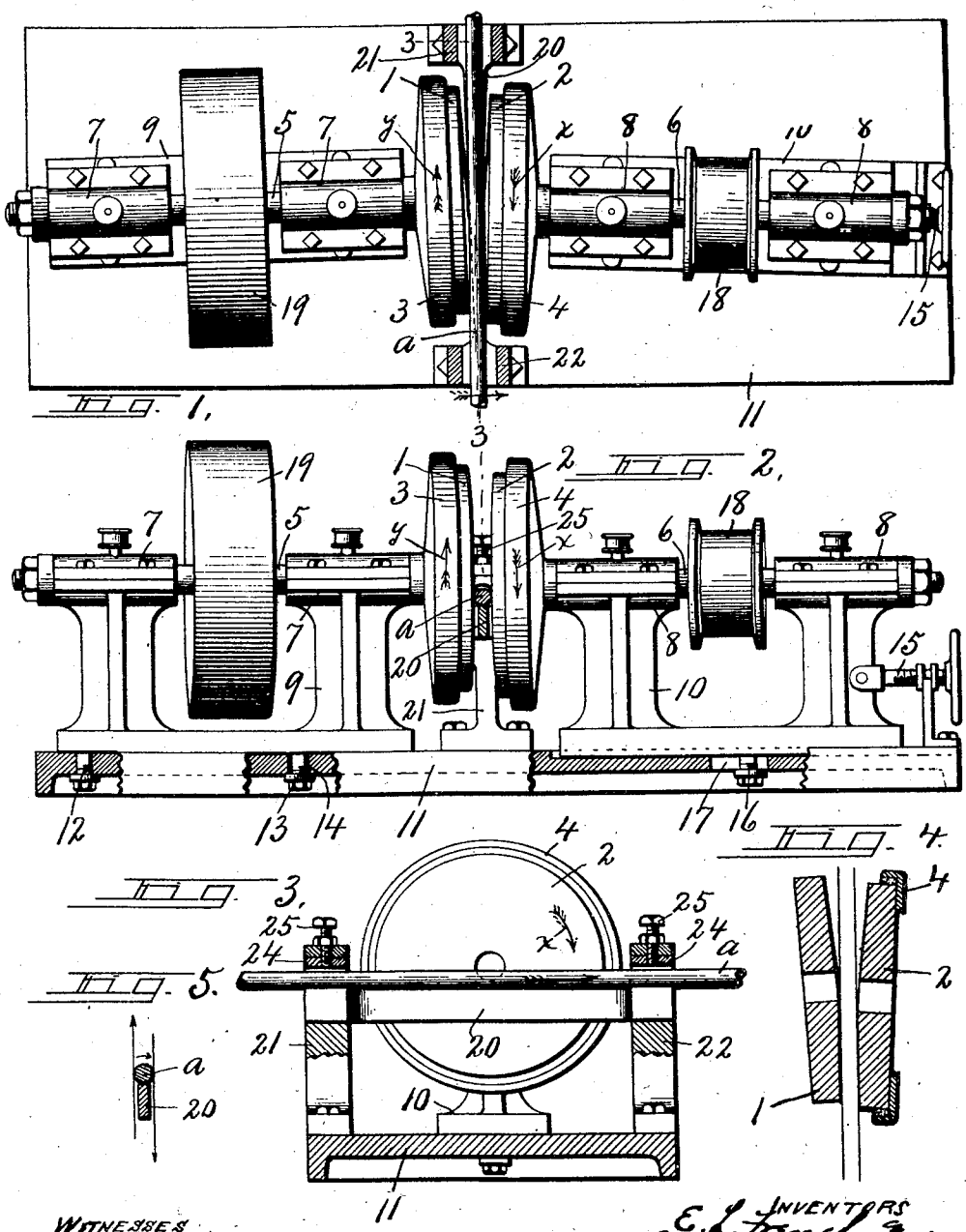
E. L. FRENCH & G. W. STEPHENSON.

GRINDING AND POLISHING MACHINE.

APPLICATION FILED MAY 16, 1911.

1,111,254. Patented Sept. 22, 1914.



WITNESSES

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GRINDING AND POLISHING MACHINE.

1,111,254. Specification of Letters Patent. Patented Sept. 22, 1914.

Application filed May 16, 1911. Serial No. 627,585.

To all whom it may concern:

Be it known that we, EDMUND L. FRENCH and GEORGE W. STEPHENSON, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Grinding and Polishing Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in machines for grinding, sizing and polishing round bars or rods after having been previously rolled or drawn to approximate predetermined diameter.

It is well known that the process of manufacture of round iron or steel bars or rods by rolling or drawing leaves a relatively thin surface or skin of more or less uncertain density or homogeneity and thereby renders the stock unsuitable for many uses without removing this surface. This is usually done by turning in order to produce the desired uniformity of size or diameter but the turning process is not only extremely slow, laborious and expensive but in many instances is found to be impracticable in establishing exact uniformity of size throughout the length of the rod or bar owing to the tendency of the rod or bar to vibrate or spring under pressure of the turning tool.

The object, therefore, of our present invention is to provide simple, practical and efficient means whereby this skin or irregular surface may be quickly and economically removed and the rod or bar brought to an exact predetermined size throughout its length, by means of a rotary grinding or polishing action as distinguished from turning. In other words, we have sought to provide means whereby the grinding or polishing elements perform the double function of rotating and feeding the rod endwise throughout its entire length and also of reducing it to a uniform size or diameter at all points.

Other objects and uses will be brought out in the following description.

In the drawings—Figures 1 and 2 are respectively a top plan and a side elevation of a rod-grinding and sizing machine embodying the various features of our invention. Fig. 3 is a transverse vertical sectional view between the grinding elements taken on line 3—3, Fig. 1. Fig. 4 is a horizontal sectional view through the grinding elements showing more particularly their lines of contact with the rod. Fig. 5 is a transverse sectional view through the rod and its supporting rest showing the lines of contact of the grinding members therewith.

In carrying out the objects stated, we provide a pair of opposed coacting grinding or polishing disks —1— and —2— of emery, carborundum or other suitable abrasive material arranged face to face a distance apart corresponding to the diameter of the rod to be ground or polished and are preferably mounted for rotary movement in or upon separate face plates or circular heads —3— and —4— which in turn are secured to separate rotary shafts —5— and —6—. These shafts are arranged end to end in different horizontal planes at an angle to each other and are journaled in bearings —7— and —8— on separate supporting brackets —9— and —10— which in turn are adjustably mounted upon a supporting bed —11— as best seen in Fig. 2. The bracket —9— with its shaft —5— is adjustable horizontally about the axis of a pivotal bolt —12— to vary the horizontal angle between the meeting faces of the disks —1— and —2— and is adapted to be held in its adjusted position by a clamping bolt —13— which passes through a slot —14— in the bed —11—. The bracket —10— with its shaft —6— is adjustable endwise or horizontally toward and from the disk —1— by means of a screw —15— to vary the intervening opening or space between said disks according to the size or diameter of the rod which it is desired to produce, said bracket being held in its adjusted position by means of a clamping bolt —16— passing through a slot —17— in the base or bed —11—. The shaft —6— is disposed in a horizontal plane slightly below that of the shaft —5— for a purpose hereinafter described and is provided with a pulley —18— adapted to be driven from any available source of power for rotating the grinding or polishing disk —2— at a comparatively high rate of speed, in this instance about fifteen hundred revolutions per minute, in the direction indicated by arrow *x*. The shaft —5— is provided with a relatively large pulley —19— adapted to be driven by a belt or other power

transmitting mechanism from the same or different source of power to drive the disk —1— at a relatively low rate of speed in the opposite direction indicated by arrow —*y*—. These disks —1— and —2— are preferably but not necessarily of the same diameter and are rigidly secured in recesses in the adjacent faces of their respective disks —3— and —4— by any suitable fastening means, as, for example, soft lead or solder.

A guide rest —20— extends in a substantially horizontal plane between the meeting faces of the disks —1 —and —2— just below their centers or axes and is supported at its ends upon front and rear brackets —21— and —22— which are located directly in front and at the rear of the disks, said guide rest serving as a support for a round rod or bar as —*a*— which is to be ground or polished to a predetermined size, the upper surface of the rest being sufficiently low to support the rod —*a*— slightly below the axes of the disks.

The portion of the guide rest —20— between the disks is of less thickness than the intervening space and is disposed centrally therein so as to clear the meeting faces of the disks and at the same time support the rod —*a*— at all points across the diameter of the disks.

Mounted in the upper ends of the bracket —22— above the guide rest —20— are additional guide members —24— which are held in place by set screws —25— and serve to steady the bar in its longitudinal movement through the machine.

The meeting faces of the grinding or polishing disks —1— and —2— are slightly convexed or conical and the disks are adjusted so that the portions of the meeting faces at the rear of their axes are substantially parallel and spaced a distance apart corresponding to the diameter to which the rod or bar —*a*— is to be ground or sized and it therefore follows that the horizontal angle at the intersection of the axes of the shafts —5— and —6— depends upon the degree of convexity or conical angle of the meeting faces of the disks when the rear portions of said meeting faces are parallel in the plane of the rod —*a*— or approximately in the plane of the upper face of the guide rest —20— which is slightly below the center of the disks.

Now by rotating the disks —1— and —2— in opposite directions, one disk as —2— being rotated at a relatively high rate of speed with its rear face traveling downwardly while the rear face of the disk —1— travels upwardly at a relatively low rate of speed, the rod —*a*— resting on the upper face of the bar —20— in contact with the rear parallel portions of the meeting faces of both disks, will be rotated in the direction indicated by arrow —*z*—, Figs. 1 and 3 by reason of the opposed motions of the disks and will also be fed longitudinally or rearwardly by reason of the disposition of the rod slightly below the horizontal planes of the axes of said disks and also by reason of its contact with said disks at the rear of said axes which imparts a spiral feeding action to the rod, thereby grinding the surface of said rod to a uniform diameter throughout its length.

In operation the rod is placed upon the front end of the guide rest —20— and fed rearwardly and substantially diametrically of said disks until the forward end of the rod is engaged by the meeting faces of the disks at the rear of their axes, whereupon the action of the disks upon the rod will automatically rotate and feed the latter rearwardly against and along the upper face of the guide rest —20— until the entire rod has passed out of the machine, whereupon the operation may be repeated with other rods if desired.

As previously stated the size of the rod may be determined by proper adjustment of the disk —2— relatively to the disk —1— through the medium of the adjusting screw —15— which is adapted to be operated by hand, this adjustment also serving to keep the disks in proper grinding and feeding contact with the rod operated upon.

What we claim is:

1. In a machine for grinding and sizing round bars, opposed conical grinding disks having radial portions thereof at the rear of their axes substantially parallel, a guide rest between the disks just below the parallel grinding faces, means for revolving the disks in reverse directions and at different speeds, the rear side of the higher speed disk traveling downwardly, and means for adjusting one of the disks axially toward and from the other disk.

2. In a machine for grinding and sizing round bars, opposed conical grinding disks having radial portions thereof at the rear of their axes substantially parallel, a guide rest between the disks just below the parallel grinding faces, means for revolving the disks in reverse directions and at different speeds, the rear side of the higher speed disk traveling downwardly, and means for adjusting the high speed disk axially.

3. In a machine for grinding and sizing round bars, opposed conical grinding disks having radial portions thereof at the rear of their axes substantially parallel, a guide rest extending continuously from front to rear of and between the disks just below the parallel grinding faces, means for revolving the disks in reverse directions and at different speeds, the rear side of the higher speed disk traveling downwardly, and means for adjusting one of the disks lengthwise of the rest.

4. In a machine for grinding and sizing round bars, opposed conical grinding disks having radial portions thereof at the rear of their axes substantially parallel, a guide rest extending continuously from front to rear of and between the disks just below the parallel grinding faces, means for revolving the disks in reverse directions and at different speeds, the rear side of the higher speed disk traveling downwardly, means for adjusting the high speed disk axially, and separate means for adjusting the low speed disk lengthwise of the rest.

In witness whereof we have hereunto set our hands this 12th day of May 1911.

EDMUND L. FRENCH.
GEO. W. STEPHENSON.

Witnesses:
C. E. O'CONNOR,
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