(No Model.)

F. A. SHOEMAKER.

GRINDING MACHINE.

No. 384,795. Patented June 19, 1888.

Fig. 1.

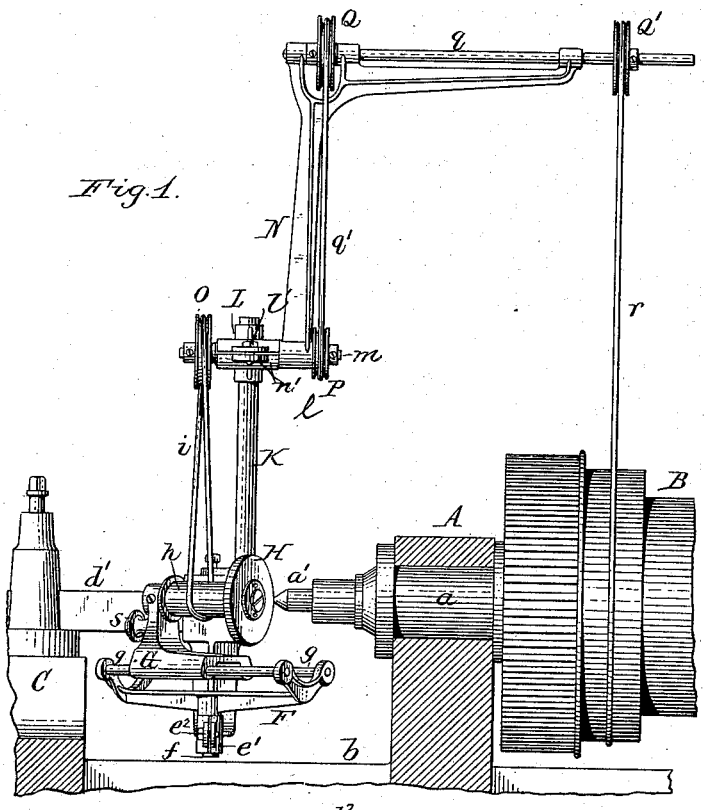

Fig. 2.

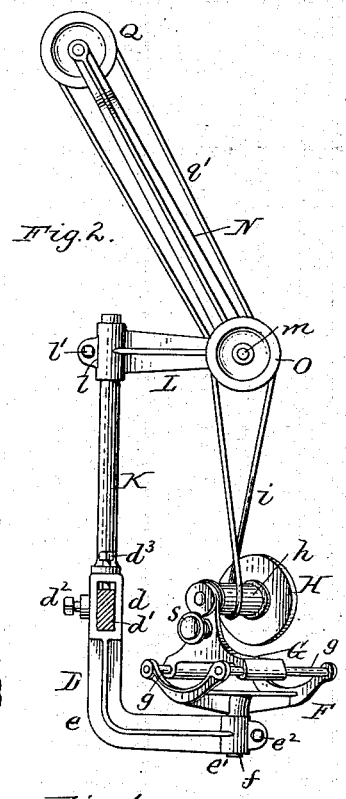

Fig. 3.

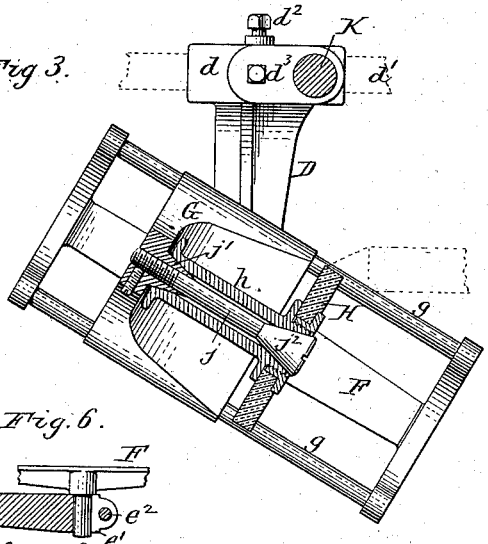

Fig. 4.

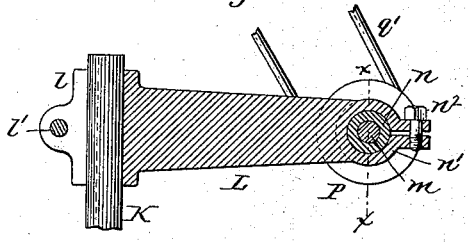

Fig. 5.

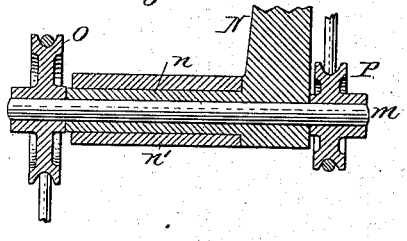

Fig. 6.

Witnesses.
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UNITED STATES PATENT OFFICE.

FRANK A. SHOEMAKER, OF BUFFALO, NEW YORK.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 384,795, dated June 19, 1888.

Application filed November 15, 1886. Serial No. 218,862. (No model.)

To all whom it may concern:

Be it known that I, FRANK A. SHOEMAKER, of the city of Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Grinding-Machines, of which the following is a specification.

This invention relates to a machine for grinding lathe-centers, pins, punches, reamers, and other similar parts which are required to be round and true.

My invention has particular reference to a machine of this kind in which the grinding-wheel is mounted in a frame which can be adjusted to place the grinding-wheel in the proper position for grinding, and in which the grinding-wheel is rotated from a rotary part of the lathe.

The object of my invention is to produce a simple and efficient machine of this kind which can be readily adjusted to the work and to the lathe on which it is used.

My invention consists of the improvements which will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my improved grinding-machine attached to a lathe. Fig. 2 is an end elevation thereof. Fig. 3 is a horizontal section through the spindle of the grinding-wheel. Fig. 4 is a vertical section through the arm which carries the counter-shaft. Fig. 5 is a vertical section in line *x x*, Fig. 4. Fig. 6 is a vertical section of the pivot of the horizontal frame and connecting parts.

Like letters of reference refer to like parts in the several figures.

A is the head-stock of the lathe; *a*, the lathe-spindle; *a'*, the lathe-center formed on the same; B, the cone-pulley at the head of the lathe; *b*, the lathe-bed, and C the slide-rest. All of these parts may be of any ordinary or suitable construction.

D represents the supporting-frame of the grinding-machine, provided with a horizontal socket or sleeve, *d*, by which the frame is secured to a horizontal bar, *d'*, by set-screws d^2 d^3. The bar *d'* is attached to the slide-rest C, and may be the butt-end of a lathe-tool which is clamped in the slide-rest. The lower portion of the frame D consists of an arm, *e*, which extends downwardly and inwardly from the socket *d*, and which is provided at its inner end with a vertical split socket, *e'*, the two parts of which are tightened by a connecting-screw, e^2.

F represents a horizontal frame, which is supported on the arm *e* by means of a vertical pivot, *f*, formed centrally on the under side of the frame F and seated in the socket *e'* of the arm *e*. The frame F is provided with parallel horizontal guide bars or ways *g*, upon which is mounted a sliding frame, G, which carries the grinding-wheel H. The latter is provided with a hollow horizontal spindle, *h*, which forms at the same time a drum, around which runs the endless belt *i*, by which the grinding-wheel is rotated. The hollow spindle *h* turns upon a horizontal arbor, *j*, which is secured to the upper portion of the sliding frame G. The latter is provided adjacent to the arbor with a cone, *j'*, and the arbor itself is provided with a conical head, j^2, upon which cones the spindle *h* revolves by means of conical bearings. The arbor *j* is secured to the frame G by means of a screw-thread, which permits the adjustment of the cones when required to take up wear. While I prefer this construction of the spindle on account of its simplicity and adjustability, any other suitable construction may be adopted.

K represents a post which extends upwardly from the socket *d*, and L represents a horizontal arm, which is attached to the post K by a split sleeve, *l*, so that the arm can be vertically adjusted on the post K upon loosening the screw *l'* of said sleeve.

m represents a horizontal counter-shaft, which is supported in the arm L.

N represents an arm extending upwardly from the arm L, and journaled at its lower end in the arm L by means of a horizontal sleeve, *n*, formed on one side of the arm N, and seated in a horizontal split socket, *n'*, formed on the arm L, and provided with a screw, n^2. The counter-shaft *m* is journaled in the arm N and sleeve *n*, and carries at the outer end of the latter a pulley, O, and at the outer side of the arm N a pulley, P. The endless belt *i* connects the pulley O with the drum *h* of the grinding-wheel.

q represents the horizontal driving-shaft, which is journaled in bearings formed at the upper end of the arm N, and which is provided with two pulleys, Q and Q'. The pulley Q is connected with the pulley P on the counter-shaft by an endless belt, q', and the pulley Q' is connected with the cone-pulley B of the lathe by an endless belt, r. The pulley Q' is adjustably secured to the driving-shaft q, so that it can be adjusted toward and from the arm N, as may be necessary, to place the pulley over the cone B.

The horizontal frame F is adjusted on its pivot f to place the grinding-wheel in the proper position for grinding, and the frame is secured in this position by the screw e^2. Rotary motion is transmitted to the spindle of the grinding-pulley from the cone-pulley of the lathe by means of the connecting belts and pulleys. This means of rotating the grinding-wheel is very reliable and permits the wheel to be rotated much faster than the lathe-center by running the lathe in gear. The grinding-wheel is moved back and forth along the work by taking hold of a knob or handle, s, formed on the sliding frame G, and moving the latter on the ways g. By properly adjusting the slide-rest the frame F can be arranged with its grinding-wheel in front or in rear of the work, as may be most convenient for the operator. This enables the operator to grind objects which are clamped between the centers of the lathe. By swinging the arm N on the sleeve n as a fulcrum the distance between the driving-shaft q and the lathe-cone B can be increased or reduced, as may be necessary, to properly tighten the driving-belt r. This facilitates the adjustment of the grinding-machine to different lathes.

The drawings represent my machine as being used for grinding a lathe-center. When reamers, pins, punches, or other similar parts are required to be ground, they are clamped between the lathe centers.

I claim as my invention—

1. The combination, with the main frame, composed of a socket, d, an arm, e, extending downwardly and inwardly from said socket d and provided at its inner end with a vertical socket, e', and a post, K, extending upwardly from the socket d and carrying a shaft, m, provided with a pulley, O, of a horizontal frame, F, provided with a vertical pivot, f, seated in the socket e', a grinding-wheel, H, provided with a pulley, h, capable of free horizontal movement on the frame F, and an endless belt connecting the pulleys O and h, substantially as set forth.

2. The combination, with the grinding-wheel and its supporting-frame D, provided with a post, K, of an arm, L, attached to said post, an arm, N, pivoted to the arm L, and a driving-shaft, q, journaled in the arm N, whereby the driving-shaft can be adjusted by swinging the arm N on its pivot, substantially as set forth.

3. The combination, with the grinding-wheel and its supporting-frame D, provided with a post, K, of an arm, L, secured to said post, a counter-shaft, m, and an arm, N, journaled concentrically in the arm L, a driving-shaft, q, journaled in the arm N, and pulleys and belts whereby the driving-shaft is connected with the counter-shaft and the latter with the grinding-wheel, substantially as set forth.

4. The combination, with the supporting-frame D, provided with a post, K, of a horizontal frame, F, connected with the frame D by a vertical pivot, a sliding frame, G, mounted on the frame F and carrying a grinding-wheel, H, an arm, L, attached to the post K, a counter-shaft, m, and arm N, journaled in the arm L, and a driving-shaft, q, journaled in the arm N, substantially as set forth.

5. The combination, with the horizontal frame F and the sliding frame G, provided with a cone, j', of a horizontal adjustable arbor, j, secured to said frame and provided with a cone, j^2, and a grinding-wheel, H, provided with a hollow spindle, h, mounted on said cones by conical bearings, substantially as set forth.

Witness my hand this 5th day of November, 1886.

FRANK A. SHOEMAKER.

Witnesses:
CARL F. GEYER,
JNO. J. BONNER.