(No Model.) 2 Sheets—Sheet 1.

G. J. COVERT & G. W. & I. L. PRICE.

MACHINE FOR GRINDING SPOKES.

No. 502,174. Patented July 25, 1893.

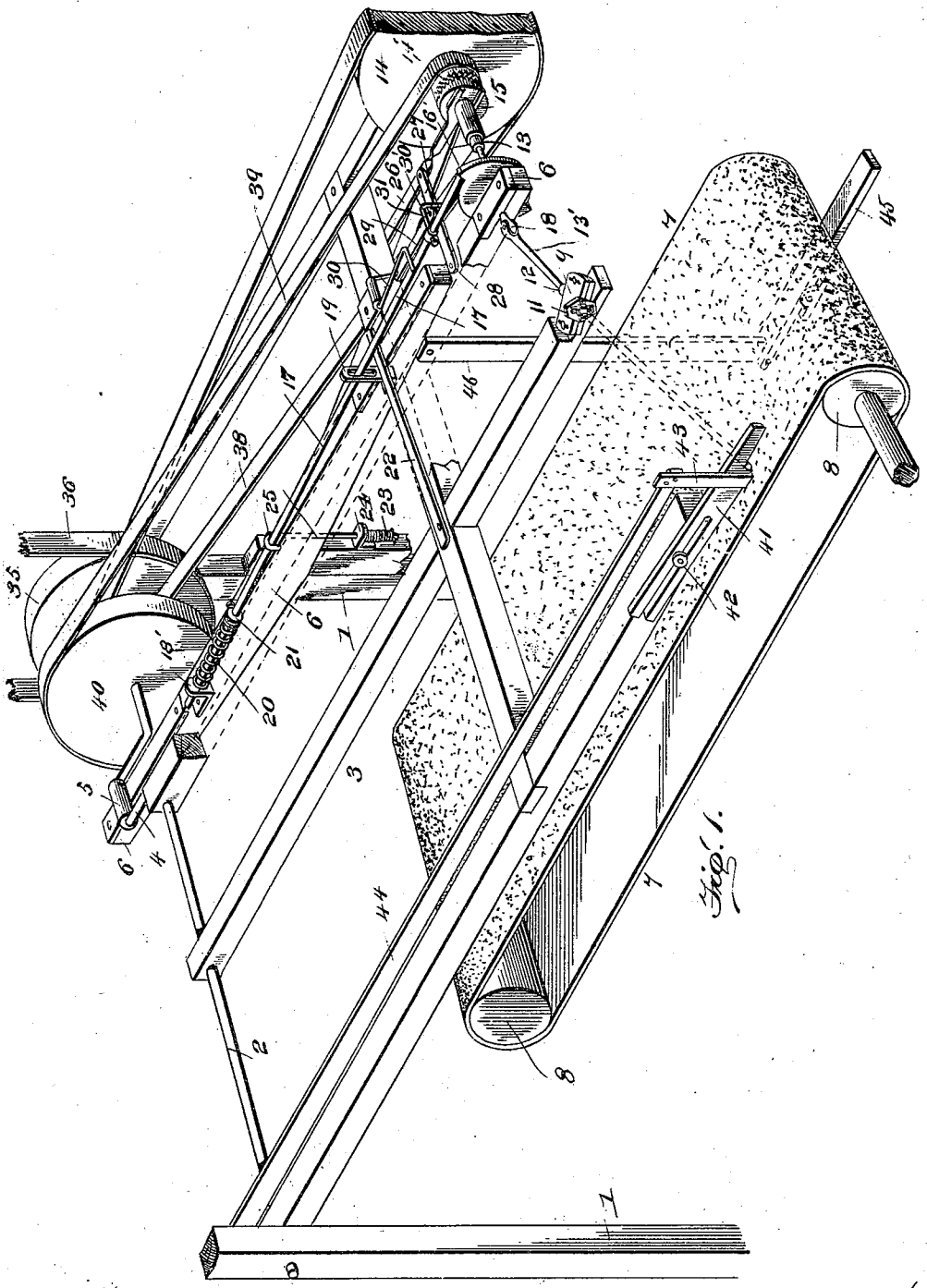

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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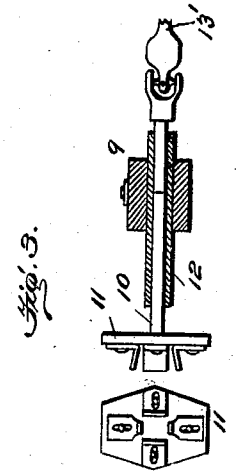

Fig. 3.

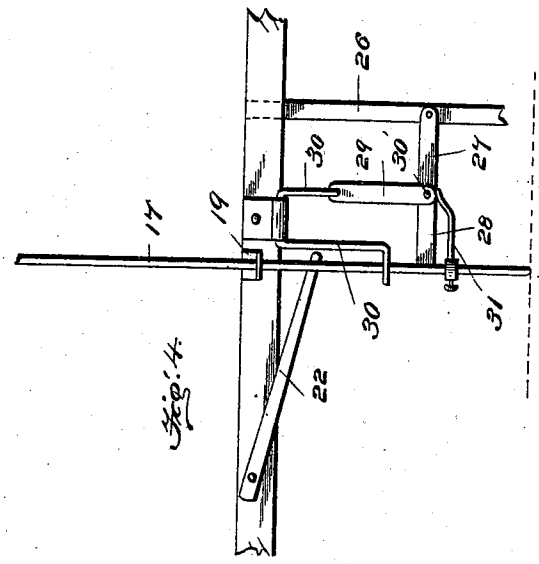

Fig. 4.

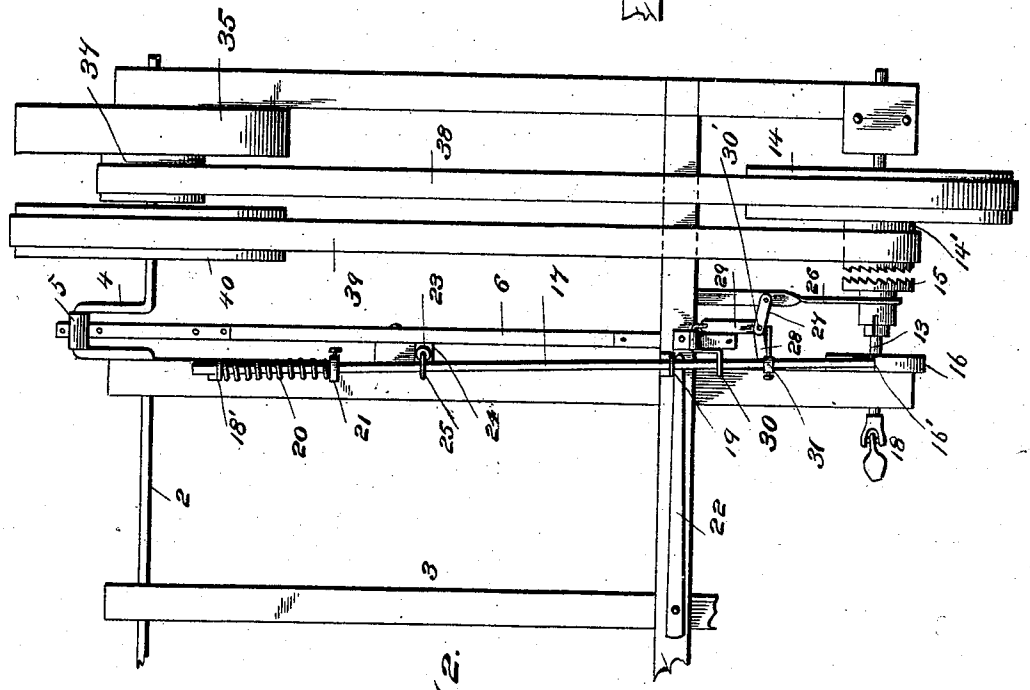

Fig. 2.

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UNITED STATES PATENT OFFICE.

GEORGE JACOB COVERT, GEORGE WILLIAM PRICE, AND IRA LEVI PRICE, OF PENN YAN, NEW YORK.

MACHINE FOR GRINDING SPOKES.

SPECIFICATION forming part of Letters Patent No. 502,174, dated July 25, 1893.

Application filed October 27, 1892. Serial No. 450,178. (No model.)

To all whom it may concern:

Be it known that we, GEORGE JACOB COVERT, GEORGE WILLIAM PRICE, and IRA LEVI PRICE, citizens of the United States, residing at Penn Yan, in the county of Yates and State of New York, have invented certain new and useful Improvements in Machines for Grinding Spokes; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to a machine for grinding and finishing spokes, and the objects in view, are, first, to provide a machine in which the spoke is automatically turned to subject the whole surface thereof to the action of the abrasive grinding and finishing surface; secondly, to automatically throw the spoke-turning head out of and into gear with the power mechanism and which spoke-head remains at rest for a period sufficient for the operator to remove the finished spoke and replace it with another spoke to be operated upon by the abrasive surface; thirdly, to provide adjusting contrivances by which spokes having tenons of different lengths can be accommodated and by which the angular position of the spoke relative to the abrasive surface can be varied, and finally to provide simple and reliable mechanisms by which the purposes above stated can be carried into practice.

With these and such other ends in view as pertain to our invention, it comprises a vertically movable frame, preferably pivoted or hinged to swing in vertical directions toward or from the abrasive surface, a spoke-receiving head or chuck carried by a shaft journaled in said movable frame, a power shaft also journaled in said frame and carrying a loose duplex pulley, a clutch keyed to the driving shaft and adapted to be thrown into and out of gear with the driving pulley, an escapement disk fixed to said driving shaft, a crank shaft journaled in the opposite end of the frame, preferably forming the pivot on which said frame swings, and having its crank arranged to ride on a longitudinal lever, an endwise movable rod guided on the longitudinal lever so that one end thereof is adapted to be thrown by a spring into the path of one of the projections on the escapement wheel to effect the endwise movement of said rod in one direction, a shipping toggle connected with the clutch and arranged in the path of an arm on the endwise movable rod so as to disengage the clutch from the driving pulley as the frame is raised, and springs for freeing the endwise movable rod from the escapement wheel as the frame descends and thereby permit the shipping toggle to return the clutch into engagement with the driving pulley as the frame is lowered to bring the spoke into operative position on the abrasive surface.

It will thus be seen that our invention contemplates, broadly, a spoke carrying frame, and means for turning the spoke on its axis, adapted to move the spoke into contact with and away from the abrasive surface, combined with mechanism which automatically arrests the rotation of the spoke when the frame is moved away from the abrasive surface, to permit the operator to replace the finished spoke with an unfinished one, and which automatically effects the rotation of the spoke as the frame is lowered to bring the spoke into contact with the abrasive surface.

The invention further consists in the novelties of construction and combination and arrangement of parts which will be hereinafter fully described and pointed out.

We have illustrated the preferred embodiment of our invention in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a perspective view of our machine, certain parts being broken away and indicated by dotted lines to more clearly illustrate the mechanisms. Fig. 2 is a plan view thereof. Fig. 3 is a detail view showing the adjustable connection between the spoke head or chuck and its shaft, to compensate for spokes having tenons of different lengths, and Fig. 4 is another detail showing the crank between the endwise movable rod and the shipping toggle to move the clutch into engagement with its driving pulley when the frame is lowered to bring the spoke upon the abrasive surface.

We will now proceed to a detailed description of one embodiment of our invention, ref-

erence being had to the accompanying drawings, in which like numerals of reference denote like parts in all the figures.

1 designates suitable uprights or posts provided for the support of the crank shaft 2 and the swinging frame 3; the latter serving to carry the operative mechanism by which the spoke is turned and arrested and the movements of the frame 2 automatically controlled. The crank shaft 2 is journaled in suitable bearings on the rear posts or uprights 1, and it has a crank 4 which is provided with a loose friction roller 5 adapted, during a certain portion of the rotation of the crank, to depress one end of a longitudinal lever 6 which extends at right angles to the crank-shaft, is fulcrumed at an intermediate point of its length on one of the uprights 1, and has its rear end arranged in the path of said crank 4. This crank shaft is designed to form the pivot on which the frame 3 is adapted to swing, and the rear ends of the longitudinal bars of said frame 3 are loosely fitted on said crank shaft to permit the frame to have such vertically-swinging movement as may be necessary to raise the free end of the frame, and the spoke carried thereby, a sufficient distance above the traveling abrasive surface for the purpose of permitting the operator to safely remove the finished spoke and replace it with another to be operated upon. This swinging frame is preferably made skeleton-shaped, as shown, consisting of the spaced longitudinal bars and one or more transverse tie-bars suitably joined together; and below said swinging frame is arranged the traveling abrasive surface, preferably consisting of an endless sand belt 7, supported by suitable rollers 8, to one of which motion is applied to continuously move the belt and present fresh abrasive surfaces to the work (the spoke).

On the free end of one of the longitudinal bars of the swinging frame is supported an adjustable bearing 9 in which is journaled the short shaft 10 that carries, at one end, the chuck or head 11, designed to receive and grasp the spoke to be ground and finished in this machine. The chuck or head 11 is provided with adjustable jaws, of any suitable form, adapted to grasp spokes of different sizes, and the bearing 9 is provided with segmental slots in which are fitted binding screws, the construction being such that the bearing can be turned or adjusted to bring the chuck and the spoke clamped therein at different angular positions across the abrasive belt 7. The shaft 10 is fitted and clamped in a tubular sleeve 12, which also receives the shank of one member of a universal joint, presently referred to, and the shaft 10 can thus be adjusted longitudinally in said sleeve to accommodate spokes having tenons of different lengths. In the same (free) end of the swinging frame 3 is journaled, in suitable bearings thereon, a driving shaft 13 which carries the duplex driving pulley 14, the clutch 15, and the escapement wheel 16; and one end of this driving shaft is connected, by the coupling shaft 13′ with the tubular sleeve 12, of the chuck-shaft 10, said coupling shaft 13′ having at each end the ball-joint connection 18, whereby the motion of the shaft 13 is transmitted to the chuck shaft 10 and the latter can be adjusted to the desired angular position across the abrasive belt 7 without breaking the connection between the driving shaft and the chuck shaft, as will be readily understood. The duplex driving pulley 14 is fitted loosely on the shaft 13, and it consists of a larger member and a smaller member 14′, the latter (14′) having a clutch-face on one end thereof with which it is adapted to engage the clutch 15 that is keyed to the shaft 13 and is adapted to slide thereon in order to fasten the driving pulley 14 rigidly to the shaft 13 or to free the same from said shaft, the mechanism for automatically moving which clutch will be presently described. The escapement wheel 16 is fastened rigidly to the driving shaft 13, and it is provided with two abutments or shoulders 16′ which extend radially from the edge of the disk or wheel; and against one of the shoulders of said rotary disk or wheel 16 is adapted to bear the free end of an endwise movable rod 17, the latter being fitted in two guides 18′, 19, fixed to the top side of the longitudinal lever 6, the guide 18′ being arranged near the rear end of the lever 6 to snugly receive the rear end of said rod 17 while the other guide 19 is vertically slotted to permit the rod 17 to have a limited vertical movement or play in order to permit the end thereof to be moved, by suitable springs, into and out of the path of the shoulders on the rotating escapement wheel or disk 16. This rod 17 is normally pressed forward into position over the disk 16 by means of a coiled spring 20, fitted on the rear end of the rod and bearing against the guide 18′ and a collar 21 clamped on said rod; and this rod is lifted or elevated clear of the projections on the wheel or disk 16, when the frame 3 is to be lowered, by a flat leaf spring 22, that is arranged preferably at right angles to the rod, has one end fixed to the frame 3, and its free end bearing against the lower side of the rod 17 near the slotted guide 19. The rod 17 is designed to be positively depressed, prior to the lifting of the frame away from the abrasive belt 7, by the coiled spring 23 operating against a fixed bracket 24 and one end of a vertical pulling rod 25 which is guided in said fixed bracket 24 and has its upper, hook-shaped end fitted over the endwise movable rod.

We now proceed to describe the shipping toggle connection between the clutch and the endwise movable rod 17 whereby the clutch is thrown into and out of engagement with the driven pulley 14 on the back and forth movements of said rod.

26 is a shipping lever fulcrumed at one end on the frame 3, and having its other forked end fitted in an annular groove on the hub of the clutch 15; and 27 and 28 are the links

forming a toggle joint, the adjacent ends of which links are connected together by a common pivot pin 30', while the link 27 is pivoted to the shipping lever 26 and the link 28 is pivoted to the frame 3. A movable arm 29 is pivoted to the pivot pin 30' which connects the inner ends of the toggle 28, 29, and to the other end of this movable arm 29 is loosely connected one end of a crank 30. This crank 30 is pivoted at intermediate points of its length on a fixed loop on the frame 3, and it has an arm which rests or bears upon the endwise movable rod 17 so as to be actuated thereby on the upward and forward movement of said rod 17 under the influence of the impelling springs 22 and 20; and on this rod 17 is fixed an arm 31 which projects outward and downward so as to strike or impinge against the links 27, 28, forming a part of the toggle joint, which joint lies in the path of said arm 31 when the rod 17 is depressed by the spring 23, whereby as the rod 17 is impelled rearward by the action of one shoulder of the wheel or disk 16 the arm 31 is adapted to strike the links 27, 28, and move the shipping lever 26 to throw the clutch out of engagement with the driving pulley 14.

Power is applied to the machine through a pulley 35 and belt 36, said pulley being fitted loosely on the crank shaft and having a smaller pulley 37 over which runs a belt 38 that transmits motion to the pulley 14; and around the small section 14' of this latter pulley 14 runs a belt 39 that communicates motion to the pulley 40 which is keyed or otherwise secured to the crank shaft 2, whereby motion is communicated to both shafts 2, 13, from a common power pulley 35. The free end of the spoke, or the end opposite to the part held in the chuck 11, is confined in place in a recess in the lower edge of a slotted bar 41 which is fixed, by a set screw 42, to one of the bars of the frame 3 so that this retaining bar 41 can be adjusted longitudinally to correspond with the inclination of the spoke held in the rotating chuck 11; and against one side of this retainer bar bears the lower end of a vertical arm 43 which is fixed to a stationary bar 44 secured to one of the uprights or posts 1 of the machine, said vertical fixed bar 43 serving to guide the outer end of the spoke while it is being adjusted in the machine.

This being the construction of our machine, the operation is as follows:—The frame 3 having been raised, a spoke has one end fitted in the chuck, and the operator, by depressing the treadle 45 which is linked at 46 to the frame, can set the machine in motion so as to lower the frame and bring the spoke against the abrasive surface of the traveling belt 7, the outer end of the spoke being guided by the bar 43 as the frame is lowered and said end of the spoke is adjusted in engagement with the retainer bar. As the frame is lowered, the tension of the spring 23 slackens on the bar 17, the spring 22 lifts the bar clear from the notched wheel 16, and the springs 22 and 20 impel the bar 17 forward and upward, thus moving the crank 30 which, in turn, shoves the arm 29 and affects the links 27, 28, so that the shipping lever 26 moves the clutch into engagement with the driving pulley 14. The shaft 13 is thus rotated by the clutch and pulley, and the chuck 11 is likewise rotated to turn the spoke on its axis, which spoke being in contact with the abrasive surface of the belt 7 is round and finished. The several pulleys and crank of the shaft 2 are so proportioned that the chuck and spoke held therein are twice rotated to one complete turn of the crank, which length of contact of the spoke with the abrasive surface 7 is calculated to be sufficient to properly finish the surface of the spoke. As the crank shaft rotates, the crank is brought to bear against the lever 6, thus depressing one end thereof and raising the other end into contact with the frame 3, thus raising the frame. As the lever is raised and the wheel or disk 16 rotates, the spring 23 is distended to pull down on the vertical rod 25, overcoming the tension of the spring 22, whereby the end of the rod 17 is brought into contact with a shoulder on the disk or wheel 16 which pushes the rod 17 rearward against the tension of the impelling spring 20, and causing the arm on said rod 17 to bear against the toggle-joint 27, 28, throwing the shipping bar 26 to move the clutch out of engagement with the pulley 14, stopping the rotation of the shaft and the clutch as the frame 3 reaches its highest elevation. The spoke can now be removed, by hand, and a new spoke inserted, and by the time this is accomplished, the crank has turned far enough to clear the lever 6, thus allowing the frame to be lowered by its own weight. As the frame lowers, the tension of the spring 23 is slackened, allowing the spring 22 to lift the rod out of engagement with the wheel 16, so that the spring 20 impels the rod 17 to move the crank 30 and throw the lever 26 to move the clutch again into engagement with the pulley 14, thus starting the machine again.

We are aware that changes in the form and proportion of parts and details of construction of the mechanism herein shown and described can be made without departing from the spirit or sacrificing the advantages of our invention and we therefore reserve the right to make such changes and alterations as fairly fall within the scope of our invention.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a spoke grinding machine, the combination with an abrasive surface, of a vertically-movable frame carrying a rotating work holder, and mechanism for automatically turning and arresting said work holder as the frame rises and falls, as and for the purpose described.

2. In a spoke grinding machine, the combination with an abrasive surface, of a verti-

cally movable frame, a rotating work-holder, mechanism substantially as described for moving said frame toward and from the abrasive surface, and a driving mechanism acting in unison with the frame-actuating mechanism and operating to rotate the work holder as the frame is brought close to the abrasive surface and to arrest the work holder as the frame is moved away from said abrasive surface, as and for the purpose described.

3. In a spoke grinding mechanism, the combination with an abrasive surface, of a swinging frame, a shaft journaled therein and carrying the work-holding head, a shouldered disk rotating with said shaft, a rod actuated in one direction by said disk, a driving mechanism for rotating the shaft and work-head, connections between said rod and said driving mechanism to move the latter in and out of operation as the rod is moved endwise, and mechanism for moving the frame toward and from the abrasive surface, as and for the purpose described.

4. In a spoke grinding mechanism, the combination with an abrasive surface, of a movable frame carrying a rotating shaft provided with a work-head, a driving mechanism for rotating said shaft also carried by said frame, an endwise movable rod having connections with said driving mechanism to move the latter into and out of gear with the rotating shaft as said shaft is actuated longitudinally, mechanism, substantially as described, for impelling said rod in one direction as the frame is lifted and in the opposite direction as the frame is lowered, a crank shaft, and a lever arranged in the path of said crank shaft and adapted to lift the frame when acted on by said crank shaft, as and for the purpose described.

5. In a spoke grinding machine, the combination with an abrasive surface, of a vertically swinging frame, a rotary shaft, having a work-head, a driving shaft connected with said rotary shaft and carrying a shouldered disk and a loose driving pulley controlled by a clutch, a crank-shaft operating against a lever to raise the frame, an endwise-movable rod supported on said lever and arranged to engage with said shoulder disk, springs for moving said rod vertically and in the direction of its length, and a shipping mechanism between said rod and the clutch on the driving shaft, as and for the purpose described.

6. In a spoke grinding machine, the combination with an abrasive surface, of a vertically-swinging frame, a rotary shaft carrying the work-head, a driving shaft connected to said shaft and having a loose pulley clutched thereto, a shouldered disk rigid with said driving shaft, a spring-impelled rod adapted to be moved into the path of said disk as the frame is lifted, a shipping lever connected to the clutch and having intermediate connections with said rod to be moved by the latter as it is impelled in one direction by the disk and in the other direction by the spring, mechanism for raising and lowering the frame, and a spring to free the rod from the disk as the frame is lowered, substantially as described.

7. In a spoke grinding machine, the combination with an abrasive surface, of a swinging frame, a shaft carrying the work-head, a driving shaft connected with said shaft and having a driving pulley clutched thereto, a shouldered disk fixed to the driving shaft, a spring impelled rod, a shipping lever connected to the clutch and having the links, a crank connected to one link and the rod, an arm carried by the rod and adapted to strike the links when the rod is forced by the shouldered disk, and mechanism for raising and lowering the frame, substantially as described.

8. In a spoke grinding mechanism, the combination with an abrasive surface, of a swinging frame carrying a rotary work-holding shaft, a driving shaft connected to said shaft and having a pulley clutched thereto, a crank shaft on which the frame is pivoted, a lever having one end arranged in the path of the crank of the crank-shaft and its other end adapted to lift the frame, an endwise movable rod supported and guided on said lever, intermediate connections between said rod and the clutch, and mechanism, substantially as described, for moving said rod positively in both directions as the frame rises and falls and thereby move the clutch to throw the driving pulley into and out of engagement with the driving shaft, substantially as described.

9. In a spoke grinding machine, the combination with an abrasive surface, of a frame, a driving shaft carried thereby, a rotary shaft carrying a work-head, a coupling shaft between said driving and rotary shafts and having the swiveled couplings therewith, an adjustable bearing in which said rotary shaft is journaled, and an adjustable retainer for holding the free end of the spoke held in the work head, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE JACOB COVERT.
GEORGE WILLIAM PRICE.
IRA LEVI PRICE.

Witnesses:
JOHN WALRATH,
MAUD CARR.