

(No Model.)

4 Sheets—Sheet 1.

P. MEDART.

MACHINE FOR STRAIGHTENING METAL BARS OR PIPES.

No. 352,705.

Patented Nov. 16, 1886.

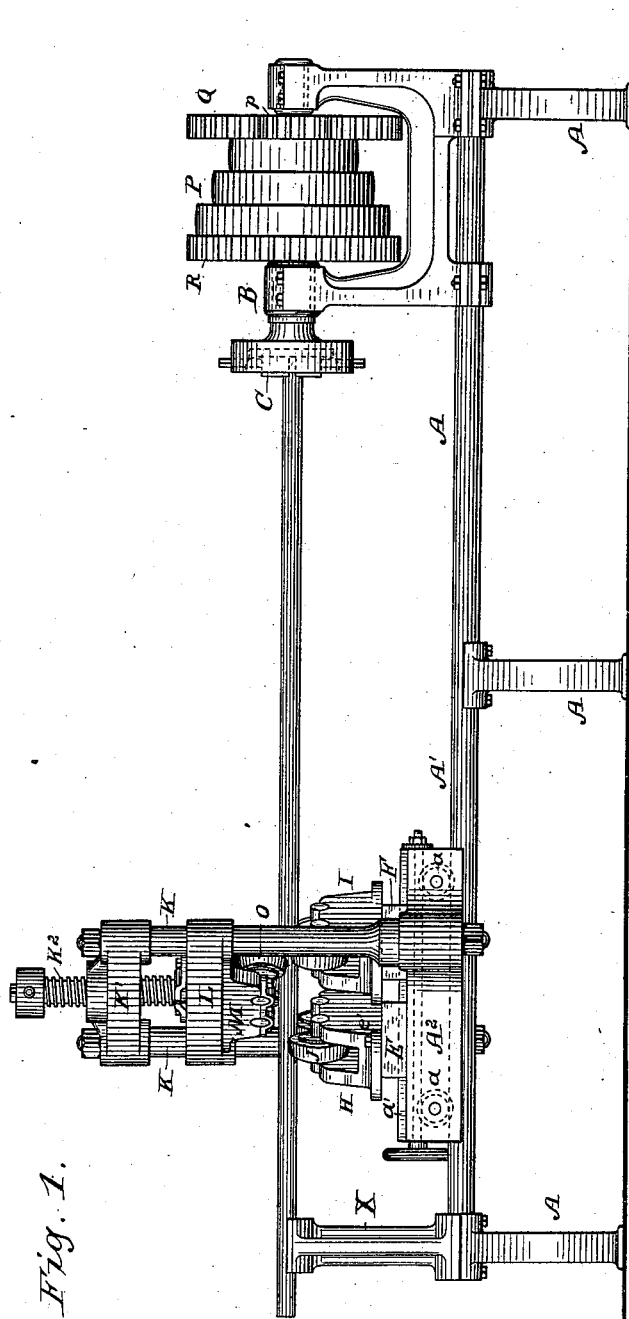


Fig. 1.

WITNESSES

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(No Model.)

4 Sheets—Sheet 2.

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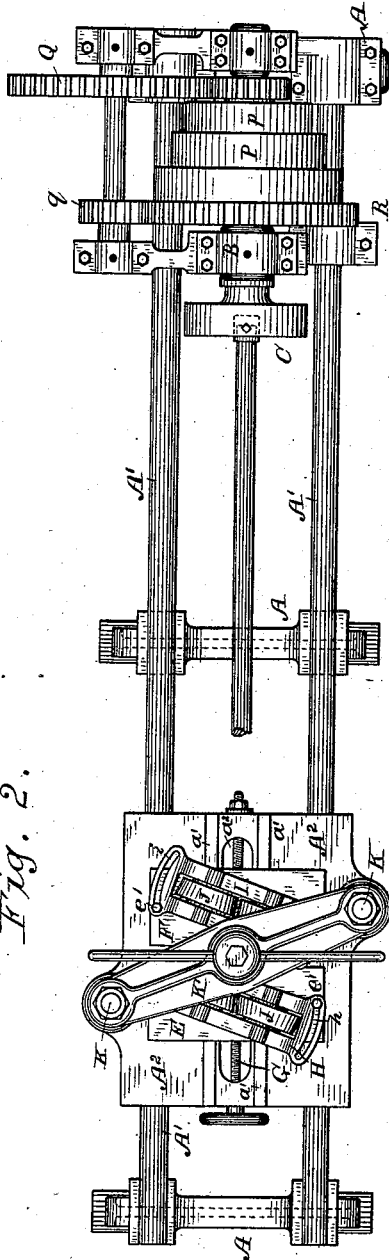


Fig. 2.

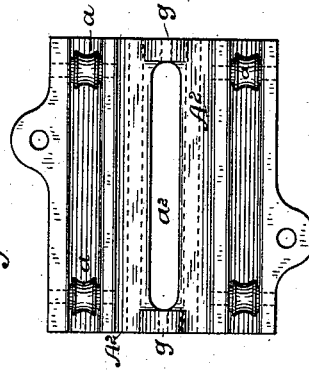


Fig. 5.

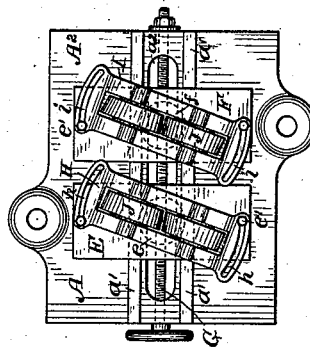


Fig. 4.

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Fig. 6.

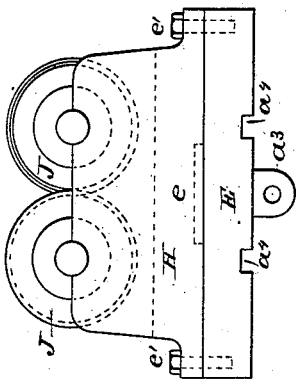


Fig. 7.

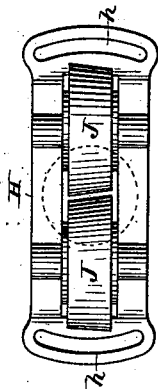


Fig. 8.

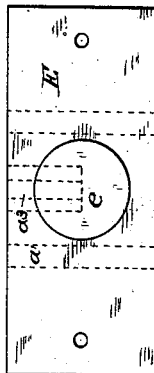


Fig. 9.

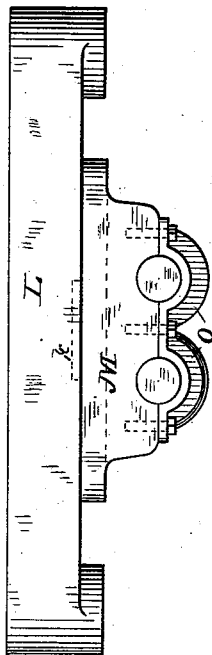


Fig. 10.

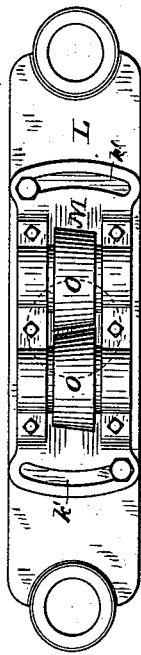
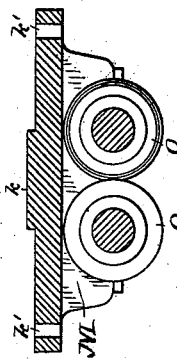


Fig. 11.



WITNESSES

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# UNITED STATES PATENT OFFICE.

PHILIP MEDART, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO  
WILLIAM MEDART, OF SAME PLACE.

## MACHINE FOR STRAIGHTENING METAL BARS OR PIPES.

SPECIFICATION forming part of Letters Patent No. 352,705, dated November 16, 1886.

Application filed January 13, 1886. Serial No. 188,418. (No model.)

*To all whom it may concern:*

Be it known that I, PHILIP MEDART, of St. Louis, State of Missouri, have invented an Improved Machine for Straightening Metal Bars or Pipes, of which the following is a specification.

Various machines have heretofore been devised and patented for this purpose. They may, for the purposes of this specification, be divided into two general classes: (a) those in which a carriage having straightening devices is driven by a direct power-connection, and is caused to reciprocate or travel longitudinally with reference to the bar upon which it acts. (b) those in which straightening-rollers or a frame having rollers is driven by a direct power-connection, and caused to rotate in a fixed relation to the main frame and act upon a bar which is caused to move endwise with reference to the rotating straightening devices.

I am also aware that, broadly, it has been proposed to secure the bar or tube to be straightened in a rotating chuck and revolve it positively and independently with reference to the straightening devices.

I am also aware that the straightening-rollers have been placed obliquely with reference to the shaft being acted on, so that the shaft is by the rotation of the rollers drawn through the machine and its entire length operated upon.

To effect the automatic straightening of bars or shafting it is necessary that either the straightening devices must be moved longitudinally to operate on the entire length of the shaft, or the shaft must be moved endwise to present all its parts to the action of the straightening devices. Heretofore the longitudinal movement of the straightening devices has been caused by the direct application of power to the traveling frame through suitable belting or gearing, while the endwise movement of the shafting has been caused by the draft of the straightening-rollers.

My improved mode of operation, broadly stated, consists in causing an endwise variation of the relation of the straightening devices and shafting by means of the rotation of the positively-rotated shaft being acted upon, whereby all parts of the shaft may be acted upon by the straightening devices and the

shaft straightened through its entire length. This mode of operation, so far as I am aware, is novel with me. I state the matter in this way, because various practical embodiments of the idea may doubtless be devised without departing from the spirit of my invention.

In my improved organization, which I will now describe, the shafting is positively rotated in a fixed relation to the main frame, and the straightening devices are caused to travel along the shaft to straighten it by the draft created by the rotation of the shaft between the rollers of the straightening devices. This construction is practical and efficient, as has been fully demonstrated by a continual practical use. It permits of a very desirable simplicity and cheapness and lightness of construction.

Other points besides the broad ground above mentioned are involved in my invention, and they will now be fully set forth.

In the accompanying drawings, Figure 1 is a side elevation; Fig. 2, a plan view; Fig. 3, a front end elevation; Fig. 4, a plan view of the lower straightening-roller housing detached; Fig. 5, a bottom view of the same; and Figs. 6, 7, and 8 are detached views of the same, the points of view of which will be plain. Figs. 9, 10, and 11 are detached views showing the upper roller-housing and its carrying frame or plate. Fig. 12 is an elevation of the rear or gearing end of the machine, and Fig. 13 is a view of a support for the shafting.

The main frame shown consists of three or more supports, A, connected by bars A', preferably cylindrical, arranged in the same horizontal plane, parallel, and a suitable distance apart, so as to form ways or tracks for the traveling straightening-carriage A<sup>2</sup>, which is provided with carrying-rollers a, which run on said bars. At the gearing end of the machine is an ordinary geared lathe-head, B, which carries an ordinary rotating chuck, C. The special construction shown is described below in detail. It is sufficient at present to say the chuck C is positively rotated with sufficient power and speed by such gearing, or such other means as may be provided. The bar or shafting D is held in the chuck in well-known ways, and positively rotated thereby.

The traveling straightening-carriage A<sup>2</sup> is formed with parallel ways a' a' on its upper

face, and with a longitudinal slot,  $a^2$ , between said ways. Two movable adjustable plates, E F, are located on the carriage  $A^2$ , being formed with parallel grooves  $a^1$ , into which the ways  
 5  $a^1$  fit, and with depending lugs  $a^3$  on their under faces, which project through the slot  $a^2$  in the carriage. An adjusting-rod, G, is swiveled at each end in suitable lugs,  $g$ , on the carriage  $A^2$ , and is provided with reverse  
 10 screw-threads, which work in threaded sockets in the lugs  $a^3$  on the plates E F. By operating the screw-rod G the plates E F may therefore be approached toward or separated from each other. Each plate E F is formed  
 15 with a circular lug or projection,  $e f$ , on its upper face, which fits in a corresponding socket in the under face of the roller-housings H I, which rest loosely on the plates, as will appear from Fig. 8 and the dotted lines in  
 20 Figs. 6 and 7. The roller-housings H I are formed at each end with slots  $h i$ , curved on the arc of a circle described from the centers of the circular lugs or projections  $e f$ .

The roller-housings may swivel or turn horizontally on the plates E F, their movement in either direction being limited by the clamp-bolts  $e'$  on the plates, which pass through the curved slots in the housings, and by means of which the housings may be secured in any desired position.  
 30

The housings are arranged transversely and obliquely with reference to the shaft or bar, and carry each straightening devices or a pair of straightening and draft rolls, J, which may  
 35 be formed with beveled peripheries, as clearly shown in the drawings, the rollers of each pair being beveled in opposite directions. Rollers having any other shaped periphery may, however, be employed. As will be clearly seen  
 40 from Fig. 1, the shafting rests between the rollers of each pair.

The carriage  $A^2$  carries two uprights or standards, K, which are united at the top by a suitable cross-piece,  $K'$ , having a threaded  
 45 socket, through which a vertically-acting screw,  $K^2$ , provided with a suitable cross-handle or wheel, works. The lower end of the screw swivels in the top of a plate, L, through which the uprights loosely pass. The under side of  
 50 this plate is formed with a socket, in which a circular hub or projection,  $k$ , formed on the upper face of the housing M loosely fits. The ends of the housing are provided with curved slots  $k'$ , in which clamp-bolts secured to the  
 55 plate L work. This housing also carries a pair of rollers, O, which are shown as beveled in reverse directions in the same manner as the lower rolls. The upper housing, with its pair of rolls, is arranged transversely and obliquely with reference to the shaft, and also  
 60 with reference to the lower pairs of rolls, as clearly seen in Figs. 1 and 2, and occupies a position between the pairs of lower rolls, so that the shaft may be acted upon at three  
 65 separate points. The upper and lower housings, when adjusted to the most favorable position, can be secured in place by means of the

clamp-bolts which work in the curved slots in the ends of the housings, as before mentioned. At the points where the rolls bear  
 70 on the shaft there are no back braces or anvils opposite the rolls, against which the shaft would be pressed by the rolls, and I deem this an advantage. The proper pressure is applied to the shafting by operating the screw  $K^2$ ,  
 75 which carries the upper housing.

The operation of the apparatus which has been described is as follows: The straightening-carriage is moved away from the chuck, and the bar or shaft is placed in position in  
 80 the chuck, with its outer end resting upon the first pair of lower rollers. The carriage is then pushed forward slightly until the extreme end of the bar rests between the outer or left-hand pair of rollers, as viewed in Fig. 85  
 1. The upper rollers are then screwed down upon the shaft with the desired pressure. The power being now applied through the gearing, as will be presently described, the chuck is positively rotated and the shaft commences  
 90 to turn between the straightening and draft rolls. The draft of the carriage, due to this rotation and to the oblique position of the straightening-rolls, will cause the carriage to move forward along the shaft until it reaches  
 95 the chuck. During this motion all the parts of the shaft will be thoroughly acted upon by the three sets of rolls and perfectly straightened.

By reversing the direction of application of  
 100 power to the gearing the shaft can be rotated in an opposite direction, and the carriage will then be caused to move away from the chuck and again act upon the bar to straighten it, if desired. Any number of traverses of the car-  
 105 riage may be accomplished in this way; but practically one or two, at the most, are usually sufficient.

In operating upon heavy stuff it is desirable to have the space between the lower pairs  
 110 of rolls greater than when the shafting is light. I therefore provide that the rollers shall be adjustable, and this adjustment may be accomplished by the organization which has been described, which is practical and efficient for  
 115 the purpose. So far as I am aware I am the first to provide such an adjustment.

It is sometimes desirable that the end of the shaft, as the carriage moves toward the chuck, should be supported. This may readily be ac-  
 120 complished by a removable support, X, such as shown in Fig. 13. These supports are constructed, as plainly shown in the drawings, with elongated feet, which rest upon the rails, and a depression in the top, in which the shaft-  
 125 ing turns. Several of them may be used, if desired; or any other suitable means for this purpose may be employed.

In order to adapt the machine to act upon shafting or bars of various thicknesses, I mount  
 130 the lower rollers in their housings so that they may be readily removed, as clearly shown in Fig. 1. When a shafting of large diameter is to be operated upon, rollers of smaller size may

be employed, and when small shafting is to be straightened larger rolls may be substituted. No change will be necessary in the upper rolls. This construction is perhaps the most simple and desirable that can be devised; but of course any other organization by which the rolls and chuck may be maintained in such proper relation as to keep the shaft perfectly horizontal may be employed.

The arrangement of gearing for driving the chuck is common, as before remarked, and a very brief description only will be necessary.

The belt-pulleys P are loose on the chuck-spindle, but fast to the pinion p, which meshes with a gear-wheel, Q, on a counter-shaft, which counter-shaft carries at its opposite end a pinion, q, which meshes with the driving-gear R of the chuck-spindle. When the pulley P is driven by a belt, the power is conveyed to the chuck through the gearing just described, thus imparting a considerable power to the rotation of the chuck. In working with light material, however, the chuck may be driven direct by the belt, in which event a greater speed will be obtained.

Having now described a practical, efficient, and desirable form in which my invention may be embodied, I claim as my invention—

1. The combination of the draft and straightening rolls with the chuck which carries and rotates the bar or shaft in contact with said rolls, the endwise relation of the straightening-rolls and shaft being varied by the draft created by the contact of the shaft with the rolls, whereby all parts of the shaft are presented to the straightening-rolls and the shaft straightened throughout its entire length.

2. The combination of the longitudinally-traveling draft and straightening rolls and the chuck which carries and rotates the bar or shaft in contact with said rolls, the relation of the straightening and draft rolls relatively to the shaft being varied by the draft created by the rotation of the shaft in contact with the rolls, whereby the shaft is straightened throughout its length.

3. The combination of the longitudinally-traveling idly-rotating straightening and draft rolls and the chuck which carries and rotates the shaft in contact with the straightening and draft rolls, whereby the draft and straightening rolls are caused to travel longitudinally along the shaft and straighten it.

4. The combination of a positively-rotated chuck which supports and rotates the shaft to be operated upon, straightening-rolls in contact with which said shaft is positively rotated, and means for causing the straightening-rolls to act on the shaft from end to end.

5. The combination of the main frame, the longitudinally freely-traveling straightener-carriage, draft and straightening rolls carried thereby, and the chuck for carrying and rotating the shafting arranged in a fixed relation to the main frame.

6. The combination of the main frame, the straightener-frame free to move longitudinally

on the main frame, draft and straightening rolls carried by the straightening-frame and free to rotate in either direction, and the chuck for supporting and rotating the shafting, substantially as set forth.

7. The combination of the lower straightening devices and mechanism for adjusting them toward or from each other, for the purpose set forth.

8. The combination of the lower pairs of straightening and draft rolls, arranged obliquely with reference to the shaft to be operated upon, and the upper pair of rolls arranged between and transversely to the lower pairs of rolls, the arrangement being such that the shafting is acted upon at three points, and is not provided with back braces or anvils at such points.

9. The combination of the frame, the straightener-carriage traveling thereon, straightening and draft rolls on the carriage, and adjusting devices for varying their obliquity or angle with reference to the shafting to be operated upon.

10. The combination of the lower pairs of straightening and draft rolls arranged obliquely with reference to the shafting acted upon, the upper pair of straightening-rolls arranged between the lower pairs of rolls and transversely thereto, and mechanism for pressing the upper rolls down upon the shafting.

11. The combination of the straightener-frame, the plates sliding on ways thereon, the roller-housings carried by said plates, the screw for adjusting the position of the plates and roller-housings, and the screw-sockets in which said screw works.

12. The combination of the frame, the plates sliding on ways thereon, mechanism for adjusting the plates toward and from each other, roller-housings adjustably carried upon said plates, and devices for securing the roller-housings in any desired position.

13. The combination of the straightener-frame provided with ways and formed with a longitudinal slot between the ways, the plates which travel on said ways, the depending threaded lugs on the plates projecting downwardly through the central slot, the reversely-threaded adjusting-screw which works in said lugs, and roller-housings carried by the plates.

14. The combination of straightening and draft rolls, their housing, its supporting-plate, the hub and socket or swiveling connection between the housing and plate, and the clamp-bolt.

15. The combination of the straightener-frame, the lower rollers or straightening devices carried thereby, the uprights or standards, also carried thereby, the upper-housing carrying-plate, through which said standards loosely pass, the housing and its straightening devices or rolls carried thereby, the socketed cross-piece which connects the standards, and the screw K<sup>2</sup>.

16. In a machine for straightening metal bars, the combination of the main frame, the shaft-supporting device arranged in a fixed

horizontal relation to the frame, the lower housing or housings, and straightening-rolls loosely and removably seated in bearings in said housing, whereby rolls of different sizes may readily be put in place to act on different-sized shafting.

17. The combination of a main frame, a rotating chuck, the driving gearing or devices, by which the chuck may be driven in either direction, and straightening and draft rolls free to rotate in either direction, arranged obliquely to the shafting carried and rotated by

said chuck, said straightening and draft rolls being rotated by contact with the shafting with which they act, whereby the relation of the rolls and chuck is varied by the draft of the rolls and the shaft straightened throughout its length.

In testimony whereof I have hereunto subscribed my name.

PHILIP MEDART.

Witnesses:

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E. C. DAVIDSON.