Oct. 15, 1946. F. M. BOHLER 2,409,340

PORTABLE SURFACE GRINDER

Filed March 1, 1944 4 Sheets-Sheet 1

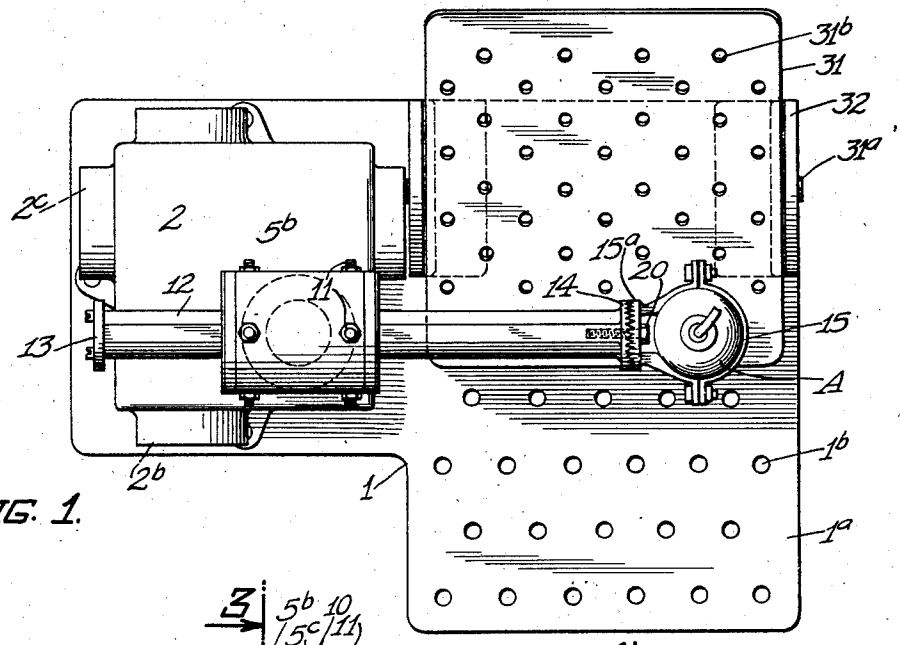


FIG. 1.

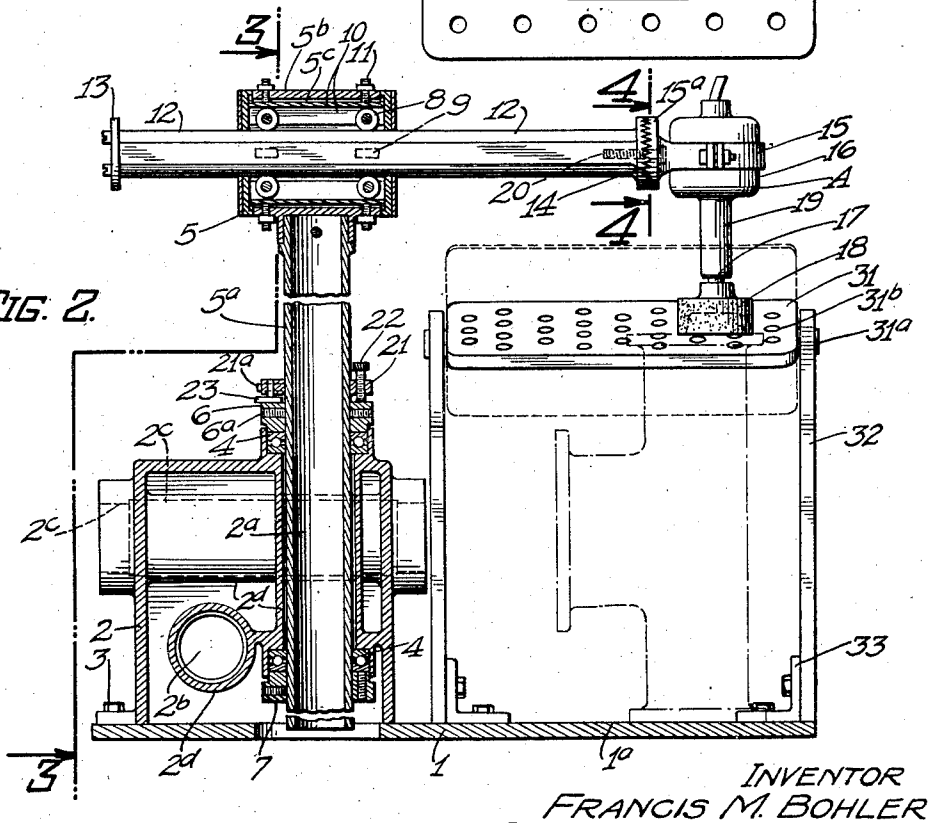


FIG. 2.

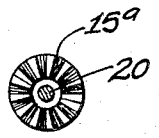
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PORTABLE SURFACE GRINDER

Filed March 1, 1944 4 Sheets-Sheet 2

FIG. 4.



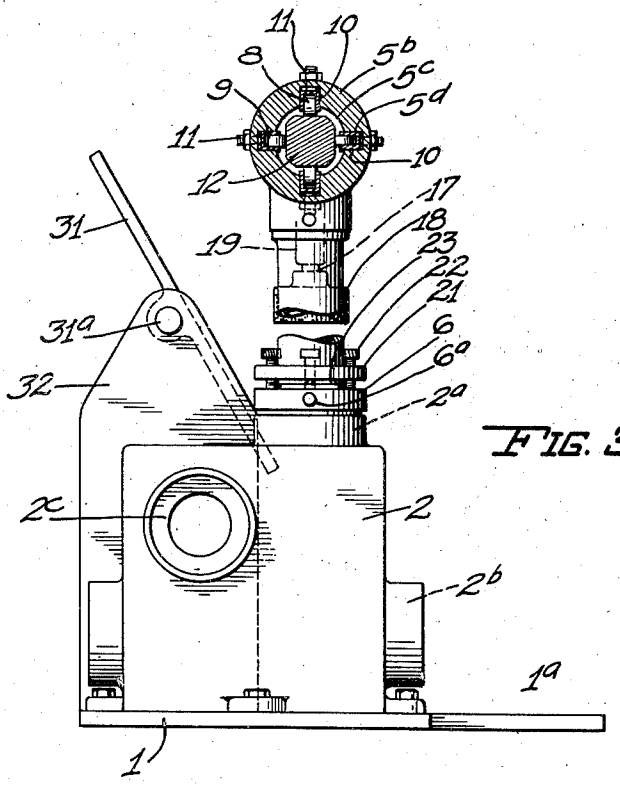


FIG. 3.

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PORTABLE SURFACE GRINDER

Filed March 1, 1944 4 Sheets-Sheet 3

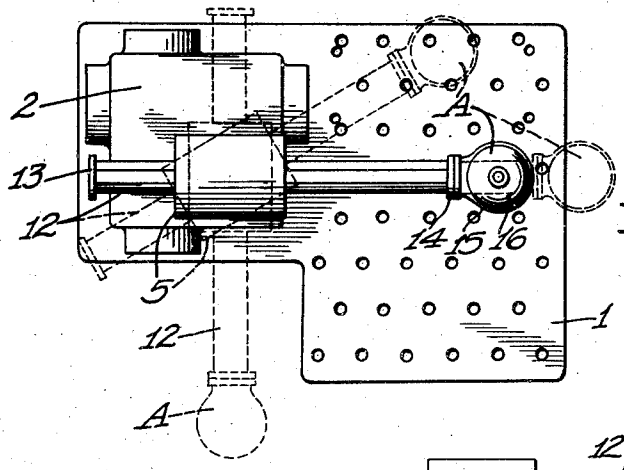


FIG. 5.

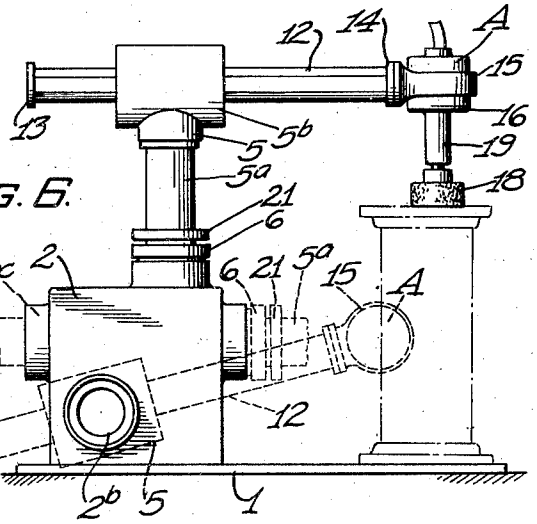


FIG. 6.

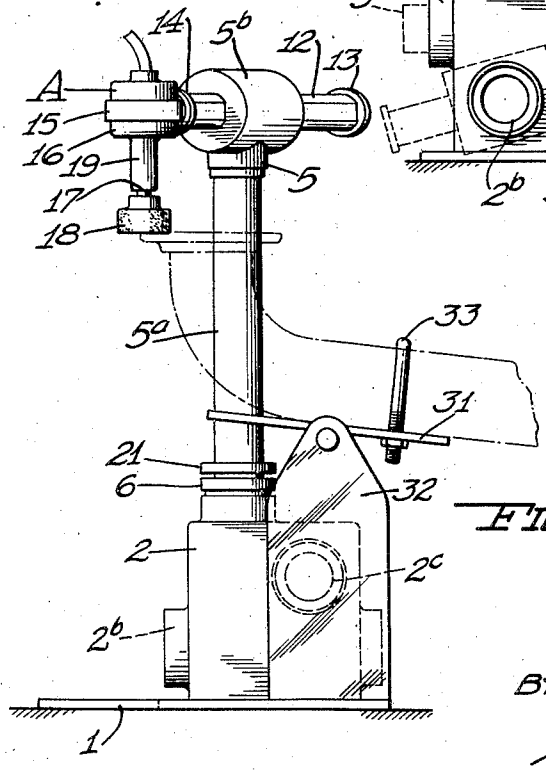


FIG. 7.

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Filed March 1, 1944 4 Sheets-Sheet 4

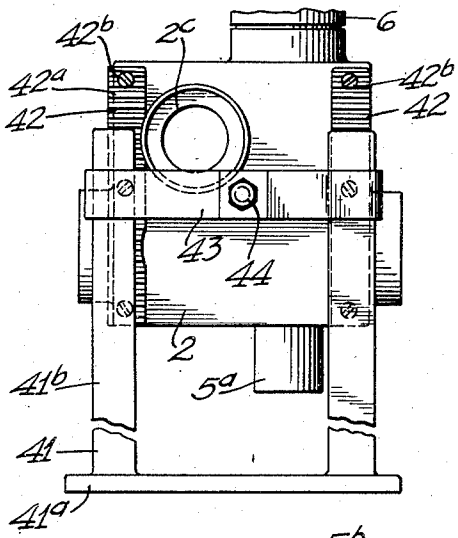
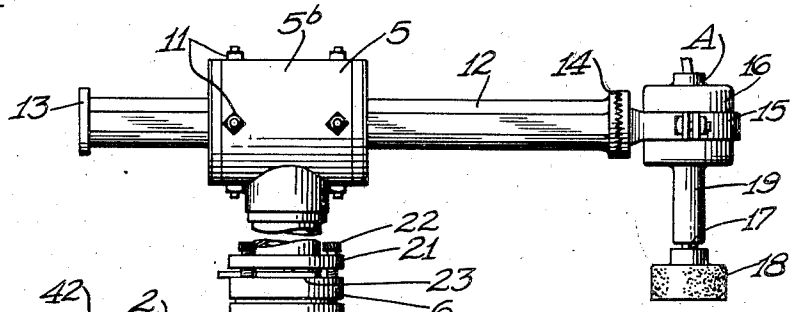


FIG. 8.



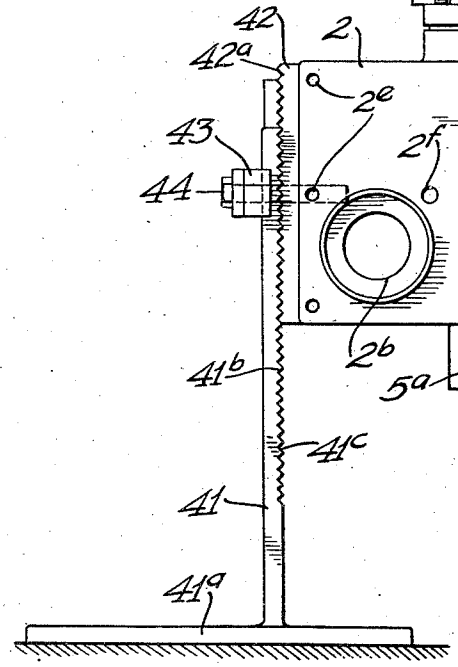


FIG. 9.

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Patented Oct. 15, 1946

2,409,340

UNITED STATES PATENT OFFICE

2,409,340

PORTABLE SURFACE GRINDER

Francis M. Bohler, Long Beach, Calif.

Application March 1, 1944, Serial No. 524,519

7 Claims. (Cl. 51—126)

1

My present invention relates to a portable surface grinder.

One of the principal objects of this invention is to provide a surface grinder which may be readily transported and readily set up for grinding smooth and flat surfaces, or flat surfaces with respect to certain base lines or foundations, for accurately, tightly, or solidly fitting or securing various surfaces together.

An important object also of this invention is to provide a machine of this class on which various objects to be ground or surfaced may be readily secured to or relative to the machine for grinding smooth and flat surfaces thereon.

My machine is particularly designed for grinding flanges on pipe fittings, valves, pumps, engines, and the like, for grinding surfaces or seats for or on foundations, engines, pumps, generators, guns, machinery, instruments, bearings, fluid-tight doors, brackets, chocks, pads, and the like, for grinding bearing or sealing surfaces on valve discs, valve gates, and the like, as well as for other uses.

A further important object of this invention is to provide a machine of this class which has multiple bearing means whereby a grinding machine or element may be mounted to swing on or about various axes located at right angles to each other so that great flexibility may be attained in grinding surfaces located at various angles.

Another important object of this invention is to provide simple and effective means for quickly adjusting the grinder from an initial to a final grinding position by the removal of a shim or shims which determine the difference between the two grinding positions.

A still further important object of this invention is to provide a novel track or way means upon which a grinder carrying bracket, slide, or carriage may operate in various angular positions with respect to the supporting means.

Another object of this invention is to provide a bracket, slide, or carriage for movably carrying a grinder, and in which the grinder may be adjusted in various angular positions with respect thereto.

An important feature of this invention is the provision of an angularly adjustable work supporting table whereby the work to be ground may be supported in various angular positions with respect to the grinder.

Still another important object of this invention is to provide a base having uniformly notched or locating means for variously adjusting and securing a movable grinding head on the base which

2

is adapted to support the grinding head with respect to the work to be ground.

With these and other objects in view, as will appear hereinafter, I have devised a portable surface grinder having certain novel features of construction, combination, and arrangement of parts and portions, as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings, and the characters of reference thereon, which form a part of this application, in which:

Fig. 1 is a plan view of my portable surface grinder in a preferred form;

Fig. 2 is a front elevational view thereof;

Fig. 3 is a fragmentary side elevational view thereof, taken at 3—3 of Fig. 2;

Fig. 4 is a fragmentary sectional view thereof, taken through 4—4 of Fig. 2;

Figs. 5, 6, and 7 are diagrammatic views showing various uses of my portable surface grinder shown in the preceding figures; Fig. 5 is a plan view, showing, by dotted lines, the grinding head shifted to various positions about and with respect to the column or bearing box which supports the grinding head above the base; Fig. 6 is a front elevational view thereof, also showing, fragmentarily and by dotted lines, an upright position of the grinder supporting slide or carriage; Fig. 7 is a side elevational view thereof, showing a pipe supported at an angle on the tumbler table for grinding a flange of a fitting secured to the pipe, the column or bearing box also showing the grinder supporting post in different dotted line positions thereof; and,

Figs. 8 and 9 show, respectively, side elevational views from different sides of a slightly modified form of construction of my portable surface grinder.

My portable surface grinder, as shown best in Figs. 1, 2, and 3, is supported on a base, which consists of a base plate 1, having an elongated work supporting or securing portion 1^a at one side, and a column or bracket 2 at the other side or other end. The portion 1^a of the base plate 1 has holes 1^b, or similar means for securing the work to be ground, or for securing the apparatus to the work or object to be ground. This column or bracket is in the form of a bearing member or bearing box having a plurality of bearing portions 2^a, 2^b, and 2^c, the first having a vertical axis, the second having a horizontal axis parallel to the long side of the work supporting or securing portion 1^a, and the last being arranged on a horizontal axis perpendicular to the long side of

said work supporting or securing portion. This bearing member or box is secured to the base plate, preferably by bolts 3, so that it may be easily removed.

Each bearing portion consists of a bore, formed by a tube 2d, and ball bearings 4 at its opposite ends. In each of the bearing portions may be rotatably mounted the bracket or head 5 which consists of a tube or post 5a having a carriage retainer 5b at one end. The tube may be positioned in any bore and mounted on the ball bearings therein. The post is retained in a fixed position with respect to the ball bearings of the bearing portion, in which it is positioned, by an upper collar 6 and a lower collar 7. The adjustment of the post 5a within the bore or bearing portion will be described hereafter.

Within the carriage retainer is a transverse passage 5c which is perpendicular to the rotating axis of the post 5a. At the upper and lower portions of the carriage retainer are pairs of rollers 8, which are positioned in the same plane. The upper and lower rollers form the upper and lower extremities of the transverse passage 5c for guiding the carriage, to be hereinafter described. At the opposite sides of the passage 5c are other pairs of rollers 9 which form the lateral limits of the passage. The rollers of each pair are mounted in channel members 10 which are positioned in longitudinal slots 5d of the carriage retainer 5b and are adjustable transversely in such slots by means of adjusting screws 11.

In the transverse passage 5c of the carriage retainer is reciprocally mounted the carriage or slide 12. This member may be a tube which is flattened at four sides, providing, together with the rollers 8 and 9, track or way means whereby the carriage or slide may reciprocate freely on the head, or the carriage retainer thereof. The particular cross-section of the slide or carriage permits the latter to be mounted to ride in various right angle positions on the rollers 8 and 9 in the transverse passage 5c of the head.

The lateral movement of the carriage is limited by stop collars 13 and 14, the end of the carriage to which the collar 14 is secured being positioned above the work supporting or securing portion 1a of the base plate.

The collar 14 carries the grinder clamp 15 which is adapted to receive and secure a grinder A. The motor 16 of this grinder may be embraced and clamped by the clamp 15. This grinder has a shaft 17 which is perpendicular to the base 1 and has a facing grinding element 18 at its lower end. The motor has an elongated downwardly extending journal 19 which may serve as a grip for guiding the grinder and causing both the reciprocation thereof in the head and also the rotation of the head about its supporting post.

As shown, particularly in Figs. 2 and 4, the stop collar 14 and the adjacent end 15a of the clamp 15 are provided with interengaging serrated portions whereby the grinder may be positioned at various angles about the axis of movement of the carriage. The portion 15a and the stop collar 14 may be secured by a screw 20, as shown.

In order to grind a surface the desired amount or to the desired limit, a third collar 21, mounted on the post 5a, is raised with respect to the collar 6, positioned immediately below the same, by set screws 22. This allows a shim or shims 23 to be placed in the space between the collars 6 and 21. The collar 21 is then secured to the post 5a by means of screws 21a. An initial or rough-

ing cut or grinding operation is then made on the work to be ground. The set screws 6a of the collar 6 are then loosened, the shim or shims 23 withdrawn, and the post lowered by means of the set screws 22 or otherwise, the distance equal to the thickness of the shims. The set screws 6a are then tightened, and the collar 7 is loosened, raised, and again secured against the underside of the lower ball bearing. A final or finish grind may then be taken on the work to be ground.

Above the base plate 1a, and preferably near one end thereof is provided a tumbler table 31 which has trunnions 31a at its opposite sides, and these trunnions are pivotally mounted at the upper ends of brackets 32 which are secured to and extend upwardly from one end of the work securing portion 1a of the base plate 1. The brackets 32 are preferably secured to the base plate by angle irons, or similar members 33, as shown best in Fig. 2, so that the tumbler plate may be easily removed or secured in position. This tumbler plate has holes 31b for securing the work or objects thereto which are to be ground.

The pipe on which is provided a flange or fitting to be ground is often located at an angle with respect to the pipe. The tumbler plate 31 is adapted to be shifted or pivoted to the inclined position of such pipe, so that the flange or surface to be ground is parallel to the face of the grinding element, as shown best in Fig. 7.

The tumbler plate 31 may similarly support other objects on an angle with respect to the surface grinding plane of the grinding element.

In Figs. 8 and 9, I have shown the bearing member or box 2 removed from the base plate shown in the other views. In this instance I have provided a base 41 having a flat base portion 41a and a pair of upright arms 41b. The arms are provided at one side with horizontal spaced serrations 41c against which are adapted to be positioned correspondingly serrated portions 42a at one side of shoes or pads 42. These shoes or pads may be secured in spaced relation, corresponding to the spacing of the arms 41b, to different sides of the bearing box 2. As shown, the bearing box is provided with a bolt 43 which may extend through a bar 44 extending over the opposite or outer sides of the arms 41b of the base. In this manner, the bearing box may be variously secured to the base.

Though I have shown and described a particular construction, combination, and arrangement of parts and portions, and certain modifications thereof, I do not wish to be limited to the same, but desire to include in the scope of my invention the construction, combination, and arrangement substantially as set forth in the appended claims.

I claim:

1. In a portable surface grinder, a base comprising a base plate having means for securing the work to be ground, said base plate having a column at one end, a head rotatably mounted on the column with one end extending therefrom and outwardly with respect to the base plate, said head being mounted in such a manner as to rotate freely with respect to the column, said head being axially adjustable on the column, a grinder carried by the head for operating on the work secured to the base plate, a shim for locating the head with respect to the column and the base plate, said shim being removable for allowing the head to move inwardly with respect to the column and the base plate for determining limits of grinding operations.

2. In a portable surface grinder, a base, a head rotatably mounted thereon with the head extending from the base, said head being mounted in such a manner as to rotate freely with respect to the base, a grinder carried by the head, means for adjusting the head toward and from the base, said means comprising a shim and an adjusting screw on the head for separating the head with respect to the base to receive the shim, said shim being removable for allowing the head to be moved towards the base, the thickness of the shim positively determining the limits of grinding operations.

3. In a portable surface grinder, a base comprising a base plate having means for securing the work to be ground, said base plate having a column at one end, a tumbler plate pivotally mounted on the base above the base plate at one side of the column and provided with means for securing work to be ground, a head rotatably mounted on the column with one end extending therefrom and outwardly with respect to the base plate, said head being mounted in such a manner as to rotate freely in the column, a slide having one end portion freely reciprocally mounted on said one end of the head, and a grinder carried by the other end of the slide, said grinder having a grinding element capable of moving in a plane parallel to said base and over said tumbler plate.

4. In a machine of the class described, a base, a head on the base, said head having a transverse carriage passage therethrough, pairs of rollers positioned in a plane and in spaced relation at opposite sides of the passage, other pairs of rollers positioned in spaced relation at opposite sides of the passage but in a plane located at right angles to the first plane, a carriage adapted to ride freely between the rollers, and a grinder carried at one end of the carriage.

5. In a machine of the class described, a base, a head on the base, said head having a transverse carriage passage therethrough, pairs of rollers positioned in a plane and in spaced relation at opposite sides of the passage, other pairs of rollers positioned in spaced relation at opposite sides of the passage but in a plane located at right angles to the first plane, a carriage adapted to ride freely at various right angle positions between the rollers, and a grinder carried at one end of the carriage.

6. In a portable surface grinder, a base having a bearing box provided with a plurality of bearings positioned at right angles to each other, a head adapted to be rotatably mounted in each of the bearings for obtaining a movable head, adjustably operable in multiple directions with respect to the base, means for retaining the head in the respective bearing in which it is positioned, and a grinder carried by one end of the head.

7. In a portable surface grinder, a base having a bearing box provided with a plurality of bearings positioned at right angles to each other, a head adapted to be rotatably mounted in each of the bearings for obtaining a movable head, adjustably operable in multiple directions with respect to the base, means for retaining the head in the respective bearing in which it is positioned, a carriage mounted on one end of the head and reciprocable thereon at right angles to its axis of rotation, and a grinder carried by the carriage.

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