

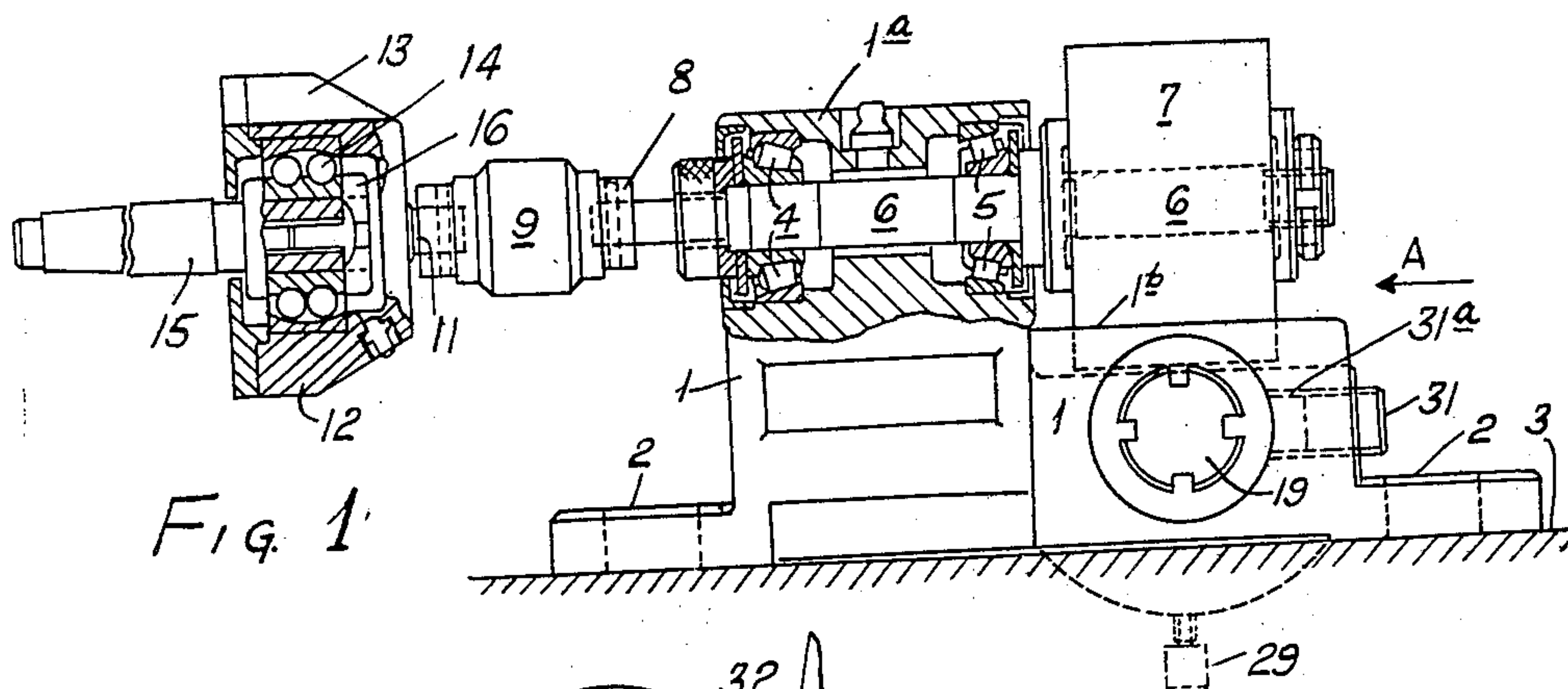
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J. AIRLIE ET AL

2,626,488

GRINDING ATTACHMENT

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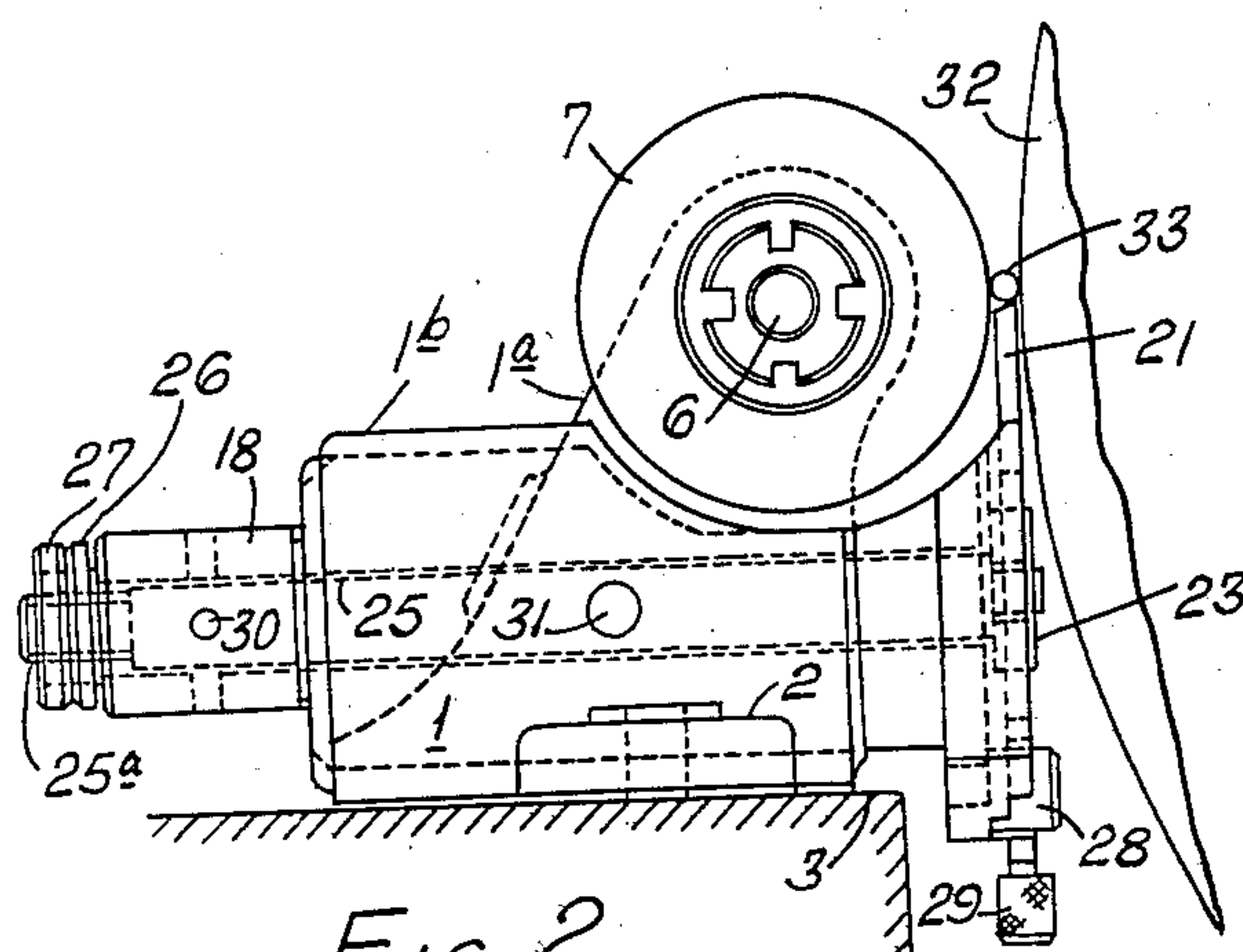


Fig. 2

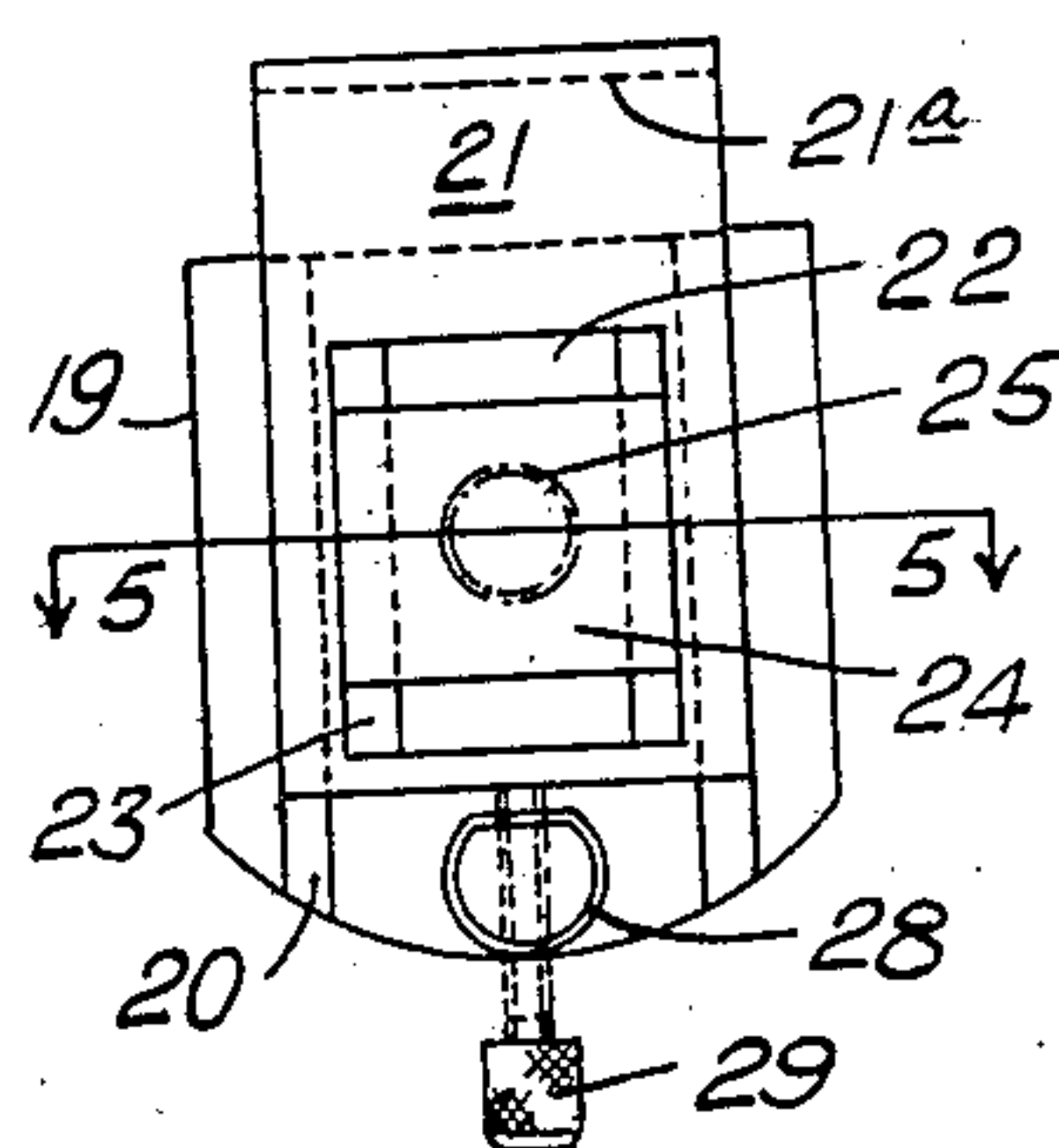


Fig. 4

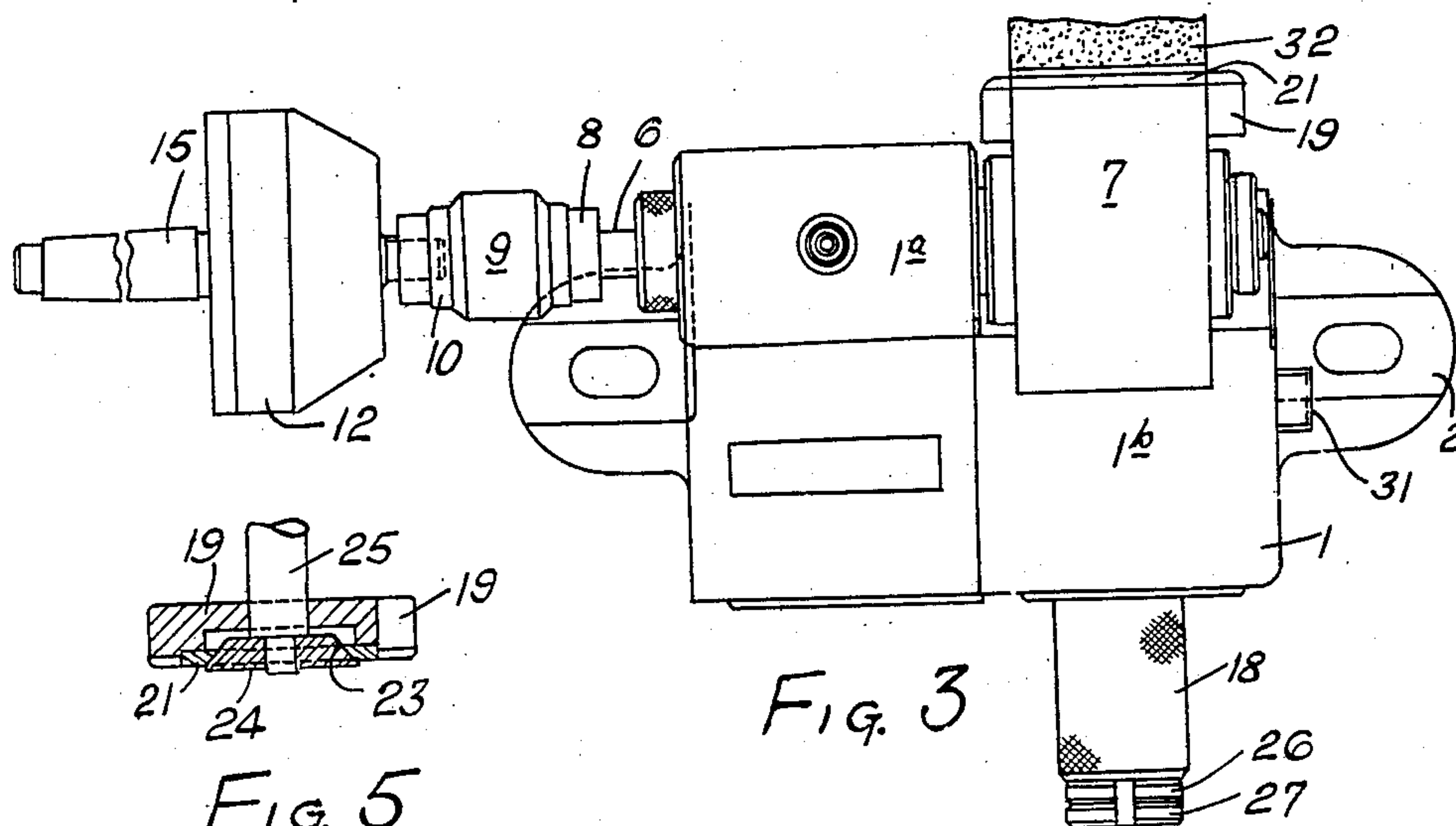


Fig. 3

Fig. 5

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UNITED STATES PATENT OFFICE

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GRINDING ATTACHMENT

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6 Claims. (Cl. 51-103)

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This invention relates to an attachment for use with grinding machines of the type in which the work, while being operated upon by a grinding wheel, is normally supported above a table between centres so that it may be rotated about an axis substantially parallel with that of the wheel by means of an operative connection made to a driving head on the machine.

The purpose of the attachment is to make it possible to perform centreless grinding operations with a machine of the type indicated without making any permanent changes therein.

According to the invention, an attachment for the purpose set forth comprises a support, a control wheel mounted thereon for rotation about its own axis, a rest adjustably mounted on the support to present a work-supporting surface to one side of the control wheel axis, means whereby the support may be secured on the table of the machine with the control wheel located adjacent to the grinding wheel and the work-supporting surface located between the two wheels, and means for establishing a driving connection between the driving head on the machine and the control wheel.

A construction of the grinding attachment according to this invention is illustrated by way of example in the accompanying drawings wherein:

Fig. 1 is a front elevation with some parts shown in vertical section,

Fig. 2 is an end elevation looking in the direction of the arrow A in Fig. 1,

Fig. 3 is a plan view,

Fig. 4 is a rear elevation of the work rest, and

Fig. 5 is a section taken on the line 5-5 in Fig. 4.

In the example illustrated there is a support or bracket 1 formed with fixing lugs 2 by means of which it may be firmly attached to the table of an existing grinding machine, this table being indicated in Figs. 1 and 2 at 3. The bracket 1 has an upstanding housing 1a formed thereon within which are accommodated roller bearings 4 and 5 supporting a horizontally disposed spindle 6 which at one end overhangs the lower portion 1b of the bracket 1 and has firmly secured thereon a control wheel 7 of hard rubber or other suitable material. The disposition of the spindle 6 is such that the control wheel 7 will overhang the inner edge of the table 3 as can be seen from Fig. 2. The end of the spindle 6 remote from the wheel is attached at 8 to the one element of a universal joint 9 which is of any suitable construction and has its other terminal connected at 10 to a stub 11 extending axially from the end face of a generally cylindrical housing 12 which is formed at one point with a groove 13 extending parallel with the axis of the housing. Within the housing is accommodated a ball bearing 14 of the self-aligning type, the inner race

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of which is secured on the end of a tapered pin 15 by means of a clamping screw 16.

In the portion 1b of the bracket of lesser height which is located beneath the control wheel 7 there is formed a horizontally extending bore (see Fig. 2) which extends in a direction at right angles to the axis of the wheel 7. Within this bore is engaged, as a close sliding fit, a tubular member 18 which is of such length that its end will project somewhat beyond the rear face of the bracket. The forward end of the tubular member projects to a considerable extent from the front face of the bracket and is secured to a flanged block 19. The flange of the block 19 is formed with guide-ways 20 between which fits slidably a rectangular plate 21 having a rectangular opening 22 formed therein. The walls of the opening 22 which are disposed parallel with the guides 20 are inclined towards each other in the forward direction as indicated at 23 (see Fig. 5). The upper edge of the plate 21 is inclined downwards transversely towards the wheel 7 to constitute a work-supporting surface 21a.

Within the opening 22 of the plate 21 is disposed a rectangular clamping block 24 which has those of its edges disposed adjacent to the inclined edges 23 of the opening inclined at the same angle and in the same sense whereas it has its other edges spaced somewhat from the corresponding edges of the opening 22. The clamping block 24 is secured on the end of a rod 25 which is received within the bore of the tubular member 18 and is of such length that its rear screw-threaded end 25a projects for a short distance beyond the corresponding end of the tubular member 18 to receive an adjusting nut 26 backed by a locking nut 27.

On the forward face of the lower part of the flange of the block 19 there is secured a stud 28 through which is screwed an adjusting screw 29, the upper end of which engages the lower edge of the plate 21.

In the portion of the tubular member 18 which projects rearwardly from the bracket 1 there are formed tommy bar holes 30 by means of which the tubular member may be rotated partially about its axis when desired. In order that the tubular member may be clamped in any desired position of adjustment, a clamping screw 31 is threaded into a suitable aperture 31a formed in the bracket 1, this screw being adapted to be operated by a plug spanner.

When it is desired to utilise the attachment according to this invention for converting a grinding machine normally adapted for "between centres" grinding so that it may be employed to perform centreless grinding operations, the bracket 1 is firmly clamped to the machine table 3 at a location such that the control wheel 7 will be disposed opposite the grinding wheel of

the machine, part of this wheel being indicated at 32 in Figs. 2 and 3. Prior to fixing down the bracket 1 the tapered pin 15 is driven into the tapered socket in the mandrel of the grinding machine so that the adjacent face of the housing 12 is brought close up against the face of the driving head of the machine. A driving pin pivoted on the driving head is then engaged in the groove 13 in the housing 12 and clamped in position so that rotation of the head will cause corresponding rotation of the housing on the bearing 14.

After the bracket has been secured in position, the work rest is suitably adjusted to bring the work-supporting surface 21a to the correct position between the opposed control and grinding wheels, 7 and 32, respectively, for supporting the work to be ground. This is indicated in Fig. 2 as a cylinder 33. Adjustment is effected by slackening off the screw 31 and the nuts 26 and 27, and turning the screw 29 in the one or other direction, whereupon the screw 31 is tightened to clamp the member 18 in the bracket 1 and the nuts 26 and 27 are tightened to cause the rod 25 to pull the clamping block 24 into the opening 22 in the plate 21, whereby firmly to clamp the latter to the block 19.

When the grinding machine is set in operation, the grinding wheel 32 is rotated at a high peripheral speed in such a direction that the surface of the wheel adjacent to the work-supporting surface 21a moves downwards. At the same time the control wheel 7 is rotated in the same direction as the grinding wheel but at a lower peripheral speed, the control wheel being driven from the driving head of the machine by way of the housing 12, universal joint 9 and spindle 6.

A work-piece 33 is placed on the work-supporting surface 21a and, when the grinding wheel is brought into contact with the work-piece, the latter is caused to rotate. Since the peripheral velocity of the grinding wheel 32 is greater than that of the control wheel 7, the work-piece 33 is held against the surface 21a and is ground by the differential action of the two wheels.

If desired, an upwardly projecting stop may be provided at one end of the work-supporting surface 21a and the spindle 6 may be inclined with respect to the horizontal so that the work-piece while being ground will also be advanced axially along the surface 21a until it strikes the stop.

What is claimed is:

1. A centreless grinding attachment for grinding machines having a table, a grinding wheel and a work-driving head, said attachment comprising a support to be secured to said table, a control wheel mounted on said support for rotation about its own axis, a rest adjustably mounted on said support to present a work-supporting surface to one side of the axis of said control wheel, and a coupling means for establishing a driving connection between said work-driving head and said control wheel, said coupling means comprising a tapered spigot and a rotary element connected to said spigot and adapted to be engaged with the work-driving head of the grinding machine.

2. A centreless grinding attachment for grinding machines having a table, a grinding wheel and a work-driving head, said attachment comprising a support to be secured to said table, a control wheel mounted on said support for rotation about its own axis, a rest adjustably mounted on said support presenting a work-sup-

porting surface to one side of the axis of said control wheel, a cylindrical member axially adjustable in the support and carrying the rest, means for clamping said member in any desired position of adjustment, and a coupling means for establishing a driving connection between said work-driving head and said control wheel.

3. A centreless grinding attachment for grinding machines having a table, a grinding wheel and a work-driving head, said attachment comprising a support to be secured to said table, a control wheel mounted on said support for rotation about its own axis, a rest adjustably mounted on said support to present a work-supporting surface to one side of the axis of said control wheel, a cylindrical member axially adjustable in the support and carrying the rest, said member being angularly movable about its own axis, and a coupling means for establishing a driving connection between said work-driving head and said control wheel.

4. A centerless grinding attachment for grinding machines of the type including a table and a grinding wheel, said attachment comprising a support to be secured to said table, a control wheel mounted on said support rotatable about its own axis and adapted to be arranged opposite the grinding wheel of the machine, a cylindrical member carried by and axially adjustable in the support, a block carried on the end of said cylindrical member in a position below and to one side of the axis of said control wheel, a work-rest mounted on said block, said work-rest having a work supporting surface located to one side of the axis of said control wheel, and means for clamping said cylindrical member in any desired position of adjustment.

5. A centerless grinding attachment as claimed in claim 4, in which said block includes a pair of spaced upright guide-ways, said work-rest being mounted between said guide-ways.

6. A self-contained attachment for use with grinding machines provided with a table, a grinding wheel projecting above the table and a driving head, said attachment constituting a unit detachable from the machine while leaving the driving head of the machine in position, said attachment including a support adapted to be secured to the machine table, a control wheel mounted on said support for rotation about its own axis, a rest adjustably mounted on the support to present a work-supporting surface to one side of said axis, said control wheel being normally located adjacent to the grinding wheel and to the work-supporting surface disposed between the two wheels, and means for establishing a driving connection between said driving head and said control wheel, said means being instantly disengageable exclusively by the shifting of said unit in the direction of the axis of the control wheel.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,683,974	Heim	Sept. 11, 1928

FOREIGN PATENTS

Number	Country	Date
391,243	Great Britain	Apr. 27, 1933