(No Model.)

W. A. McCOOL.

STRAIGHTENING MACHINE.

No. 388,701. Patented Aug. 28, 1888.

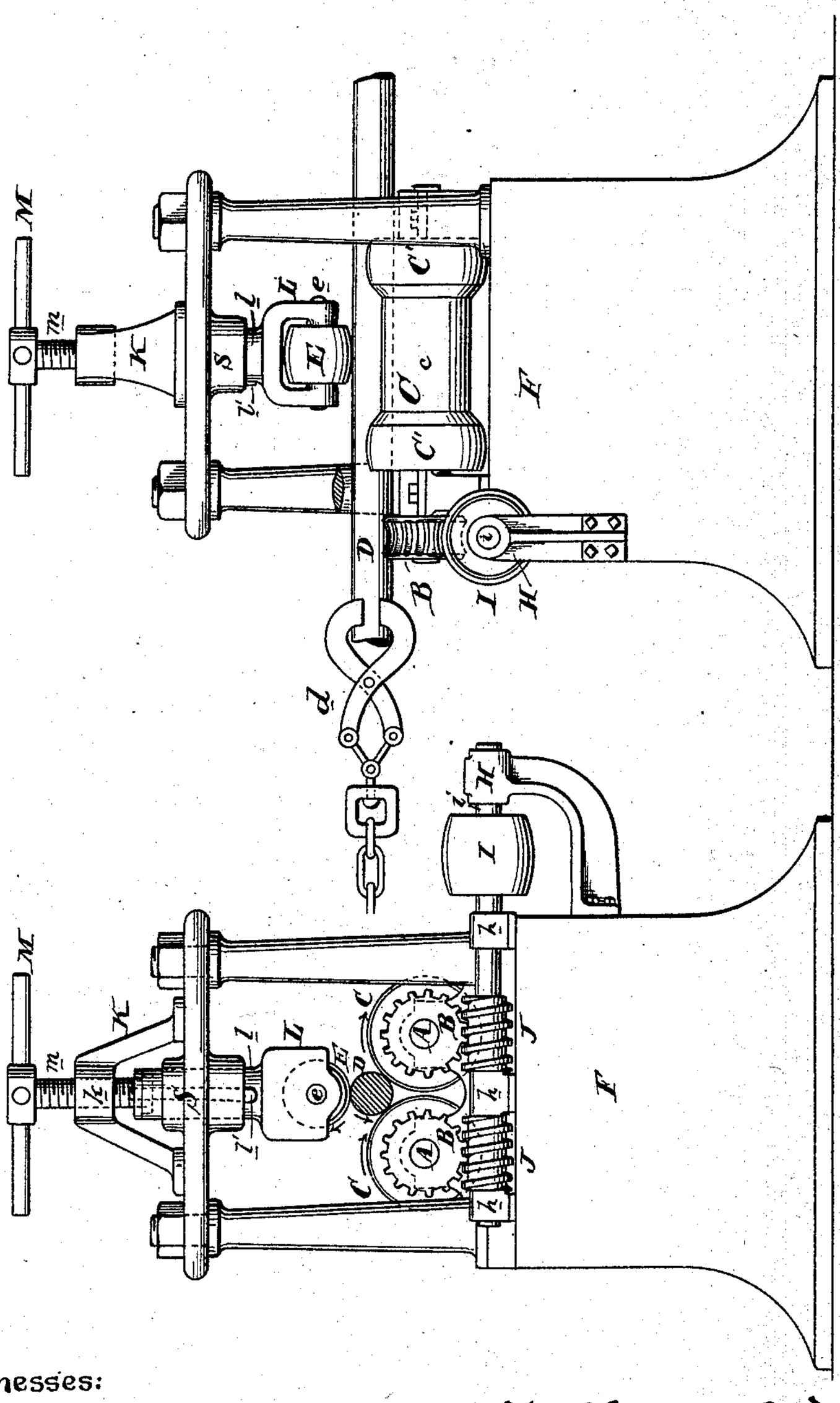

FIG. 2

FIG. 1

Witnesses:
E. S. McDonald,
Frederick H. Davis.

Inventor:
William A. McCool
By John R. Bennett.
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM A. McCOOL, OF BEAVER FALLS, PENNSYLVANIA, ASSIGNOR TO THE HARTMAN STEEL COMPANY, (LIMITED,) OF SAME PLACE.

STRAIGHTENING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 388,701, dated August 28, 1888.

Application filed June 16, 1888. Serial No. 277,298. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. McCOOL, a citizen of the United States, and a resident of Beaver Falls, in the county of Beaver and State of Pennsylvania, have invented a new and Improved Straightening-Machine, of which the following is a specification.

Great difficulty is experienced in the manufacture of rods, shafting, and similar articles of metal by their becoming warped, twisted, or otherwise distorted or bent out of shape, which prevents their being used until subjected to some straightening process.

The object of my invention is to provide a suitable machine or organization of mechanical devices whereby such rods, shaftings, or similar articles of ductile metal may be straightened and rendered permanently straight and true without cutting or injuring its surface; and my invention consists, in general terms, in a straightening-machine composed of two grooved supporting-rollers and a friction-roller which presses upon the rod, shafting, or similar material to be straightened over the space formed by the grooves of said grooved rollers and mechanism for rotating the said grooved rollers.

In carrying out my invention I provide two grooved rollers having supporting-flanges or other suitable and equivalent arrangement of supporting-wheels for supporting the rod, shafting, or similar article at two places along its length, leaving it unsupported between the said wheels or supporting-flanges of said grooved rollers. The rollers or wheels are rotated in the same direction, so as to slowly rotate the rod, shafting, or similar article resting upon them, and while being so rotated the said rod, shafting, or similar article is slowly moved or drawn longitudinally over such supporting rollers or wheels. Simultaneously with this treatment of the rod, shafting, or similar article a pressure is brought to bear upon it through the mediation of a pressure-roller acting in a direction toward the grooved supporting rollers or wheels, so as to bend or tend to bend the rod, shafting, or similar article down or toward a point intermediate between its points of support on the rollers or wheels. The combined pressure of said roller with the rotary and longitudinal movement of the rod, shafting, or similar article being acted upon straightens or renders it true. The operation is continuous and regular and does not abrade or otherwise injure the rod or shafting.

It is evident that any article capable of being rotated and fed longitudinally in this manner can be treated in this machine, and it is also evident that in place of feeding the rod or shafting longitudinally, the supporting-rollers and pressure or straightening roller may be made to move longitudinally over the rod or shafting. A relative movement is all that is required.

In the drawings, Figure 1 is an end elevation of a rod or shaft straightening machine embodying my invention, and Fig. 2 is a side elevation of same.

The main frame of the machine may be made as desired, and as shown, is lettered F, and constitutes a pedestal adapted to rest upon the ground or floor. Supported thereon by suitable journals are two parallel rollers, C C, having the raised parts or flanges C′ and the depressed or grooved parts *c*. This presents four supporting points or parts for the rod or shafting D, while that portion of which that comes over the grooved or recessed parts *c* of the rollers is unsupported.

In place of making the two rollers, as shown, with the grooves *c*, it is clear that four wheels corresponding to the parts C′, secured in pairs to two shafts, A, may be used.

The shafts A, which support the rollers or wheels, are provided with worm-wheels B, and with these worm-wheels, worms J on a shaft *i* mesh for the purpose of rotating the rollers or wheels all in the same direction, as indicated by arrows. The shaft *i* of the worms is provided with a band-wheel, I, and is supported in suitable bearings, H *h*. Any suitable means may be employed to give motion to the shaft *i*; or, in fact, any well-known mechanical equivalent—such as spur-gearing—may be employed to make the rollers C C rotate in the same direction in place of the worm and worm-wheels shown.

D is the rod or shaft being treated, and is pressed down upon the supporting rollers or wheels by the pressure or straightening roller E, which is of less width than the distance between the flanges C′ of one of the rollers C,

and preferably somewhat convex on its periphery, as shown in Fig. 2. This convexity is also desirable on the flanges or wheels C′ to prevent injury to the rod or shaft and facilitate its longitudinal movement. This pressure or straightening roller E is carried in a frame or head, L, having a vertical guide-stem, *l*, working through a bearing, S, secured to the main frame F of the machine, and which head is prevented from turning by means of the feather *l′*, or other equivalent device.

K is an extended portion of the main frame, and has a threaded portion, *k*, for receiving a powerful screw, *m*, having an operating-handle, M, for causing rotation when it is desired to feed the screw up or down. The lower end of the screw *m* acts upon the stem *l* of the head L, carrying the roller E, and by means of this screw the roller E may be adjusted to produce a greater or less action upon the rotating rod or shaft D. This rod or shaft D is drawn along between the rollers by any suitable means—for instance, the vise and traction-chain *d* shown.

The straightening is caused by the readjustment of the particles of metal due to the shifting of their positions, and this takes place without injuring their cohesive or tensile strength.

It is evident that, while I have shown a preferred construction, the details may be modified without departing from my invention.

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

1. The combination of rotary supports for a shaft, rod, &c., to be straightened, arranged at a distance apart, with a pressure-roller arranged to act upon the rod or shaft at a point between its rotary support and on the opposite side, and adjusting devices to adjust the rotary supports and pressure-roller to or from each other.

2. The combination of two rotary supports for a shaft, rod, &c., to be straightened, arranged at a distance apart, with a pressure-roller arranged to act upon the rod or shaft at a point between its rotary support and on the opposite side, and adjusting devices to adjust the rotary supports and pressure-roller to or from each other, and means to rotate said rotary supports with a uniform speed.

3. The combination of two grooved supporting-rollers having supporting parts arranged at a distance apart and upon which the rod or shaft to be straightened rests, mechanism to rotate said grooved rollers, and a pressure-roller arranged above said grooved rollers and adapted to press upon the rod or shaft in a direction corresponding to the grooved portions of said supporting-rollers.

4. The combination of two grooved supporting-rollers having supporting parts arranged at a distance apart and upon which the rod or shaft to be straightened rests, mechanism to rotate said grooved rollers, and a pressure-roller arranged above said grooved rollers and adapted to press upon the rod or shaft in a direction corresponding to the grooved portions of said supporting-rollers, and means for adjusting said pressure-roller to or from the grooved rollers.

5. The combination of two grooved supporting-rollers having supporting parts arranged at a distance apart and upon which the rod or shaft to be straightened rests, mechanism to rotate said grooved rollers, and a pressure-roller arranged above said grooved rollers and adapted to press upon the rod or shaft in a direction corresponding to the grooved portions of said supporting-rollers, and means for adjusting said pressure-roller to or from the grooved rollers, and means for pulling the rod or shaft longitudinally between the rollers.

6. In a machine for straightening rods, shafts, &c., the combination of supports for the rod, shaft, &c., arranged at a distance apart and adapted to support the rod, shafts, &c., at different places along its length, means to rotate the rod, shaft, &c., and a pressure-roller bearing upon the rod, shaft, &c., at a point in its length intermediate to the supports therefor.

7. In a machine for straightening rods, shafts, &c., the combination of supports for the rod, shaft, &c., arranged at a distance apart and adapted to support the rod, shafts, &c., at different places along its length, means to rotate the rod, shaft, &c., a pressure-roller bearing upon the rod, shaft, &c., at a point in its length intermediate to the supports therefor, an adjustable head for said roller, movable to or from said supports, and a screw-feed for said head to adjust it with reference to the supporting of the rods, shaft, &c., being acted upon.

8. In a machine for straightening rods, shafts, &c., the combination of a main frame, two parallel grooved supporting-rollers adapted to support the rod, shaft, &c., at two places along its length, gearing connecting said rollers to make them rotate in the same direction, power mechanism to rotate said rollers, a pressure-roller arranged above said supporting-rollers and above the grooved portions thereof, and adjusting devices to adjust the pressure-roller to or from the supporting-rollers.

9. A straightening-machine which consists of two grooved rollers and a friction-roller which bears upon the shaft or other material to be straightened over the space formed by the groove of said grooved rollers, and mechanism for rotating said grooved rollers.

WILLIAM A. McCOOL.

Witnesses:
GEO. H. SONNEBORN,
E. S. McDONALD.