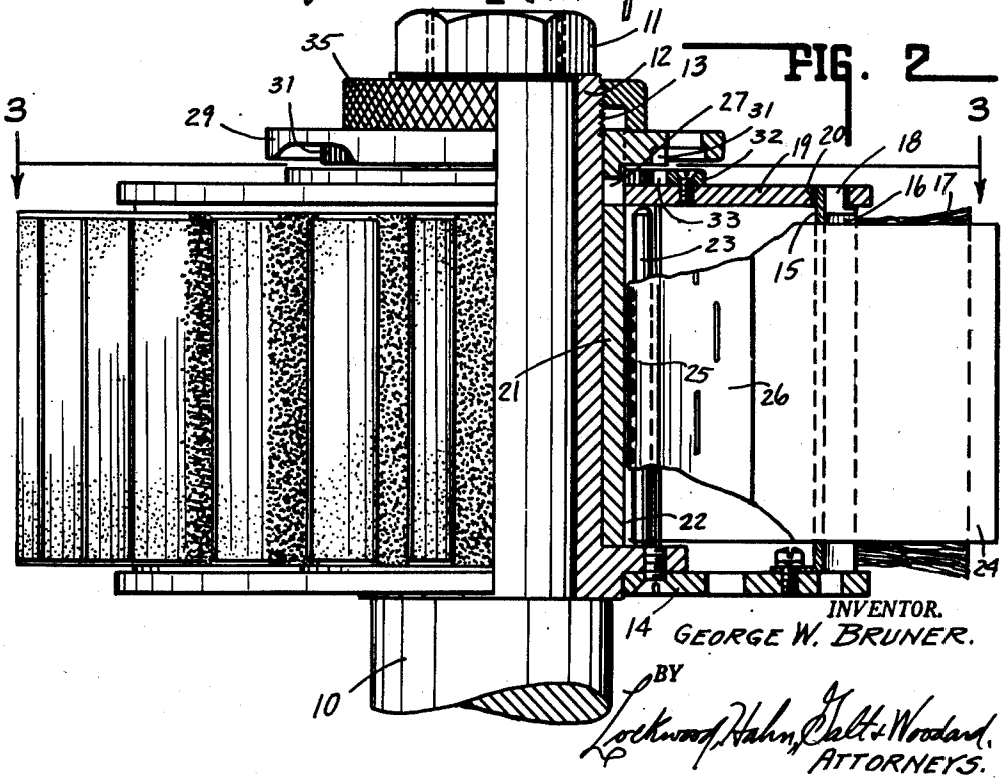


FIG. 2



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FIG. 3

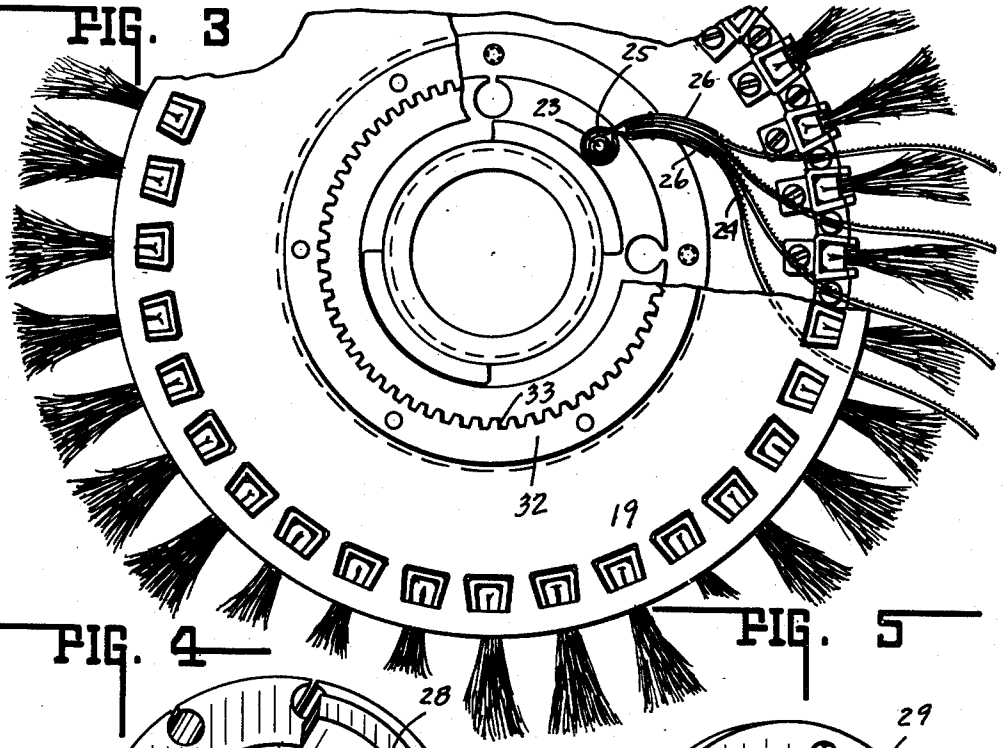


FIG. 4

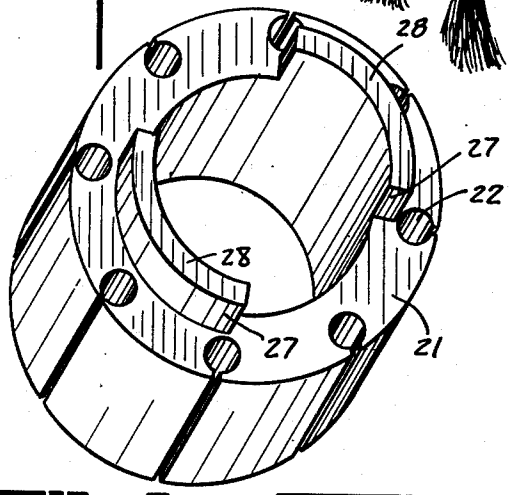


FIG. 5

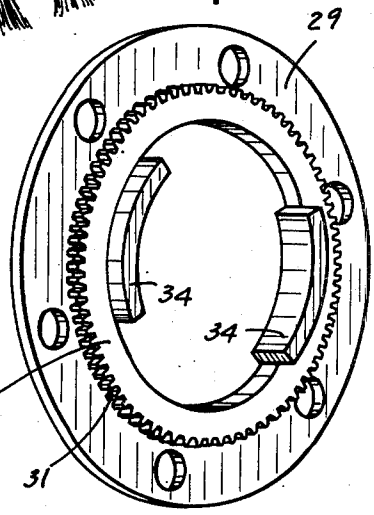


FIG. 6

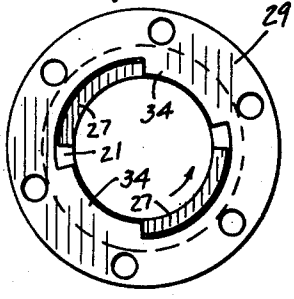
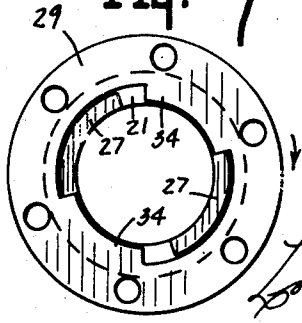


FIG. 7



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UNITED STATES PATENT OFFICE

2,601,499

ABRASIVE HEAD

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10 Claims. (Cl. 51—194)

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This invention relates to an abrasive head of that type which may be employed in grinding and smoothing or polishing products of metal, die castings and the like, as well as wood and other materials, particularly those having irregular surfaces, reference being had to Letters Patent to Plengemeier No. 2,125,460, granted August 2, 1938, and Letters Patent to Bradley No. 2,430,099, granted November 4, 1947.

In heavy duty heads of this type much time is consumed on the job in resetting the exposed ends of the abrasive strips becoming worn down or destroyed. In treating metal products with the head the abrasive is so rapidly consumed as to require periodic resettings at short intervals in the course of the operations, wherein the abrasive strips are fed outwardly to present a new surface.

Due to this condition, it is the purpose of this invention to simplify and facilitate the resetting operation so as to decrease the time and effort or strength required, and thereby improve the operator's efficiency. For this purpose the head is so arranged that the abrasive winding drum may be quickly released for abrasive feeding and re-secured in its new position without releasing the head from the spindle or loosening its locking nut.

Another feature of the invention resides in the structure for limiting the feeding of the abrasive to a predetermined extent. Once the head is set up each abrasive feeding operation permits only a limited predetermined maximum length of abrasive strip to be fed outwardly. By reason of such limitation, the operator need not consume time by determining the amount of abrasive he is feeding out, but it will be automatically controlled which will result in a substantial saving in abrasive, as well as time and effort.

Still a further feature of the invention resides in the automatic feeding of abrasive from the head and a limit control therefor for limiting the amount of the abrasive fed from the head at each resetting. Heavy duty heads of this type require considerable force to rotate the winding drum to a new abrasive setting. By means of this invention, the winding drum is caused to rotate relative to the head through the combined action of inertia and centrifugal force. Thus, upon the adjusting collar being reset and rotative power applied to the head, the inertia of the drum will cause the head to rotate relative thereto, thereby effecting relative rotation therebetween in a direction to feed the abrasive

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strips outwardly to the new setting, the extent of such feeding being automatically limited to a predetermined amount of fresh abrasive.

A further feature of the invention resides in the provision of an annular series of indicia markings for indicating to the operator the total amount of abrasive fed from the head throughout a series of resetting operations so as to inform him of the amount of unused abrasive remaining in the head.

From the foregoing it will be observed that without disturbing the mounting of the head upon the spindle or the locking nut therefor, the adjusting collar may be reset to a predetermined position relative to the cap plate, to feed out a minimum amount of abrasive to as little as the pitch of one tooth, and a maximum amount limited to the slot or space in the winding drum between the projecting lugs thereon. Furthermore, this may be accomplished without the use of wrenches and the entire resetting job may be performed with a minimum of physical force whereby women operators may readily effect a resetting. In addition, the interlocking teeth provide a safety factor against accidental unloading or releasing of all the abrasive stored in the head at one time, since the relative rotation between the drum and the head is not dependent upon friction, as in the above patents, but the interlocking of the teeth. This safety factor is designed to inspire greater confidence in the operator when using the head.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

Fig. 1 is an end view of the head.

Fig. 2 is a section taken on the line 2—2 of Fig. 1 with the abrasive adjusting collar released for a resetting operation, and a portion broken away.

Fig. 3 is the same as Fig. 1 with parts broken away.

Fig. 4 is a perspective view of the winding drum.

Fig. 5 is a perspective view of the abrasive adjusting collar.

Fig. 6 is a reduced illustration of the relation between the adjusting collar and winding drum, showing them in resetting position.

Fig. 7 is the same as Fig. 6 showing them in operating reset position.

In the drawings there is shown a driving spindle 10 for mounting and driving the abrasive head, said head being secured on said spindle by a lock nut 11. Said head includes a cylindrical

hub 12 threaded at its outer end as indicated at 13. Secured to said hub there is an annular base plate 14 to which there is secured an annular series of brush holders 15, each holder being arranged at right angles to the plane of the base plate to slidably receive a brush head 16 carrying the brush bristles 17 extending radially outwardly from the head. Each of said brush holders is generally V-shaped in cross section with their free edges extending to interlock with and hold the brush heads in place, the upper ends of said holders being reduced at 18.

Surrounding said hub 12 there is an annular cap plate 19 mounted in corresponding spaced relation to the base plate 14, said cap plate being provided with an annular series of apertures 20 for receiving and interlocking with the reduced ends 18 of the respective brush holders 15. Rotatably mounted about the drum 12 and between said plates there is an abrasive anchor and winding drum 21 provided with an annular series of longitudinally slotted bores 22 in each of which there is provided an abrasive anchor pin 23. The abrasive strips 24 are arranged so that one strip extends between each pair of adjacent brushes 17, there being a plurality of said strips anchored to each pin. For this purpose there is provided an abrasive loading in the form of a looped fabric 25 for mounting over the anchor pin, and having a pair of wings 26 between which a plurality of strips 24 is secured. Thus, as herein shown, there are eight anchor pins and thirty-two brushes, each loading including four abrasive strips.

Adjacent the outer end of the winding drum 21 there is provided and formed thereon a pair of angularly spaced abrasive limiting lugs 27 terminating in an end thrust bearing end 28 adjacent the end threads 13 on the hub 12, the space between said lugs providing a limit slot for the purpose hereafter described. The opposite end of the drum forms an end thrust bearing against a flanged portion of the hub 12. Operatively related with said drum there is provided an abrasive adjusting collar 29 on the underside of which there is secured a gear ring 30 providing an annular series of teeth or serrations 31 adapted to mesh and interlock with a mating internal toothed ring 32 having teeth or serrations 33, secured to the cap plate 19. The collar 29 is apertured to fit over the threaded end of the hub 12, and is formed with a pair of opposed limiting ears 34 extending downwardly therefrom freely into the slot between the lugs 27 to bear against the end surface of the drum 21 and provide an end thrust bearing support therefor. Said ears 34 are of less length than the slot between the lugs so that relative angular displacement between the drum 21 and the collar 29 will be permitted to a limited and predetermined degree.

The collar 29 is held in its reset position and tooth engagement with the cap plate by a releasable clamping knob 35 threaded upon the threads 13 of the hub 12. Said knob has its periphery knurled and is of sufficient diameter for convenient and forceful gripping to screw it into clamping engagement with said collar or back it off to release said collar and disengage the teeth. The collar may then be reset for a predetermined abrasive feed out without disturbing the lock nut 11.

In operation, the head may be loaded either when dismounted from the spindle or when mounted thereon. Thus, a new loading of the head may be effected without removing it from the spindle. This is accomplished by unscrewing and removing the knob 35 and collar 29 from the hub and then removing the cap plate 19. The winding drum will then be exposed for reception of the abrasive loadings without unloading or removing the lock nut 11 or the use of a wrench.

When it is merely desired to adjust the drum for a new feed out of abrasive strips upon the ends thereof becoming worn or damaged, it is only necessary to back off the clamping knob 35 sufficiently for axially displacing the collar 29 to disengage the teeth 31, 33. The collar may then be reset and clamped by the clamping knob.

In this fashion a new setting is provided without effort; without removing the head or the lock nut and without expending energy in actually rotating the winding drum to its new feed out position. The only accomplishment at this point is that the adjusting collar is reset to permit a predetermined and limited feed out of the abrasive.

Having been thus set, power is applied to the head. Due to the inertia of the winding drum and the abrasive carried thereby resisting such rotative movement, relative rotation between the drum and the head will thereby be affected within the limitation permitted by the newly set spacing between the ears 34 and lugs 27, from their resetting position shown in Fig. 6 to their operating reset position shown in Fig. 7. Such relative rotation and centrifugal force will feed the abrasive strips out to present fresh abrasive portions to a predetermined extent as thus determined. However, if it is desired to feed the abrasive out to a lesser degree, the resetting position of the collar would be moved only the distance of one or more teeth so as to reduce the maximum limit of spacing between the ears and lugs. The resetting operation having been made prior to applying power, after the power is applied and the abrasive automatically fed out, the operation of the head may be continued.

By providing angular displacement indicia 35 on the cap plate 19 surrounding the outer periphery of the adjusting collar 29, and with a fixed indicia on said collar, the operator may readily observe the amount of abrasive which has been used and correspondingly the amount or length of abrasive strips still within the head and useable.

Summarizing some of the advantages of the above, it may be noted that when the head is locked to the spindle there is no further need of wrenches to loosen nuts, reload, or feed out new abrasive. This saves a considerable amount of time. The amount of abrasive to be fed out may be determined accurately in the manner above described, a factor that is very important for economical and efficient operation of the head. The operation of the abrasive feed out mechanism requires but little manual effort, making the readjustment of the abrasive not only more rapid, but also making it possible for manipulation with slight physical effort so that it is convenient for women operators to readjust the abrasive. Furthermore, the positive abrasive lock through interengagement of the teeth substantially minimizes the chances of accidental unloading or releasing of all the abrasive loaded in the head at one time, whether through carelessness or lack of strength in locking up the head. This is not only a safety factor, but also inspires greater confidence in the

operator that the head will not "explode" when in use.

The invention claimed is:

1. In an abrasive head to be driven by a driving spindle including an annular series of radially-extending brushes between which abrasive strips are adapted to be extended, the combination therewith of a hub adapted to be secured on said spindle for rotation therewith, a hub plate extending radially from said hub and secured thereto, a cap plate surrounding said hub and spaced from said hub plate for mounting said brushes therebetween, an abrasive anchoring and winding drum rotatably mounted on said hub for anchoring and winding abrasive strips thereabout, said drum having a series of abrasive limiting lugs projecting from one end thereof through said cap plate, an abrasive adjusting collar rotatably mounted upon said hub having ears projecting inwardly between said lugs spaced from the adjacent ends thereof to permit of predetermined relative rotation between said collar and drum, an annular series of interlocking teeth carried by said collar and cap plate respectively for interlocking said collar and said plate in resetting position, and a clamping knob threaded on said hub for clamping said collar in interlocked relation with said cap plate.

2. In an abrasive head to be driven by a driving spindle including an annular series of radially extending brushes between which abrasive strips are adapted to be extended, the combination therewith of a hub adapted to be secured on said spindle for rotation therewith and having a radially-extending hub plate, a cap plate mounted on said hub spaced from said hub plate for mounting said brushes therebetween, an abrasive winding drum carried by said hub between said plates, said drum having spaced projections extending from the end thereof adjacent said cap plate, an abrasive adjusting collar rotatable upon said hub exteriorly of said cap plate having spaced projections extending inwardly for limited movement between said drum projections to permit rotation of said drum through a predetermined angular distance relative to said collar, interlocking projections carried by said collar and cap plate respectively for interlocking said collar and said plate in resetting position, and a clamping knob on said hub for clamping said collar in interlocked relation with said cap plate.

3. In an abrasive head to be driven by a driving spindle including an annular series of radially-extending brushes between which abrasive strips are adapted to be extended, the combination therewith of a hub adapted to be secured on said spindle for rotation therewith and having a radially-extending hub plate, a cap plate mounted on said hub in spaced relation to said hub plate between which said brushes are mounted, an abrasive winding drum rotatable on said hub between said plates, said drum having spaced projections extending from one end thereof adjacent said cap plate, an abrasive adjusting collar rotatable upon said hub having spaced projections extending inwardly for limited movement between said first-mentioned projections whereby said drum is permitted to rotate through a predetermined angular distance relative to said collar, an annular series of interlocking teeth carried by said collar and cap plate for interlocking said collar and said plate in resetting position, the pitch of said teeth being substantially less than the spacing between said projections, and a clamping knob on said hub for clamping said collar in interlocking relation with said cap plate.

4. In an abrasive head to be driven by a driving spindle, including an annular series of radially-extending brushes between which said abrasive strips are adapted to be extended, the combination therewith of a hub adapted to be secured on said spindle for rotation therewith having a radially-extending hub plate, a cap plate carried by said hub in spaced relation to said hub plate for mounting said brushes therebetween, an abrasive winding drum mounted on said hub between said plates for winding abrasive strips thereabout, said drum having an arcuate slot in the end thereof adjacent said cap plate, an abrasive adjusting collar rotatably mounted on said hub exteriorly of said cap plate having a projection extending into the arcuate slot of said drum in predetermined spaced relation to the ends thereof to permit of a predetermined relative rotation between said collar and drum, interlocking elements carried by said collar and cap plate for angular adjustment therebetween to resetting position, and a clamping member engageable with said collar for locking it in its reset position with relation to said cap plate while permitting limited predetermined relative rotation between said hub and plates in a direction to extend said abrasive strips within the limits of movement of said projection within said arcuate slot.

5. In an abrasive head to be driven by a driving spindle including an annular series of radially-extending brushes between which said abrasive strips are adapted to be extended, the combination therewith of a pair of spaced plates for mounting said brushes therebetween, means for securing said plates for rotation by said driving spindle, an abrasive winding drum surrounding said spindle and rotatably mounted between said plates, an abrasive adjusting collar surrounding said spindle exteriorly of one of said plates, interlocking projections on said drum and collar having a predetermined angular free play therebetween, interlocking elements between said collar and its adjacent plate, and a clamping member engageable with said collar for clamping it in interlocking engagement with said adjacent plate with said interlocking projections in predetermined spaced relation to permit limited relative rotation between said drum and plates in a direction to extend said abrasive strips from said head in accordance with the setting of said collar.

6. In an abrasive head to be driven by a driving spindle including an annular series of radially-extending brushes between which said abrasive strips are adapted to be extended, the combination therewith of a pair of spaced plates for mounting said brushes therebetween, means for securing said plates for rotation by said driving spindle, an abrasive winding drum surrounding said spindle and rotatably mounted between said plates, an abrasive adjusting collar surrounding said spindle exteriorly of one of said plates, interlocking projections on said drum and collar having a predetermined angular free play therebetween, interlocking elements between said collar and its adjacent plate, a clamping member engageable with said collar for clamping it in interlocking engagement with said adjacent plate with said interlocking projections in predetermined spaced relation to permit limited relative rotation between said drum and plates in a direction to extend said abrasive strips from said head in accordance with the setting of said

collar, and an annular series of indicia on said last-mentioned plate surrounding and adjacent said collar for indicating the angular resetting thereof.

7. An abrasive head adapted to be rotated at high speed including an abrasive winding drum rotatably mounted concentrically within said head, an abrasive adjusting collar mounted on and exteriorly of said head concentrically with said drum, said collar and drum being provided with interengaging projections having free play therebetween to permit predetermined angular displacement thereof, an annular series of interlocking teeth on said head and collar respectively, said collar being axially displaceable relative to said drum and head to effect disengagement of said teeth without disengaging said projections, and a clamping member movable on said head into engagement with said collar for securing it in selected tooth engagement and releasing it from tooth engagement for resetting the relative angular positions of said projections.

8. An abrasive head adapted to be rotated at high speed including an abrasive winding drum rotatably mounted concentrically within said head provided with an arcuate slot at one end thereof, an abrasive mounting collar mounted exteriorly of said head concentrically with said drum provided with a projection extending into said slot having free play therein to permit predetermined angular displacement therebetween, an annular series of interlocking teeth on said head and collar respectively, said collar being axially displaceable relative to said drum and head to effect disengagement of said teeth without removing said projection from said slot, the pitch of said teeth being substantially less than the free play of said projection within said slot, and a clamping member movable on said head into engagement with said collar for securing it in selected tooth engagement and releasing it from tooth engagement for resetting the position of said projection in said slot.

9. An abrasive head adapted to be rotated at high speed including an abrasive winding drum rotatably mounted concentrically within said head provided with an arcuate slot at one end thereof, an abrasive mounting collar mounted exteriorly of said head concentrically with said drum provided with a projection extending into said slot having free play therein to permit predetermined angular displacement therebetween, an annular series of interlocking teeth on said head and collar respectively, said collar being axially displaceable relative to said drum and head to effect disengagement of said teeth without removing said projection from said slot, an annular series of indicia on said head adjacent and surrounding said collar for indicating the extent of angular displacement thereof throughout its several abrasive resettings, and a clamping member movable on said head into engagement with said collar for securing it in selected tooth engagement and releasing it from tooth engagement for resetting the position of said projection in said slot.

10. An abrasive head adapted to be rotated at high speed including an abrasive winding drum rotatably mounted concentrically within said head, an abrasive adjusting collar mounted exteriorly of said head concentrically with said drum, said collar and drum being provided with interengaging projections having a free play therebetween, an annular series of interlocking teeth on said head and collar respectively, said collar being axially displaceable relative to said drum and head to effect disengagement of said teeth without disengaging said projections, and a clamping knob movable on said head into and out of engagement with said collar for securing it in selected teeth engagement when tightly engaged thereagainst and releasing it from teeth engagement when freed therefrom for permitting the resetting of the relative positions of said projections.

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No references cited.