Sept. 24, 1935. T. F. PHILIPPI 2,015,495

POLISHING MACHINE

Filed July 26, 1933 4 Sheets-Sheet 1

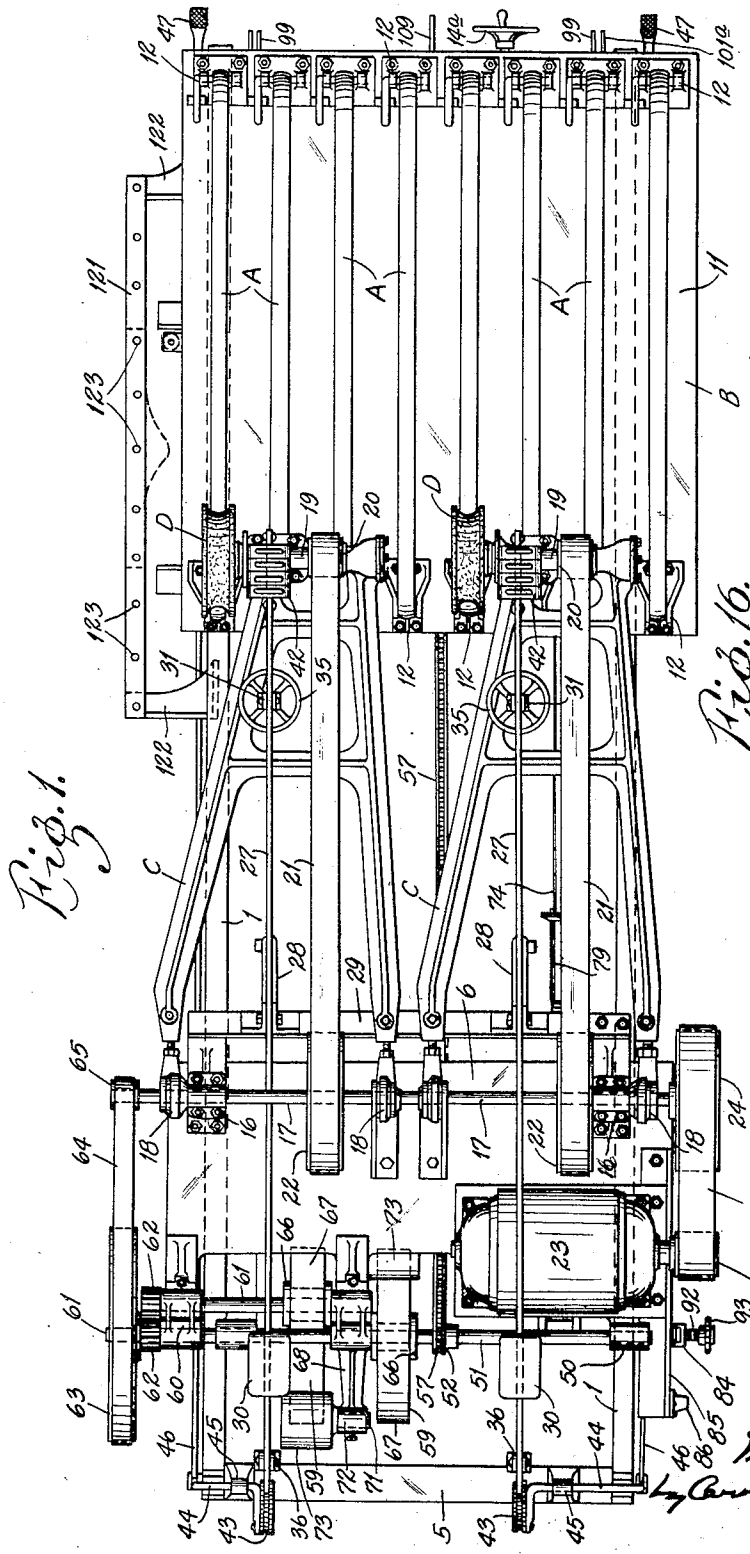


Fig. 1.

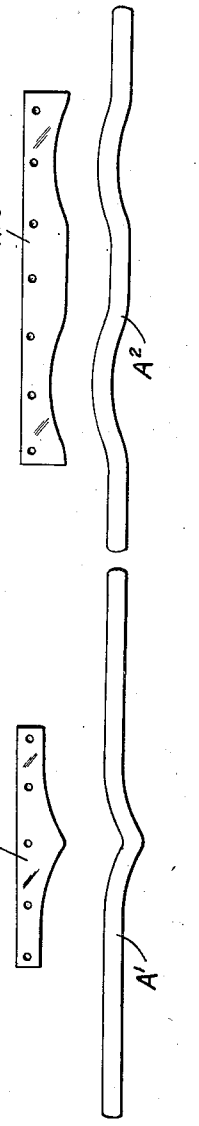


Fig. 1a.

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Sept. 24, 1935. T. F. PHILIPPI 2,015,495

POLISHING MACHINE

Filed July 26, 1933 4 Sheets-Sheet 2

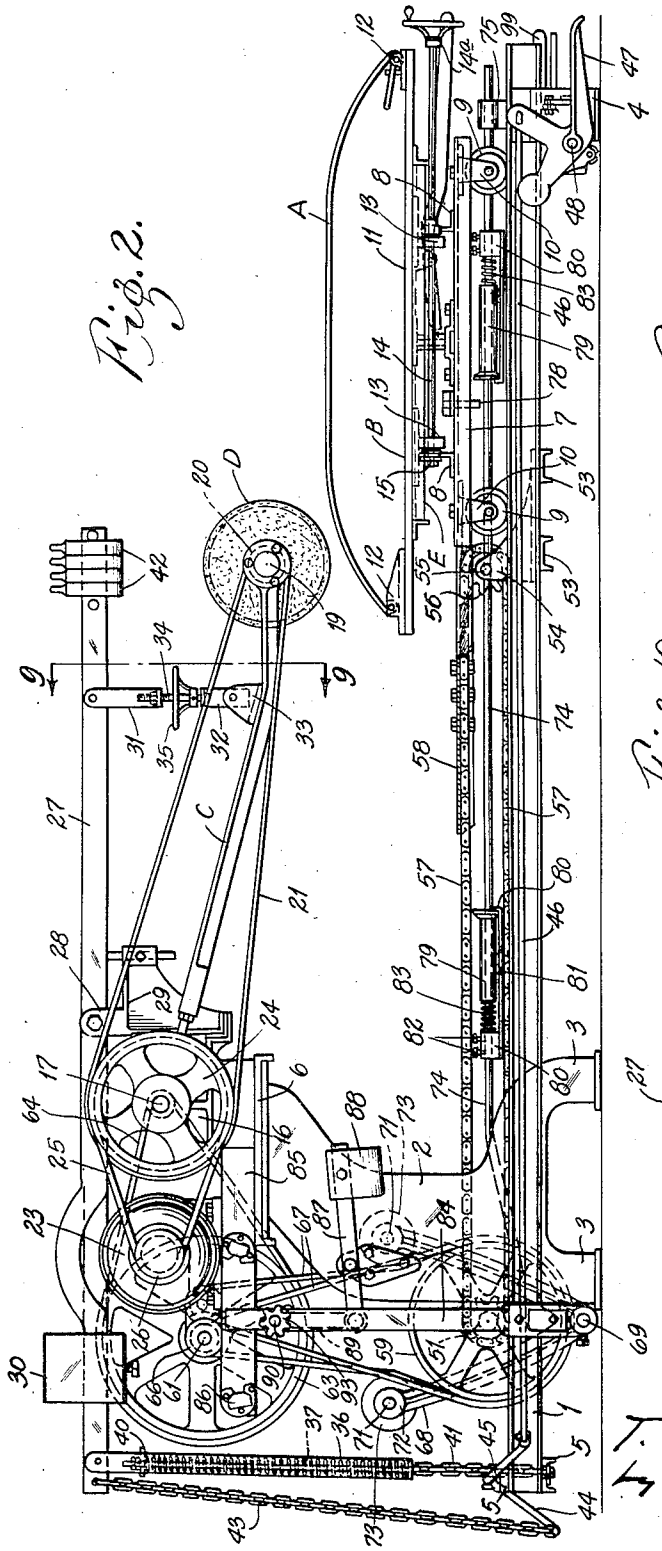


Fig. 2.

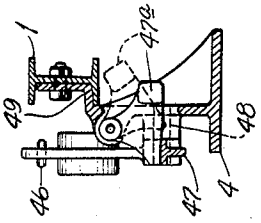


Fig. 11.

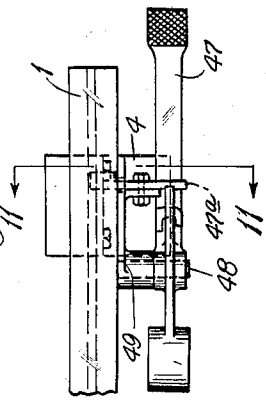


Fig. 10.

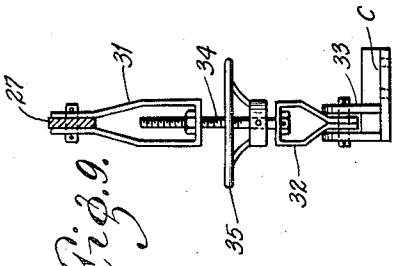


Fig. 9.

INVENTOR:
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Sept. 24, 1935. T. F. PHILIPPI 2,015,495

POLISHING MACHINE

Filed July 26, 1933 4 Sheets-Sheet 3

Fig. 3.

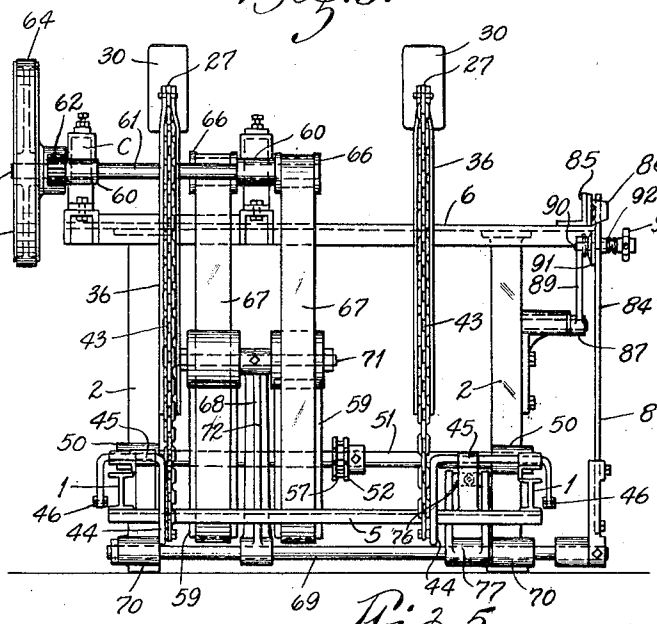


Fig. 8.

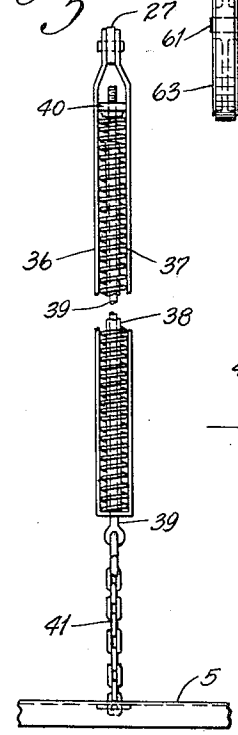


Fig. 5.

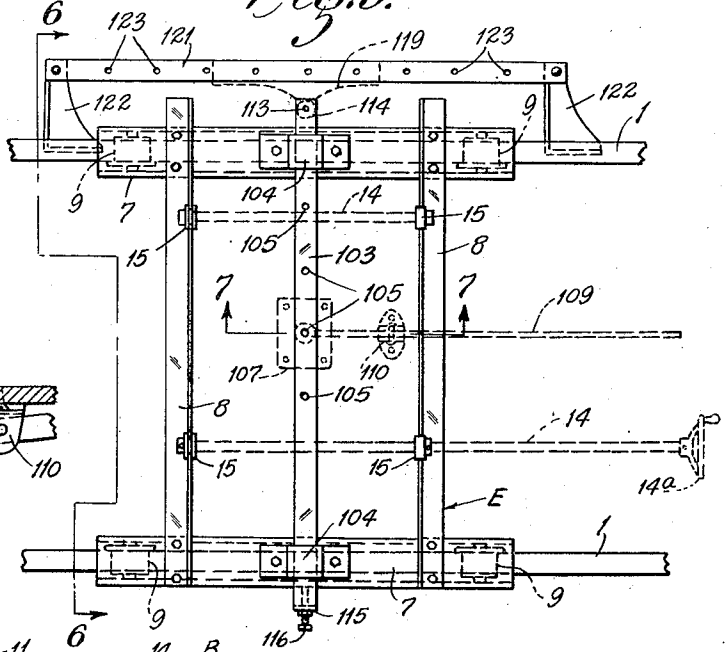


Fig. 7.

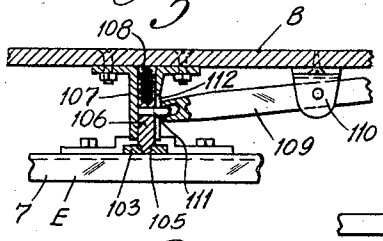
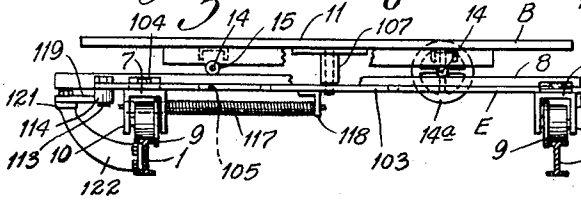


Fig. 6.



INVENTOR.

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Sept. 24, 1935. T. F. PHILIPPI 2,015,495

POLISHING MACHINE

Filed July 26, 1933 4 Sheets-Sheet 4

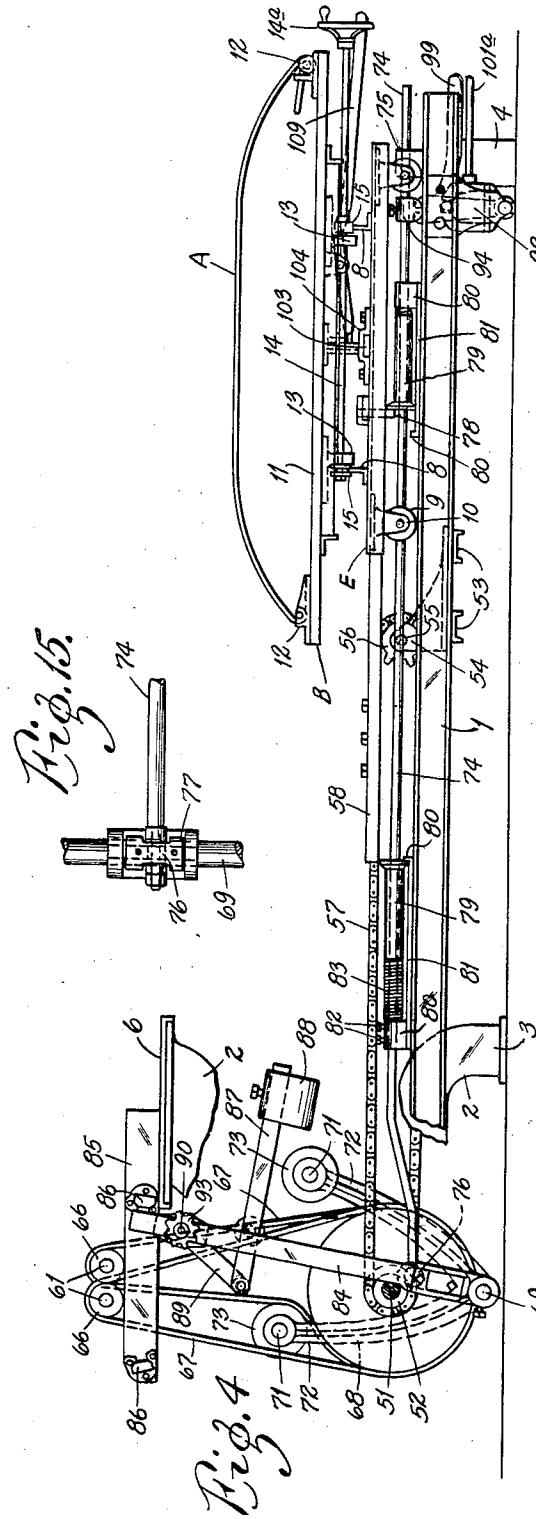


Fig. 4

Fig. 15.

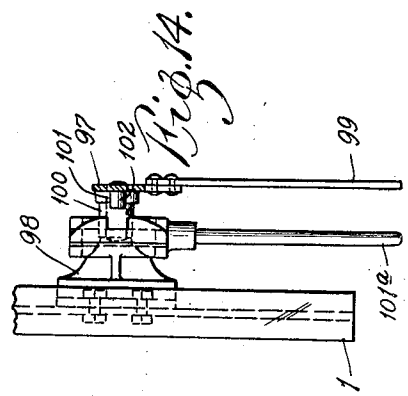


Fig. 14.

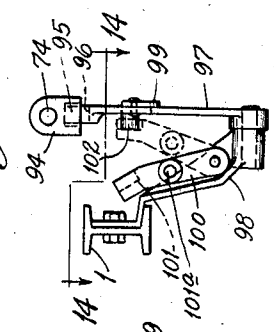


Fig. 13.

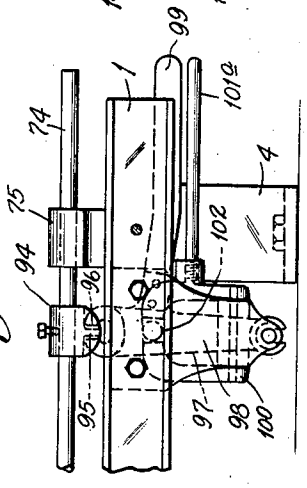


Fig. 12.

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Patented Sept. 24, 1935 2,015,495

UNITED STATES PATENT OFFICE

2,015,495

POLISHING MACHINE

Theodore F. Philippi, East St. Louis, Ill.

Application July 26, 1933, Serial No. 682,192

7 Claims. (Cl. 51—100)

My invention relates to polishing machines, particularly to a machine for polishing elongated articles that are of irregular shape such as automobile bumpers with curved ends. The principal object of this invention is to provide a polishing machine that will polish such articles evenly throughout their entire length. Further objects are a polishing machine that will polish a plurality of articles simultaneously and a machine wherein the polished articles can be readily moved out of the way and new ones brought into correct position for polishing them without stopping the operation of the machine. Other objects are a machine that is readily adjustable for polishing articles of different shapes; that is strong and durable and easy to operate; and that consumes a comparatively small amount of power.

The invention consists principally in a machine including a work table that moves the work back and forth endwise under a polishing unit carried by the machine and in means for counterbalancing such polishing unit so that a constant pressure is maintained between it and the work during the entire reciprocating movement thereof. The invention further consists in a polishing machine including a work table that is capable of supporting a series of articles and that is adjustably movable transversely with respect to its reciprocating movement so that different articles can be successively moved into position for polishing them. The invention further consists in the mechanism for reciprocating the work table and in the parts and combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawings which form part of this specification and wherein like reference symbols refer to like parts wherever they occur,

Fig. 1 is a plan view of a polishing machine embodying my invention,

Fig. 2 is a side elevation of the polishing machine,

Fig. 3 is an end view of the parts located at the rear end of the machine,

Fig. 4 is a side view of the machine with a number of parts broken away to show the mechanism for driving and reciprocating the work supporting table,

Fig. 5 is a fragmentary plan view of the parts of the machine that support the work supporting table,

Fig. 6 is a sectional view along the line 6—6 in Fig. 5,

Fig. 7 is an enlarged sectional view along the line 7—7 in Fig. 5,

Fig. 8 is a rear view of a resilient link connection between the rear end of a balancing bar and the frame,

Fig. 9 is an enlarged sectional view along the line 9—9 in Fig. 2,

Fig. 10 is a fragmentary plan view of a mechanism located at the front end of the machine for lifting the polishing unit off the work,

Fig. 11 is a sectional view along the line 11—11 in Fig. 10,

Fig. 12 is an enlarged fragmentary side view of the mechanism located at the front end of the machine for stopping the operation of the work supporting carriage,

Fig. 13 is an end view of the parts shown in Fig. 12,

Fig. 14 is a sectional view along the line 14—14 in Fig. 13,

Fig. 15 is a fragmentary plan view of the swivel connection between the control rod and the reversing mechanism; and

Fig. 16 is a diagrammatic view showing two types of bumpers that may be polished by the machine together with the corresponding cam plates used to control the movement of the work supporting table in polishing the particular bumpers.

The polishing machine shown in the accompanying drawings is especially adapted for simultaneously polishing a plurality of automobile bumpers A having curved ends. In general, said machine comprises a framework having a work table B mounted thereon for supporting the bumpers A and having two frame arms C pivotally mounted on the framework and carrying polishing wheels D adapted to engage and polish the bumpers. The work table B is mounted on top of a carriage E that is arranged to travel back and forth on the framework to move the bumpers endwise under the polishing wheels D so that they are polished throughout their entire length.

The framework comprises longitudinal side members or rails 1 that are fixed near their rear ends to upright side frame members or standards 2 whose bottoms are shaped to form short leg members 3. The longitudinal side members 1 are supported at their front ends by short upright members or legs 4 fixed thereto and provided with foot flanges. The longitudinal side members 1 at their extreme rear ends are rigidly connected by a suitable cross-member 5 fixed to their bottoms; and a plate or shelf 6 extends from standard 2 to standard 2 with its ends resting on and rigidly secured to the tops thereof.

The portions of the longitudinal members 1 that are located forward of the shelf 6 constitute a track for the carriage E that carries the work table B. The carriage comprises longitudinal side members 7 that are connected by two spaced parallel cross-members 8 secured to the tops of said side members 7; and flanged wheels 9 run on the side frame members 1 and are supported in brackets 10 that are fixed to the bottoms of the carriage side members 7 near their ends. The work table B is mounted upon the cross angle-irons 8 of the carriage for movement transversely of the direction in which the carriage moves. The work table B comprises a flat top 11 having suitable fixtures 12 on its top for removably securing the ends of the bumpers thereto, said fixtures being arranged so that the bumpers will extend parallel to the line of travel of the carriage. Depending from the bottom of the work table top 11 near each side thereof are a pair of spaced brackets 13. Each pair of these brackets has a longitudinal shaft 14 extending through them with wheels 15 fixed on the shaft for running on the cross angle-irons 8 of the carriage frame. One of the shafts 14 extends beyond the front end of the work table B and is provided with a hand wheel 14a for moving the work table transversely. By means hereinafter described, the work table B may be held in fixed position on the carriage E when polishing bumpers of certain types.

The parts that support the polishing wheel supporting arms C, together with the mechanism for driving the polishing wheels D, are supported on top of the shelf 6 at the rear end of the machine. Secured to the top of the shelf 6 near the front edge thereof are suitable bearing brackets 16 that support a cross-shaft 17. Each frame arm C is provided at its rear end with collars 18 that are rotatably mounted on the cross-shaft 17 so as to permit free vertical swinging movement of said arm on said shaft. The front or free end of each frame arm C has a shaft 19 journaled therein on which is mounted the polishing wheel D carried by said arm. Said shaft 19 has a pulley 20 fixed thereon that is driven by a belt 21 which passes around a pulley 22 fixed on the arm supporting shaft 17. The shaft 17 is preferably driven by an electric motor 23 seated on the shelf 6, one end of said shaft having a pulley 24 fixed thereon that is driven by a belt 25 mounted around a pulley 26 fixed to the armature shaft of the motor 23.

Each frame arm C is supported near its free end by a balancing lever 27 fulcrumed near its center on a bracket 28 that is mounted on an angle iron 29 that extends along the front edge of the shelf 6 with its end secured to the bearings 16 for the cross-shaft 17. The counterbalancing lever 27 is connected near its front end to the frame arm C by an adjustable connecting device and is provided near its rear end with a weight 30 that partially counterbalances the frame arm and its polishing wheel D. As shown in Fig. 9, the adjustable connecting device comprises a stirrup 31 pivotally suspended from the front arm of the counterbalancing lever 27 and an inverted stirrup 32 pivotally secured to a bracket 33 fixed on the frame arm with an adjusting screw member 34 extending through the bottom portions of the two stirrup members and having a hand wheel 35 fixed thereon between said stirrups. Pivotally secured to the rear arm of each counterbalancing lever 27 rearwardly of the weight 30 thereon is an elongated stirrup 36 (see Fig. 8) that contains a long coil spring 37. Disposed within the coil spring 37 is a pipe 38 whose bottom rests on the closed lower end of the stirrup 36; and slidably mounted within said pipe is a rod 39 whose upper end extends beyond the top of the pipe and has an adjusting nut 40 threaded thereon for engaging the top of said coil spring. By means of this nut, the force exerted by the coil spring 37 is readily varied. The bottom portion of said rod 39 extends through the bottom of the stirrup and is fixed to the upper end of a chain 41 whose lower end is attached to the rear cross-member 5 of the framework. By this arrangement, the compression of the coil spring 37 tends to relieve the pressure of the polishing wheel D on the bumper A as it travels up and down the downwardly curved end portions thereof. Accordingly, the effective weight of the polishing wheel on the bumper is substantially equalized throughout the entire length of the bumper in consequence of which an even polishing action is assured over its entire surface. Preferably, removable weights 42 are provided on the front end of the counterbalancing lever 27, which weights, together with the adjustable connection between said lever and the arm frame C, provide a delicate adjustment for obtaining proper working pressure of the polishing wheel on the bumper.

Connected to the rear end of each counterbalancing lever 27 is a chain 43 that is attached to one arm of a bent lever 44 that is pivoted in a bearing 45 fixed to the rear cross-member 5. The other arm of the lever 44 is pivotally connected to the rear end of an actuating rod 46 that extends alongside the longitudinal side member 1 of the framework and is operatively connected at its front end to a foot treadle lever 47 fulcrumed on a pin 48 projecting laterally from a post on a supporting bracket 49 that is fixed to said longitudinal side frame member. By this arrangement, the foot treadle lever 47 may be operated to swing the front end of the polishing wheel frame arm C upwardly and thus lift the polishing wheel D off the bumper; and the foot treadle lever is provided with a suitable latching device 47a for holding the polishing wheel and its supporting structure in such position.

The motor 23 that drives the polishing wheels D is operatively connected to the carriage E for moving it back and forth on its tracks. Mounted in bearings 50 secured to the standards 2 slightly above the longitudinal side frame members 1 is a cross-shaft 51 having a sprocket wheel 52 fixed thereon. A pair of spaced cross-members 53 is secured to the bottoms of the longitudinal side frame members 1 below the polishing wheels, and fixed on these cross-members 53 are bearings 54 in which is journaled a shaft 55 having a sprocket wheel 56 fixed thereon. Mounted around the sprocket wheel 56 and the sprocket wheel 52 is an endless sprocket chain 57. Secured to the bottoms of the cross angle-irons 8 of the carriage E intermediate its longitudinal side members is a tongue arm 58 that extends beyond the rear end of said carriage and is attached to the upper stretch of the sprocket chain 57. Fixed to the cross-shaft 51 carrying the rear sprocket wheel 52 are two pulleys 59. Journaled in bearings 60 provided therefor at the rear of the shelf 6 are two spaced parallel cross-shafts 61 provided with gears 62 that intermesh with each other. One of these gear shafts 61 has fixed on its end a pulley

63 that is driven by a belt 64 that is mounted around a pulley 65 fixed on the end of the cross-shaft 17. By this arrangement, one of the two gear shafts 61 is driven in one direction by the belt 64 while the other of said gear shafts is driven in the opposite direction by the intermeshing gears 62 on the corresponding ends of said shafts. Each gear shaft 61 has a pulley 66 fixed thereto that has a belt 67 loosely mounted around it and around one of the pulleys 59 fixed on the sprocket wheel cross-shaft 51. Accordingly, if these belts are alternately tightened, the sprocket wheel cross-shaft 51 will rotate in one direction and then in the opposite direction to cause the carriage to travel back and forth. The belts 67 are tightened by means of a V-shaped rocker arm 68 fixed at its apex on a rocker shaft 69 that is located directly below the sprocket wheel shaft 51 and journaled in suitable bearings 70 fixed to the standards 2 near their bottoms. The V-shaped rocker arm 68 has stub shafts 71 that project laterally in opposite directions from the ends of the two fingers 72 of said rocker arm, and mounted on these shafts are idler pulleys 73 journaled therein adapted to engage the loosely mounted belts 67 for tightening them. By this arrangement, when the rocker arm 68 is tilted forwardly one of the idler pulleys 73 will engage and tighten one of the loosely mounted belts 67 to cause the sprocket wheel shaft 51 to rotate in one direction, and when the rocker arm is tilted rearwardly the other idler pulley 73 will engage and tighten the other loosely mounted belt 67 to cause said sprocket wheel shaft to rotate in the opposite direction.

The rocker or carriage reversing shaft 69 is operated by a control rod 74 that extends alongside the path of travel of the carriage E and is slidably supported near its front end in a bracket 75 secured to one of the longitudinal side members 1 of the framework. The rear end of the carriage reversing or control rod 74 has a swivel pin connection 76 with the free end of an upstanding rocker arm 77 fixed to the rocker shaft 69. The control rod 74 is slid back and forth to actuate the rocker arm 68 and thus reverses the travel of the carriage E by a pin 78 depending from the carriage E in position to abut against the opposing ends of two sleeves 79 slidably mounted on said rod in longitudinally spaced relation. Each of the sleeves 79 is movable along the rod 74 between two stops 80 located at opposite ends of a stop bracket 81, the larger stop being sleeved on said rod to permit adjustment of the stop bracket longitudinally thereof and being fixed to said rod by set screws 82. A coil spring 83 is sleeved on the rod 74 between each sleeve 79 and the large stop at one end of the stop bracket 81 for said sleeve. By this arrangement, the pin 78 presses against one of the axially yieldable sleeves 79 as the carriage nears the end of its travel, thereby shifting the rod 74 in a direction that will reverse the travel of said carriage.

Fixed on the end of the rocker shaft 69 is a rocker arm 84 that extends upwardly along the outside of one of the standards 2. Mounted on a bracket 85 that projects rearwardly from the shelf 6 are two abutment members 86 that are arranged one on each side of the free upper end of the rocker arm 84 and serve to limit its rocking movement. Mounted on a horizontal pivot fixed to the standard 2 located adjacent to the arm 84 is a lever 87 having a weight 88 fixed on its front arm and having its rear arm pivotally connected to the lower end of a link 89 whose upper end is pivotally connected by means of a pin 90 to the upper end of the rocker arm 84. When the rocker arm 84 is in neutral position, it extends vertically, and the connecting link 89 also extends vertically so that the weight 88 is in dead center position and will not affect the movement of said rocker arm. However, when the control rod 74 is shifted by the carriage E in either direction to cause the rocker arm 84 to move out of dead center position, the weight on the lever 87 will assist in moving said rocker arm and also hold it in position against one of the abutment members 86 and prevent the idler pulley 73 on the V-shaped rocker arm 68 from backing away from the belt 67 engaged by said pulley. Sleeved on the pivot pin 90 between the arm 84 and the link 89 is a friction disk 91 that is clamped between said arm and said link by means of a coil spring 92 sleeved on said pin between the outer face of said arm and the hub of a wheel 93 that is threaded on the outer end of said pin. By this arrangement, the friction disk 91 operates to prevent the arm 84 from rebounding after striking the abutments 86, the friction being regulated by means of the wheel 93.

In order to stop the movement of the carriage, the rocker arm 68 must be held in neutral vertical position. This is accomplished by a collar 94, which is fixed to the control rod 74 near its front end and is provided with a depending lug 95 that loosely engages a recess 96 provided therefor in the upper end of an arm 97 pivoted on a bracket 98 fixed to the outer side of the adjacent longitudinal side member 1. Fixed to the arm 97 is a handle 99 that extends slightly beyond the front end of the machine, and by manipulating this handle, the control rod 74 can be held in neutral position. A latching mechanism is provided on the bracket for latching the handle with the control rod in neutral position. Said mechanism preferably comprises an arm 100 pivoted at its lower end on the bracket 98 for vertical swinging movement towards and away from the inner face of the arm 97. The upper end of the lock arm 100 is provided with a notch 101 adapted to cooperate with a pin 102 on the rod operating arm 97 and thus lock the same against movement. The lock arm 100 is actuated by means of a handle 101a located just below the handle 99 of the rod operating arm 97.

The above described carriage feed and the control therefor have been made the subject matter of a divisional application Serial No. 36,787 filed August 19, 1935.

In the drawings, the work table B is provided with a sufficient number of fixtures 12 for accommodating eight bumpers; said fixtures being arranged so that said bumpers will be spaced equal distances apart on said table. The work table is moved transversely of the carriage by means of the hand wheel 14a to bring a bumper directly beneath a polishing wheel D; and means are provided for locking said work table to the carriage so as to hold said bumpers in line with said polishing wheels. Said table locking means preferably comprises a horizontal cross-bar 103 slidable endwise in brackets 104 fixed to the tops of the longitudinal side members 7 of the carriage and provided with four vertical holes 105 for receiving the lower end of a pin 106 slidably mounted in a bracket 107 fixed to the underside of the work table. A compression spring 108 is interposed between the top of the pin 106 and the bottom of the work table for keeping the lower end of said pin in the holes 105 in the cross-

bar 103. The pin 106 is disengaged from the holes 105 in the cross-bar 103 by means of a hand lever 109 pivoted to swing vertically in a bracket 110 fixed to the underside of the work table. The outer arm of the lever 109 extends outwardly beyond the front end of the table; and the rear arm of said lever is provided with an opening for receiving a pin 111 that projects horizontally from the stop pin 106 through a vertical slot 112 provided therefor in the pin supporting bracket 107. By this arrangement, when the outer arm of the hand lever 109 is moved downwardly the inner arm thereof will swing upward and disengage the stop pin 106 from the holes 105 in the cross-bar 103 and thus release the carriage and allow it to be moved over to its next position. In this connection, it is important to note that the four holes 105 in the cross-bar 103 are located in such position and spaced at such distances apart that each hole determines one of the four polishing positions of the work table. One end of the cross-bar 103 is provided with a vertical pin 113 on which is journaled a roller 114, the purpose of which will hereinafter appear. The other end of the cross-bar 103 is provided with a depending flange 115 that overhangs the adjacent longitudinal side member 7 of the carriage and is provided with an adjustable stop screw 116 which is yieldably held in abutting relation to said longitudinal side member by means of coil springs 117 fastened at one end to the opposite longitudinal side member 7 of the carriage and at the other end to a bracket 118 fixed to said cross-bar intermediate the ends thereof.

In order to polish bumpers of the type that are bent edgewise, after the manner of the bumpers A′ and A² illustrated in Fig. 16, master forms 119 and 120, respectively, are bolted to a longitudinal supporting bar 121 which is fixed to brackets 122 secured to the longitudinal side member 1 located adjacent to the roller end of the cross-bar 103. The longitudinal bar is provided with a series of vertical holes 123 for bolting thereon a master form for the particular shape of edge bent bumper that is to be polished. Each master form 119, 120 comprises a plate member or the like having a cam surface, which is shaped to correspond to that of a bumper and is adapted to be engaged by the roller 114 on the end of the cross-bar 103 when the carriage is moved back and forth. By this arrangement, the work table in moving back and forth will also move laterally against the tension of the coil springs 117 and thus keep the surface of the particular bumpers being polished in contact with the polishing wheels.

The hereinabove described polishing machine is operated as follows: The group of bumpers A to be polished is fixed on the work table B. The hand lever 109 extending from the front of the work table is actuated to disengage the locking pin 106 from the cross-bar 103. The table is then moved crosswise of the carriage E by means of the hand wheel 14a to bring the first bumper directly below the one polishing wheel and the fifth bumper directly below the other polishing wheel. The table is then locked in such position by releasing the handle lever 109 and allowing the locking pin 106 to seat itself in the registering hole 105 in the cross-bar 103. The work table is then set in motion by releasing the control rod latch handle 101a and by operating the control rod hand lever 99 to shift the control rod 74 out of neutral position and thus cause the rocker shaft 69 and the V-shaped rocker arm 68 to move into such position that one of its idler pulleys 73 will engage one of the loosely mounted belts 67 to tighten the same and thus cause the sprocket wheel shaft 51 to rotate and move the carriage in one direction. At the end of the travel of the carriage in this particular direction, the pin member 78 which depends from said carriage will engage one of the sleeves 79 on the control rod and shift it far enough in the direction of travel of the carriage to rotate the swing of the rock arm 68 and bring the other idler pulley 73 into engagement with the other loosely mounted belt 67 to tighten the same and thus cause the carriage to reverse its direction of travel. Thus, the two belts 67 are loosened and tightened alternately, thereby imparting a continuous back and forth or reciprocating movement to the carriage.

The polishing wheels D are engaged with the bumpers by releasing the foot treadle 47 at the front end of the machine. Assuming that the tensioning mechanism has been properly adjusted by means of the adjusting nuts 40, and the proper weights 42 for the particular weight of polishing wheels have been placed on the front end of the counterbalancing levers 27, the polishing wheels will bear against the central portion of the bumpers with substantially the same pressure as it will bear against the curved ends thereof. Accordingly, an even polishing action takes place throughout the entire length of the bumpers.

After the first and fifth bumpers have been thoroughly polished, the foot treadle 47 is again actuated to raise the polishing wheels and the control rod hand lever 99 is operated to stop the movement of the carriage. It is to be noted that these operations do not require stopping the motor 23 driving the polishing wheels. After the carriage is stopped, the hand lever 109 extending in front of the work table is actuated to release the work table from the carriage and the hand wheel 14a is then operated to move said work table transversely of said carriage to bring the second and sixth bumpers beneath the grinding wheels. In this connection, it is to be noted that the hand lever 109 of the work table is depressed for a fraction of a second and then released so that, as soon as the table has moved over far enough, the coil spring 108 will automatically force the locking pin 106 into the second hole in the cross-bar 103 so that the work table will stop in its second polishing position. In the third polishing position of the table, the third and seventh bumpers are polished, while in the fourth position of said table the fourth and eighth bumpers are brought into position beneath the polishing wheels.

When it is desired to polish bumper bars that are curved edgewise after the manner of the bumper bars shown in Fig. 16, it is necessary to shift the reciprocating bars laterally so as to bring the curved portions thereof beneath the polishing wheels. This lateral movement of the bumper bars during the endwise reciprocating movement thereof is brought about by the use of a cam plate or master form of the kind shown in Fig. 16, having a curved cam edge corresponding to the curvature of the edge bent bumper bars that are to be polished. As stated above, such cam plate is rigidly secured to the frame of the machine with its cam edge in position to be engaged by the roller 114 at the end of the cross-bar 103. With this arrangement, the roller 114 at the end of the cross-bar 103 follows the cam edge of the plate during the reciprocating movement of

the table and thus imparts to the table the lateral movement necessary to keep the bumpers in line with the polishing wheels.

Obviously, the hereinbefore described polishing machine admits of considerable modification without departing from the invention. Therefore, I do not wish to be limited to the precise construction and arrangements of parts shown and described.

What I claim is:

1. A polishing machine comprising a work supporting table, a lever pivoted on said machine with one arm overhanging said work table, an arm pivoted on said machine below the overhanging lever arm, a polishing wheel operatively sustained by said pivoted arm, balance weights on said lever, a yieldable connection between the other arm of said lever and said machine including a compression spring and a stop for limiting the compression of said spring, and means for adjusting said pivoted arm relative to the overhanging arm of said lever.

2. A polishing machine comprising a work supporting table, a lever pivoted on said machine with one arm overhanging said work table, a polishing wheel operatively sustained by said overhanging arm of said lever, and a yieldable connection between the other arm of said lever and said machine, said connection comprising a stirrup pivotally connected at its upper end to said lever, a rod slidable vertically in said stirrup, a flexible connection between the lower end of said rod and said machine, a nut threaded on the upper end of said rod, and a compression spring sleeved on said rod and held under compression between the nut thereon and the bottom of said stirrup and a stop for limiting the compression of said spring.

3. A polishing machine comprising a work supporting table, a lever pivoted on said machine with one arm overhanging said work table, a polishing device operatively sustained by said overhanging arm of said lever, and a yieldable connection between the other arm of said lever and said machine, said connection comprising a stirrup pivotally connected at its upper end to said lever, a rod slidable vertically in said stirrup with its lower end anchored to said machine, a nut threaded on the upper end of said rod, a compression spring sleeved on said rod between the nut thereon and the bottom of said stirrup, and a sleeve surrounding said rod for limiting the deflection of said spring.

4. A polishing machine comprising a reciprocating carriage, a polishing element, a work table mounted on said carriage for movement transversely thereof, and means for locking said table to said carriage, said locking means comprising a pin mounted on said table and adapted to engage any one of a series of holes provided therefor in said carriage.

5. A polishing machine comprising a reciprocating carriage, a polishing element, a work table mounted on said carriage for movement transversely thereof, means for locking said table to said carriage, said locking means comprising a spring-pressed pin mounted on said table and adapted to engage any one of a series of holes provided therefor in said carriage, and a lever pivoted to said table and operatively engaging said pin for disengaging the same.

6. A polishing machine comprising a reciprocating carriage, a polishing element, a work table mounted on said carriage for movement transversely thereof, a cross-bar mounted on said carriage for sliding movement transversely thereof, an adjustable stop member on one end of said cross-bar, and a spring connection between the other end of said cross-bar and said carriage for holding said stop member in abutting relation to said carriage.

7. A machine for polishing laterally curved articles comprising a reciprocating carriage, a work table mounted on said carriage for movement transversely thereof, a polishing wheel located above said table in position to engage an article thereon, a cross-bar mounted on said carriage for yielding movement transversely thereof, means for locking said table to said yieldable cross-bar, a roller journaled on said yieldable cross-bar, and a cam plate fixed to said machine and having a cam face cooperating with said roller shaped to conform to the curvature of the articles being polished.

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