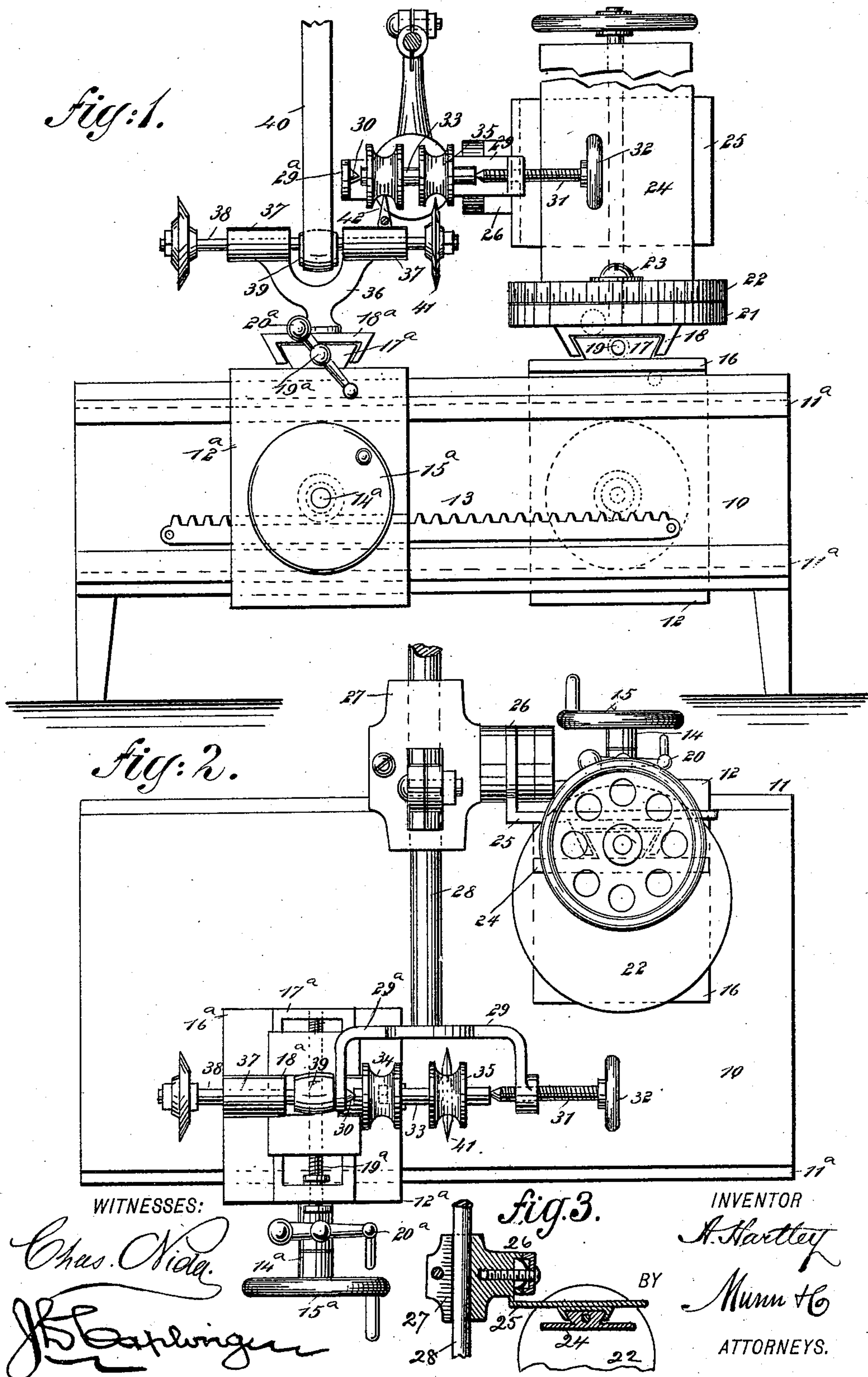


(No Model.)

A. HARTLEY.  
ATTACHMENT FOR GRINDING MACHINES.

No. 548,985.

Patented Oct. 29, 1895.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

AMOS HARTLEY, OF VASSAR, KANSAS, ASSIGNOR OF ONE-HALF TO AUGUST J. SCHAEFER, OF GALION, OHIO.

## ATTACHMENT FOR GRINDING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 548,985, dated October 29, 1895.

Application filed May 28, 1895. Serial No. 550,968. (No model.)

*To all whom it may concern:*

Be it known that I, AMOS HARTLEY, of Vassar, in the county of Osage and State of Kansas, have invented certain new and useful Improvements in Attachments for Grinding-Machines, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in attachments for grinding-machines; and the object of the invention is to provide a work-holding attachment for grinding-machines especially adapted for use in connection with the grinding-machine shown and claimed in my pending application, Serial No. 506,187, filed April 3, 1894.

The invention comprises a work-holding attachment consisting of a U-shaped frame adapted to be supported on the work-holding mandrel of the grinding-machine and provided in the ends of its arms with means for securing therein in axial alignment a form or pattern and an irregular piece of work to be ground—such, for example, as a grooved sheave—the pattern being in position to be engaged by a finger or projection on the tool-post and the piece of work being in position to be engaged by a grinding-wheel on the spindle of said tool-rest.

The invention also contemplates certain novel details of construction and combinations of parts whereby certain important advantages are attained.

The invention will be hereinafter fully set forth, and its novel features carefully defined in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation showing a grinding-machine constructed as set forth in my above-mentioned application with my improved work-holding attachment applied thereto for use. Fig. 2 is a plan view of the machine as shown in Fig. 1; and Fig. 3 is a detail horizontal section, on a reduced scale, through the mandrel-support and the adjustable slide-plate and arm to which said support is secured.

As shown in the drawings, the grinding-machine is provided with a suitable frame or

bed 10, having a flat top and provided at top and bottom on its opposite sides with longitudinal guides 11 and 11<sup>a</sup>, whereon are mounted slides 12 and 12<sup>a</sup>, provided with rotative shafts 14 and 14<sup>a</sup>, having crank-handles 15 15<sup>a</sup> at their outer ends and provided with pinions adapted to engage longitudinal rack-bars 13, secured at opposite sides of the frame or bed 10, whereby it will be seen that when the cranks 15 and 15<sup>a</sup> are turned the slides 12 and 12<sup>a</sup> are caused to move longitudinally on the bed or frame 10 of the machine.

At their upper portions the slides 12 and 12<sup>a</sup> are provided with angular inturned portions 16 16<sup>a</sup>, respectively, extending transversely across the flat top of the bed 10 of the machine, and these portions 16 16<sup>a</sup> are of such a length as to be adapted to pass one another when the slides 12 12<sup>a</sup> are moved longitudinally of the bed 10, as above described, and said inturned portions are provided with recessed ribs having at their opposite sides guides 17 17<sup>a</sup>, extending transversely of the bed 10 and adapted to receive slides 18 and 18<sup>a</sup>, adapted to be moved along said guides 17 17<sup>a</sup> by means of screws 19 19<sup>a</sup>, collared in the portions 16 16<sup>a</sup> of slides 12 12<sup>a</sup> and provided with crank-handles 20 20<sup>a</sup> at their ends.

On the slide 18 is mounted a circular plate 21, and a second similar plate 22 is centrally pivoted on the upper side of said plate 21 by means of a screw or bolt 23, said plates 21 and 22 being provided on their peripheries with gage-marks, so that the upper plate may be turned and held in any desired position relatively to the lower plate 21, and the upper plate 22 carries a vertical post 24, provided with a vertical guide, on which is adjustably mounted a slide-plate 25, provided with an arm 26, extending from one side, whereon is adjustably secured a split arm 27, which serves as a support for the mandrel 28, whereon the work-holding attachment is carried.

The slide 18<sup>a</sup> is provided with bearings 37 at its opposite sides, in which is journaled a shaft or spindle 38, having a central pulley 39, located between the bearings 37 and adapted to receive a belt 40, whereby said shaft 38 may be driven. On the end of the shaft 38 is mounted a grinding-wheel 41, of any preferred



construction, and on the bearing 37, adjacent to said grinding-wheel 41, is fixed an arm 42, projecting a distance therefrom parallel with and equal to one of the radii of said grinding-wheel 41.

The work-holding attachment comprises a yoke mounted on the end of the mandrel 28 and provided with arms 29 and 29<sup>a</sup>, extending in opposite directions and having their end portions bent forward and arranged parallel to each other, the end of the arm 29<sup>a</sup> being provided on its inner face, or that face adjacent to the arm 29, with a conical stud or bearing 30, and the arm 29 is provided with an interiorly-screw-threaded perforation aligned with said stud or bearing 30 and adapted to receive a screw 31, having a handle 32 and provided with a conical end corresponding to and opposite the conical bearing 30 in the arm 29<sup>a</sup>. Between the bearing 30 and the end of screw 31 is clamped a shaft 33, on one end of which is secured a pattern or matrix 34, shaped to correspond to the form of the work when finished, and on the other end of said shaft 33 is carried the piece of work to be ground, (indicated at 35 in the drawings,) this work being usually a rough casting or the like, corresponding generally to the pattern or matrix 34. The pattern 34 and work 35 are, as herein shown, in the form of peripherally-grooved sheaves or rollers; but it will be evident that other forms may be ground by means of the attachment, as herein set forth.

The pattern 34 and work 35 are arranged on the shaft 33 in such a position that when the center of one is in contact with the finger 42 on bearing 37 the center of the other will be in contact with the grinding-wheel 41 on shaft 38, and when the parts have been so positioned the carriage or slide 12 is moved over until the work 35, carried by the work-holding attachment on the end of mandrel 28, is in contact with the grinding-wheel 41, the pattern 34 being then in contact with the finger 42 and the mandrel 28 being adjusted longitudinally in the bearing 27, so that the shaft 33 of the attachment is parallel to and immediately above the shaft 38, carrying the grinding-wheel. The carriage or slide 12 is now moved longitudinally of the bed 10 of the machine, causing the work to move over the grinding-wheel 41, the slide 25 being gradually fed down until the finger 42 comes in contact with the pattern 34, this operation being continued and the shaft 33 of the attachment being rotated until the entire surface of the piece of work 35 has been ground to conform to the matrix or pattern 34.

The attachment constructed as above described is extremely simple and inexpensive, and is especially advantageous for use in grinding irregular forms in connection with a

machine constructed as shown and described in my above-mentioned patent application.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A work holding attachment for grinding machines comprising a mandrel adjustable vertically and longitudinally a yoke carried at one end of said mandrel and provided with arms having parallel end portions, and a shaft removably secured between said arms, and adapted to carry a form or pattern and a piece of work to be ground, substantially as set forth.

2. A work holding attachment for grinding machines comprising an adjustable mandrel support, a mandrel adjustable longitudinally in the said support, a yoke carried at one end of the said mandrel and provided with arms extending in opposite directions and having their ends bent forward parallel to each other, one of said arms being provided with a bearing and the other arm being provided with a clamp screw aligned with the said bearing and a shaft removably held between the said bearing and the end of the clamp screw, substantially as set forth.

3. The combination with a work holding attachment for grinding machines, comprising a mandrel support, a vertically adjustable arm on which said support is adjustably secured, a mandrel adjustable longitudinally in the said support, a yoke secured at one end of said mandrel and provided with arms having parallel end portions and a shaft removably secured between the said arms and adapted to carry a form or pattern and a piece of work to be ground, of a shaft provided with a grinding wheel adapted to engage the piece of work, and an arm or projection adapted to engage the form or pattern, substantially as set forth.

4. The combination with a work holding attachment for grinding machines, comprising an adjustable mandrel, a yoke carried at one end of said mandrel and provided with arms having parallel end portions, and a shaft secured between said arms and adapted to carry on one end a form or pattern and on the other end a piece of work to be ground, of a shaft arranged below the work carrying shaft and provided with a grinding wheel adapted to engage the said work and an arm projecting from the bearing of said shaft a distance equal to one of the radii of the said grinding wheel and adapted to engage the said form or pattern, substantially as set forth.

AMOS HARTLEY.

Witnesses:

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A. E. NEILL.