(No Model.) 4 Sheets—Sheet 1.

P. MEDART.

MACHINE FOR GRINDING PULLEY SHAFTS AND THEIR COUPLINGS.

No. 492,095. Patented Feb. 21, 1893.

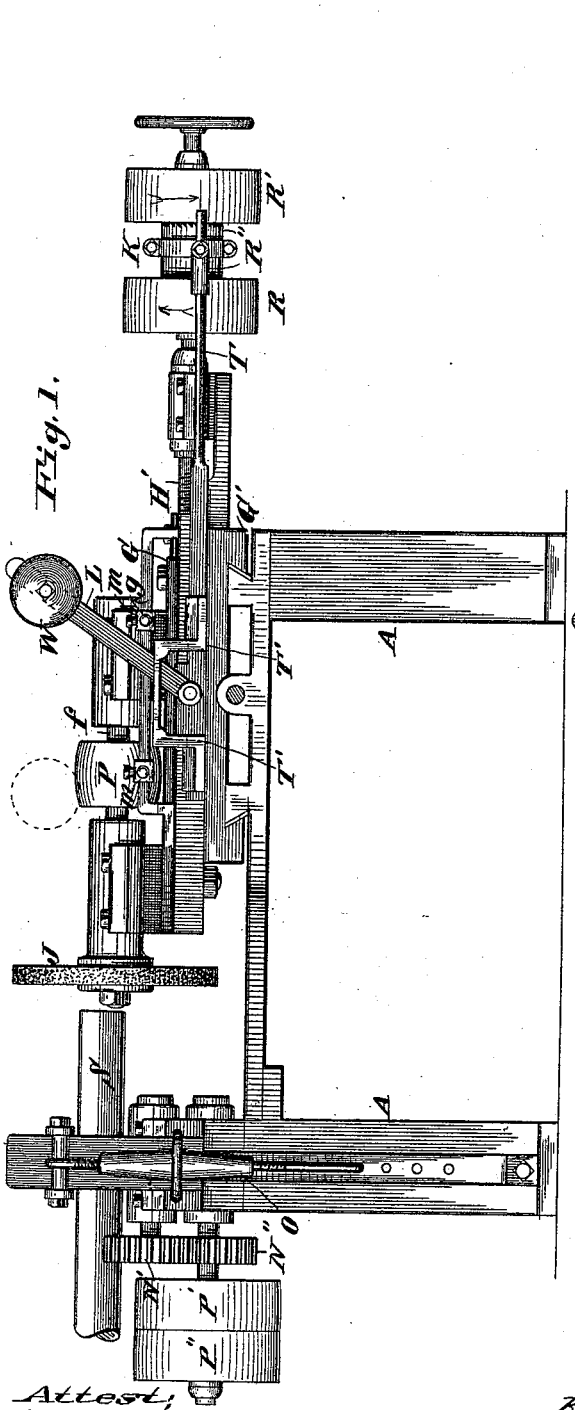

Fig. 1.

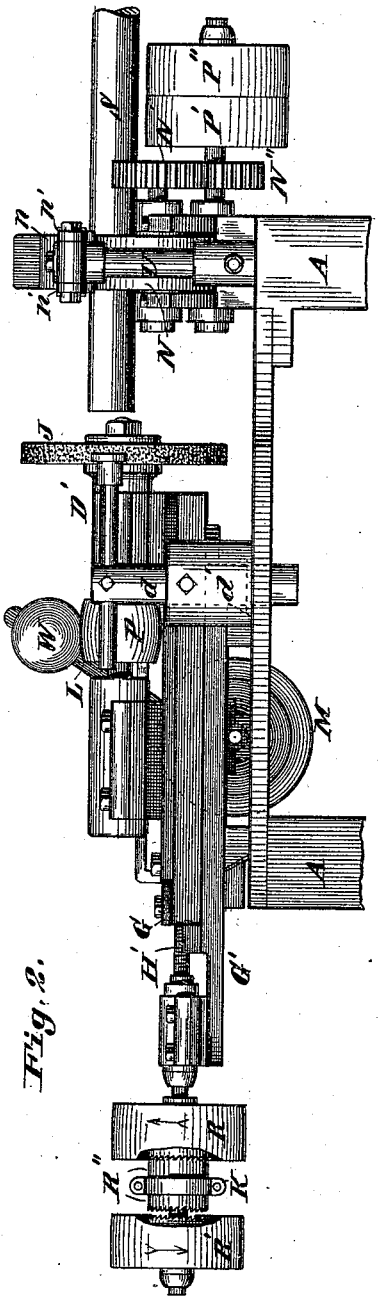

Fig. 2.

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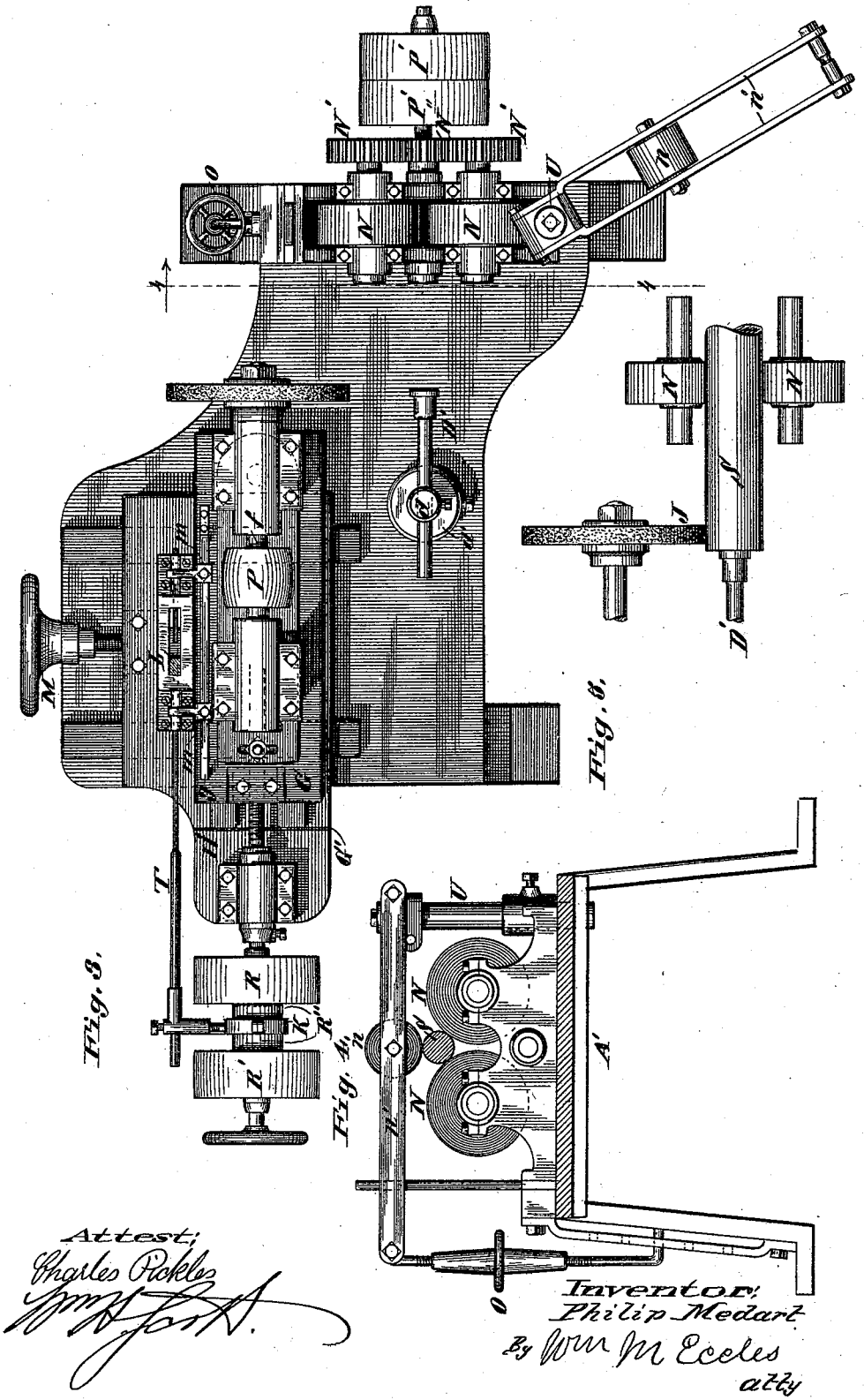

Fig. 3.

Fig. 4.

Fig. 6.

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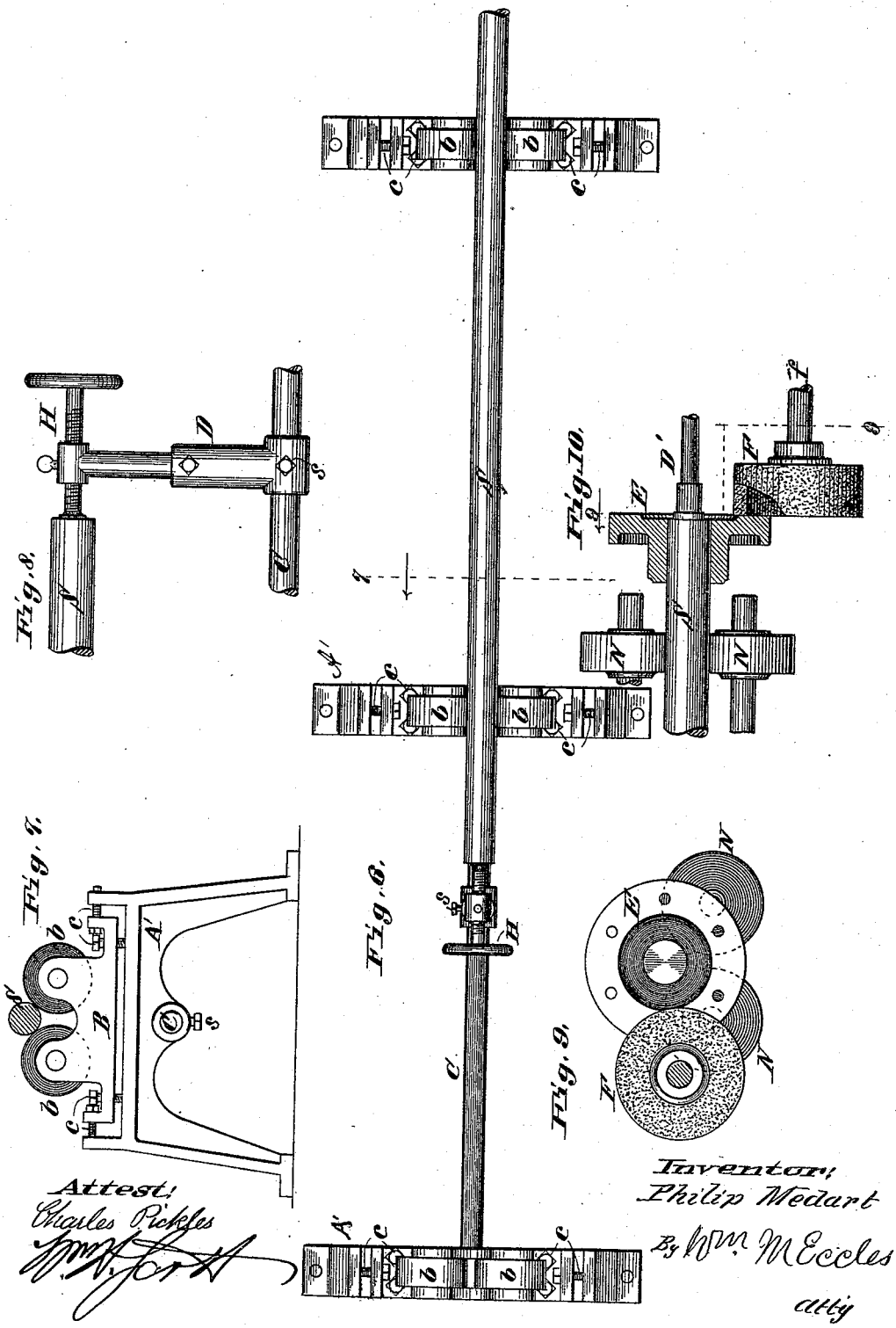

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Fig. 11.

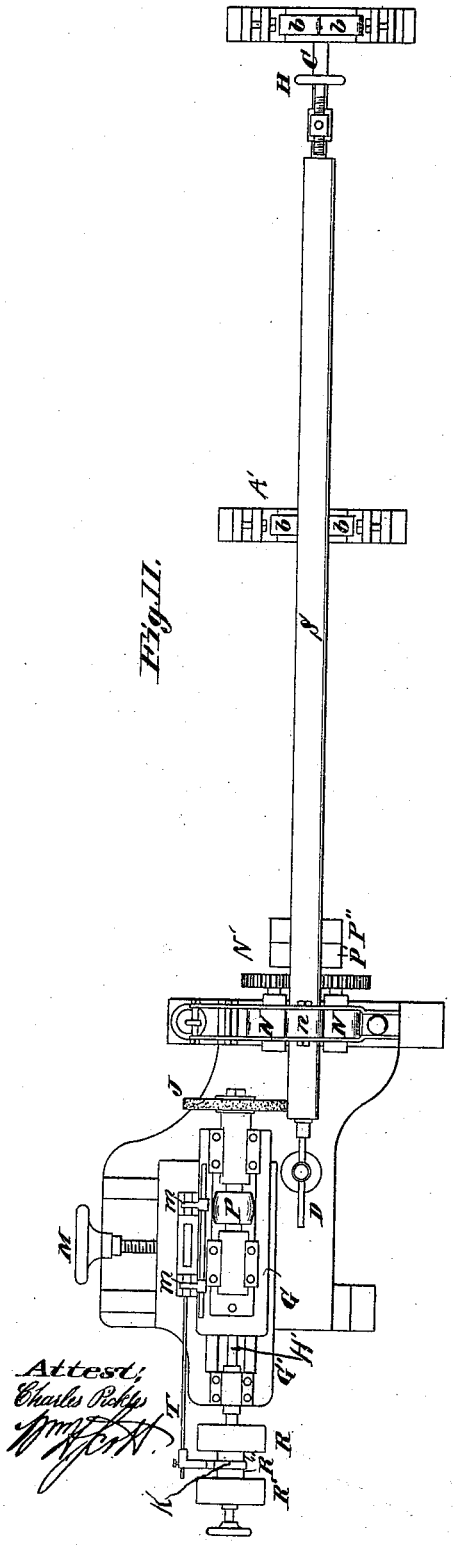
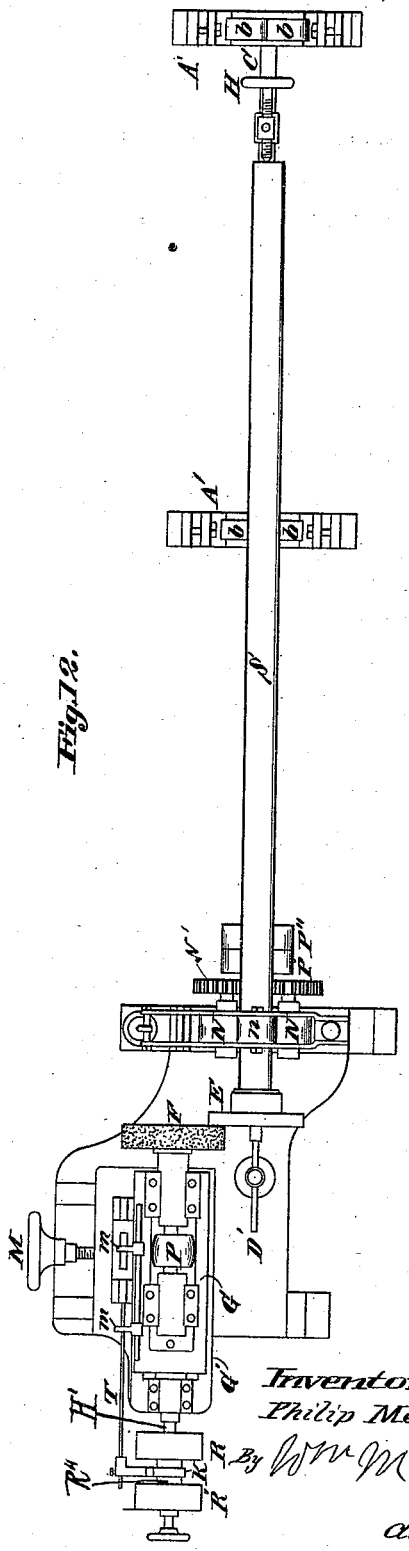


Fig. 12.



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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 GRINDING PULLEY-SHAFTS AND THEIR COUPLINGS.

SPECIFICATION forming part of Letters Patent No. 492,095, dated February 21, 1893.

Application filed June 20, 1892. Serial No. 437,374. (No model.)

To all whom it may concern:

Be it known that I, PHILIP MEDART, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented a new and useful Machine for Grinding Pulley Shafts and their Couplings, of which the following is a specification.

The objects of my invention are first to grind a pulley shaft at the point or points where a coupling is to be placed on the shaft perfectly concentric with the center of the shaft at the point or points where it runs in its boxing. Second, to grind the face of the coupling of the pulley shaft in a plane exactly at right angles with the line passing through the center of the shaft at the various points of bearing of the supporting rollers so that when the couplings are bolted together face to face, the longitudinal center of the two shafts bolted together will be one continuous straight line. I attain these objects by the mechanism illustrated in the accompanying drawings in which—

Figure 1, is a side elevation of the head end of my machine with a part of the shaft attached which is to be ground. Fig. 2 is an elevation of the reverse side of the same. Fig. 3 is a plan view of the same with the section of the shaft omitted. Fig. 4 is a vertical section drawn on the line 4—4. Fig. 3, and shows in addition the carrying rollers shown in Fig. 3, a pressure roller, and a section of the shaft being treated. Fig. 5 shows a detached view of the grinding wheel, a section of shaft being ground and two carrying rollers supporting said shaft. Fig. 6 is a plan view of the tail end of the machine carrying the other section of the pulley shaft shown in Figs. 1 and 2. Fig. 7 is a transverse section drawn on line 7—7 in Fig. 6 looking in the direction of the arrow. Fig. 8 is a detached view of the stand or shaft support shown in Fig. 6. Fig. 9 is a section drawn on the line 9—9 in Fig. 10 looking in the direction of the arrow. Fig. 10 is a detached view of the supporting rollers, a section of the shaft with coupling fitted on its end, and a surface grinder shown in Fig. 12. Fig. 11 is a plan view of Figs. 1 and 6 joined together, and constituting the entire machine for grinding the ends of the shafts preparatory to mounting the coupling thereon. Fig. 12 is a plan view of the same machine showing the operation of the grinder on the face of the coupling preparatory to joining said coupling with a like coupling on another shaft.

A, is the frame work of the machine carrying the grinders and their attendant mechanism.

A′ A′ A′, are stands or supports made of suitable material and adapted to carry supporting rollers which support the shaft to be treated at various points. These rollers are placed at appropriate distances along the shaft to be treated. These stands or uprights are provided with a housing B, which carries rollers *b*, *b*, having their peripheries running close together and adapted to carry the shaft to be treated. This housing is adjustably attached to the stands or uprights by set screws *c c c c*, whereby the rollers may be readily adjusted longitudinally in a straight line so as to carry the shaft in the same manner while it is being treated as it will be carried when it is hung in its boxings. Through the central portion of these uprights is passed a coupling which consists of a piece of iron or steel passing from one to the other through a hole in the central part of the upright, and is held thereto adjustably by means of a set screw, *s*. This coupling C, is provided with a sliding upright D, which rises to about the center of the end of the shaft which is to be treated. It is provided at the bottom with an ordinary set screw with which it is securely held to the coupling C, at any desired point. At the top it is provided with a hand-screw passing through a fixed nut at the top of said stand. This hand-screw is designated by the letter H, and serves to hold the shaft from working back in its revolution and is not intended as a point upon which to center the shaft to be treated, said shaft being centered by the rollers *b b b b*. It also serves the purpose of moving the shaft endwise so as to hold the face of the coupling against its grinder while it is being ground.

At the other end of the shaft S, which is being ground, is placed on the frame work an adjustable stop D′, to hold the end of the shaft S from moving endwise while being treated. This adjustable stop consists of a bar passing through an upright, and adjustably held

thereto by a set screw. This upright designated by d, passes through a sleeve d', and is held therein by an ordinary set screw. Thus the stop D′ may be elevated or depressed to meet the center of the shaft S by elevating or depressing the upright d in the sleeve d'. d' is secured to the frame work.

E is the head of a coupling secured on the end of a shaft after the end of the shaft has been ground at the end with its circumference concentric with the circumference of the shaft at the various points where it runs on the several supporting rollers.

F, is a grinder made cup-shaped on its outer surface and mounted on a shaft, f, which is journaled in a movable base plate.

J, is a grinder or emery wheel which can be placed upon the shaft f, when it is desired to grind the circumference of the shaft S, which is to be treated preparatory to putting on the coupling. It is easily removed, and the cup-shaped grinder F put in its place by simply unscrewing a nut at the end of the shaft. This shaft f, is journaled to a movable plate G, by appropriate journal boxes. It is also provided with a pulley P, by means of which it can be driven at a high rate of speed by a belt connected with the power. This plate G, is adapted to slide laterally upon a plate G′ by being fitted into ordinary slides upon said plate. It is moved back and forth by a shaft H′, which has its neck journaled in the plate G′ and its screw part or threaded part entering into a stationary nut in the plate G. The head of this screw or screw shaft H′, is provided with two pulleys R R′. which are hung loosely upon the extension of the screw shaft H′, so that they can revolve freely upon said shaft without turning the same when not in contact with the ratchet R″. This ratchet R″ is movably mounted on the shaft H′, between the pulleys R R′, and is adapted to slide back and forth upon said shaft, but not turn thereon. It is provided on each face with ratchet teeth, which are adapted to engage corresponding ratchet teeth on the inside of the pulleys R R′ respectively, so that when the ratchet teeth are thrown in contact with one of the pulleys, R′ the shaft H′, will be driven in the direction of the arrow on said pulley, and the plate G, will be correspondingly moved toward the left, and its grinder or emery wheel J, will move along the surface of the shaft S, from right to left, and thus grind its surface as far as it is permitted to travel. When the ratchet R″ is moved against the ratchet teeth of the other pulley R, the shaft H′ will be revolved in the direction of the arrow on said pulley, and the plate G, will be reversed in its movement, and the grinder or emery wheel J, will be caused to move back from left to right along the circumference of the shaft S. Thus it will be seen that if the shaft S, is caused to revolve on a circumference bearing at the various places of contact with the supporting rollers, and the grinder or emery wheel J, is caused to revolve in a rapid manner in contact with the circumference of the end of said shaft, and it is moved back and forth while so revolving it will effectually and accurately grind the circumference of this shaft in exact straight lines with the circumference of the various points of bearing on said shaft.

The shaft H′, is caused to revolve in opposite directions by shifting the ratchet wheel R″ from one side to the other. The shifting of the ratchet wheel can be done by any ordinary shifting apparatus, but I have invented a new shifting device which I prefer to use in this connection. It consists of a shifting rod T, which is loosely connected with the ratchet wheel R″ by a collar K, at one end, and moving in slides on the plate G′ at the other end. Rising from, and on the plate G′ are two stands T′ T′ which come in contact with the arm of the weighted lever L. This weighted lever is connected at its lower end to the rod T, and provided with a weight, W, at its upper end, of sufficient weight to move the shifting rod T, when the lever comes in contact with the stands T′ T′.

On the plate G is arranged a bar g, upon which are shifting lugs m m, held on said bar at any desired place by means of set screws. These lugs m m, project far enough to come in contact with the weighted lever L, as the plate G moves back and forth, and they serve to throw the weighted lever from one side to the other, and thus regulate the throw of the plate G. It is obvious when it is desired to grind the end of the shaft S, but a short distance laterally, the lugs m m, will be placed close together, and when it is desired to grind it a long distance laterally, the lugs m m, will be placed farther apart on the bar g.

The plate G′, is made to slide transversely on the frame-work A, so that the grinder or emery wheel J, may be shifted toward or away from the shaft S, which it is to grind. This plate G′ when shifted in proper position is held in place on the frame-work by an ordinary screw device M, which consists of a hand wheel and screw, said screw passing through a fixed nut in the plate G′.

N N, are two rollers journaled in the frame-work and provided with spur wheels N′ N′, which are fixed to the shafts of said rollers. These rollers are arranged with their shafts approximately parallel to each other, and so placed that their peripheries will be close to each other, and support between them the shaft to be ground as shown in Figs. 4 and 5. Meshing in these spur wheels is a third spur wheel N″, which is fixed to a shaft journaled in said frame-work so as to engage said spur wheel with each of the spur wheels N′ N′. To this shaft is attached a tight and loose pulley P′ P″ adapted to carry the power belt.

Above the rollers N N is a pressure roller n, which is journaled in a lever n'. This lever is held down by a right and left hand

screw fastened at one end to the lever n' and at the other end, to the frame-work, A, respectively. It is readily shifted by reason of the fact that it is hinged upon an upright U, and by reason of the fact that its other end is made detachable with the right and left hand screw O, as seen in Fig. 3. The function of this pressure roller n, is to hold the shaft S, tightly down against the rollers N N, so that when they are revolved in one direction, the shaft will be turned in the opposite direction, and its center of motion will be made to coincide with the center of the circle described by the periphery of the shaft at its point of contact with the rollers N N, and not necessarily with the center of the shaft at the end, which would be the case if the shaft was caused to revolve on a centered end which is the old method of turning. Thus it is obvious that a pulley shaft having its end ground in this machine preparatory to receiving a coupling thereon, will have the surface of said ground end in exact straight lines with the various bearings of the shaft at the points where it is held on the supporting rollers, and as a consequence when the coupling is put on said ground end, and then has its front face ground in a plane at right angles with these lines running laterally along the shaft, and coupled to another shaft similarly treated, the two shafts will make one continuous straight shaft having its various bearings in one continuous straight line, and when mounted in its various boxings, will run without straining or binding any one of the boxings, and will run freely in all of them, a result which is entirely new in the art.

It is obvious that when the operator desires to grind the face of the coupling, all he has to do is to unscrew the grinder or emery wheel J, screw on the cup-shaped grinder F, and move the shaft S, with couplings attached to the end of the shaft previously ground by the wheel J., up against the cup shaped grinder, F. Thus I have a machine which will grind the end of any shaft exactly concentric with the shaft at the various points of bearings of the same when in use, and if a coupling is placed thereon, and its face operated on by the cup-shaped grinder F, as described, and the coupling is bolted to another similarly treated, face to face, it will make a continuous shaft sure to revolve in its general bearings without bending or springing the shaft, and without straining the several hangers or boxes.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In a machine for grinding pulley shafts, the combination of a series of supporting rollers arranged on the frame-work in a line with each other, and supporting the shaft to be ground, in combination with a grinding wheel journaled in a base plate movably connected to the frame-work, so as to move laterally with the shaft being ground, said shaft of said grinding wheel moving substantially in parallel lines with said shaft being ground, substantially as described and for the purposes set forth.

2. In a machine for grinding pulley shafts, the combination of a movable base plate; a grinding wheel mounted thereon; a shaft journaled to the frame work in a fixed box and provided at one end with a right and left-pulley to run it in opposite directions, and with a screw at the other end working in a fixed nut in the movable base plate; a right and left ratchet interposed between said pulleys and adapted to move on said shaft laterally but not rotate thereon; a shifting rod connected with said ratchet at one end, and to the end of a weighted lever at the other end; a weighted lever movably connected to said shifting rod and rising between two fulcrums secured to a stationary base plate, and an adjustable stop adjustably secured to said movable base plate, coming in contact with said weighted lever as it moves; all combined and operating to automatically reverse the lateral movement of the grinding wheel on the frame work, for the purposes stated.

3. In a machine for grinding pulley shafts, the combination of a movable base plate mounted on a frame-work; a grinding wheel having a concave or cup-shaped grinding surface mounted on said movable base plate, with the grinding face in the same plane with the face of the coupling to be ground; and a series of sets of supporting rollers journaled in the frame-work in a line with each other, substantially as described, and for the purposes set forth.

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