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No. 781,423. PATENTED JAN. 31, 1905.

B. C. HEMMING.

AUTOMATIC POLISHING MACHINE.

APPLICATION FILED DEC. 30, 1901. RENEWED NOV. 16, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

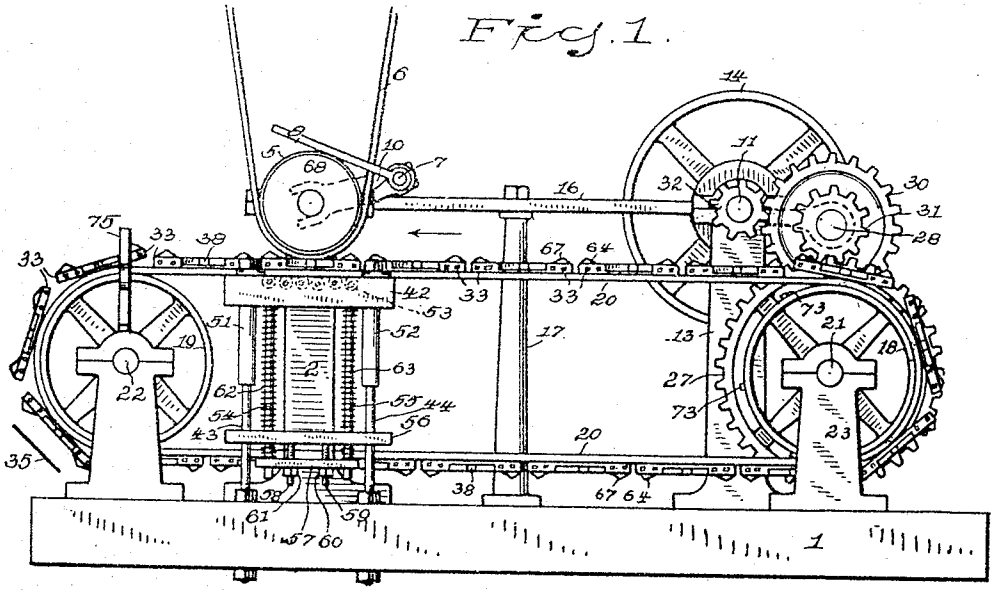
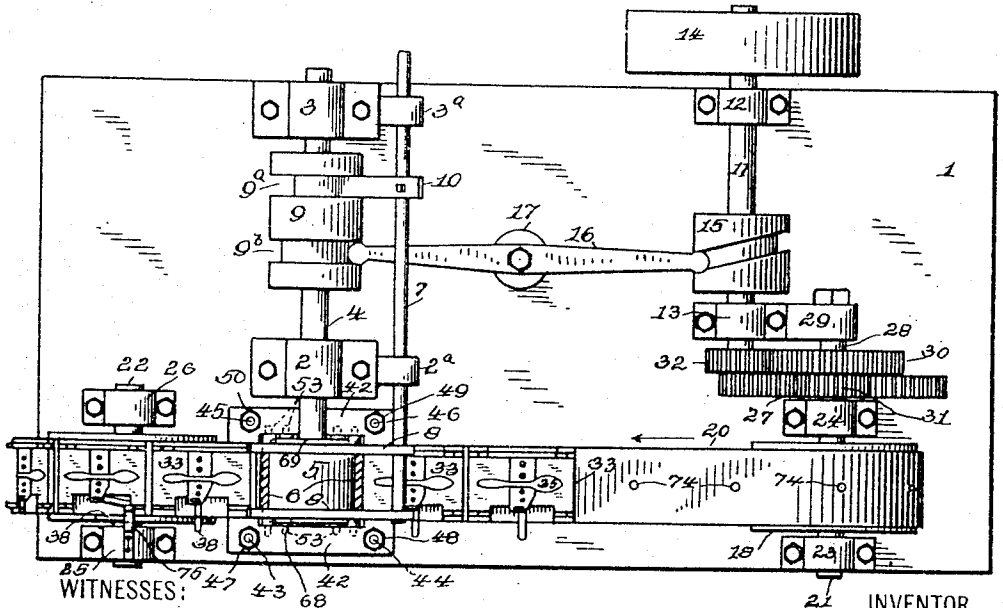


Fig. 2.



WITNESSES:

H. A. Lamb.

H. J. Chaffee.

INVENTOR

Benjamin C. Hemming.

BY Geo. O. Phillips.

his ATTORNEY

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Fig. 3.

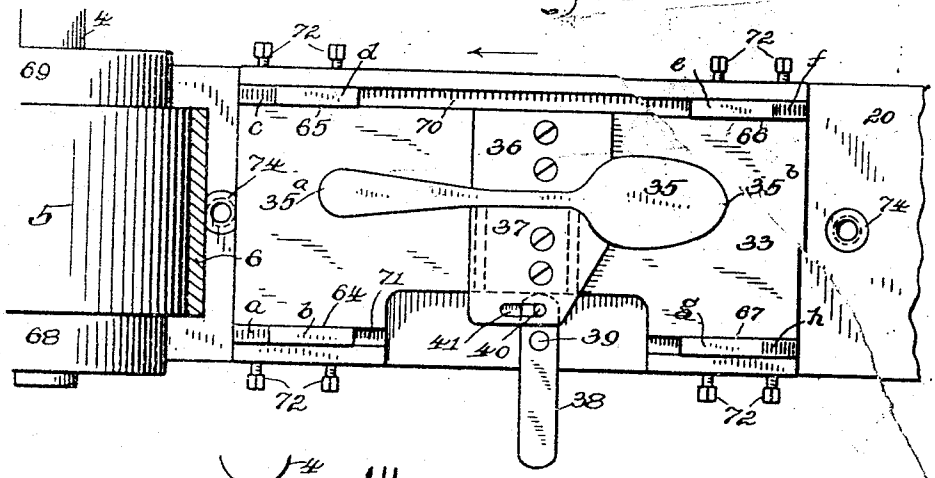


Fig 4.

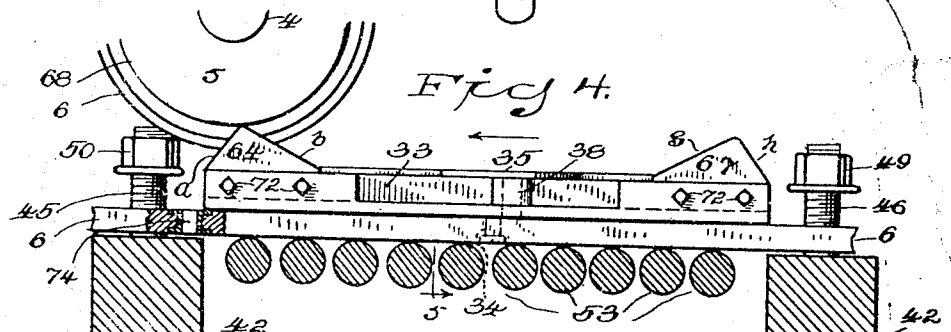
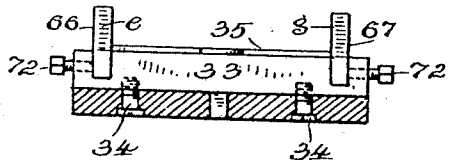


Fig. 5.



51a

45

52a

46

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H. J. Chaffee.

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BY Geo. W. Phillips

his ATTORNEY

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No. 781,423. Patented January 31, 1905.

UNITED STATES PATENT OFFICE.

BENJAMIN C. HEMMING, OF MERIDEN, CONNECTICUT.

AUTOMATIC POLISHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 781,423, dated January 31, 1905.

Application filed December 30, 1901. Renewed November 16, 1904. Serial No. 232,961.

To all whom it may concern:

Be it known that I, BENJAMIN C. HEMMING, a citizen of the United States, and a resident of Meriden, in the county of New Haven and State of Connecticut, have invented a certain new and useful Improved Automatic Polishing-Machine, of which the following is a specification.

My invention relates to an automatic polishing-machine for polishing various kinds of small articles; and it consists in certain details of construction to be more fully set forth in the following specification and such features believed to be new and novel particularly pointed out in the claims.

To enable others to understand my invention, reference is had to the accompanying drawings, in which—

Figure 1 represents a side elevation of the machine and broken view of the polishing strap or belt. Fig. 2 is an upper plan view of the machine, broken view of the polishing-belt, showing also part of the holders removed from the endless flexible traveling belt or carrier. Fig. 3 is a broken plan view of the endless carrier with one of the holders thereon and a spoon in said holder, broken view of the polishing-belt and its pulley. Fig. 4 is a side elevation of one of the holders, broken view of the polishing-belt and its pulley, broken view of the holder-carrier, sectional view of a series of rollers underlying said carrier, and sectional view of the depressible roller-frame. Fig. 5 is an end elevation of the holder and sectional view of the endless carrier through line 5 of Fig. 4.

Its construction and operation are as follows:

1 represents the bed of the machine.

2 and 3 are standards supporting the rotatable polishing-arbor 4, carrying the small pulley 5, over which runs the polishing-belt 6. This belt is driven from overhead by means of mechanism not shown. The arbor 4 is also adapted to have a reciprocating longitudinal movement as well as a rotary movement in the manner presently to be described.

7 is a shipper-rod operatively mounted in the lugs 2^a and 3^a, projecting from the standards 2 and 3.

8 represents shipper-fingers embracing the polishing-belt.

9 is a double-grooved collar. The groove 9^a is adapted to receive the fork end of the arm 10, secured to the shipper-rod 7, so that said rod and arbor 4 will be moved longitudinally together.

11 is the driving-shaft mounted in the standards 12 and 13 and carries the driving-pulley 14 and cam 15.

16 is a cam-lever pivotally supported on the standard 17. One end of this lever engages with the groove in said cam, while its opposite end engages with the groove 9^b of the collar 9 on the polishing-arbor 4, so that by the rotative movement of shaft 11 and through the medium of its cam and lever 16 the arbor 4 is longitudinally reciprocated.

18 and 19 are pulleys carrying the endless belt or carrier 20, presently to be described, and are mounted on the short shafts 21 and 22 in the standards 23, 24, 25, and 26.

27 is a large gear mounted on the shaft 21. Above said shaft is another short shaft 28, rigidly secured in the hanger 29, projecting from the inner standard 13. 30 and 31 are gears mounted on this short shaft, one engaging with the small pinion 32 on shaft 11 and the other with the large gear 27 on the shaft 21. These gears are for the purpose of reducing the speed of the pulley 18, and consequently the linear speed of the endless carrier 20.

33 represents a series of holders in which the articles to be polished are secured. These holders are secured (see Fig. 5) to the carrier by means of the two screws 34, located at the center of the holders, so that they will rock or tilt in passing around the end pulleys 18 and 19. As represented, the spoons 35 (see Figs. 3 and 4) are held in said holders between the stationary block or jaw 36 and the movable jaw 37.

38 is a handle-lever pivotally supported on the pin 39 and carries at its inner end the pin 40 to operate in the slot 41 of the movable jaw 37, whereby such jaw is operated.

42, Figs. 1, 2, and 4, is a depressible supporting frame or table having a vertical movement on the long bolts 43, 44, 45, and 46. The lower ends of these bolts are anchored in the bed of the machine, while their upper threaded ends carry the nuts 47, 48, 49 and

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50 to limit the upward movement of the depressible frame 42. Four guide-sleeves—viz., 51, 52, Fig. 1, and 51^a 52^a, Fig. 4—project from the under side of the frame 42 to keep it from tilting on said bolts. This frame is simply a rectangular piece whose central open space is filled with the rollers 53, journaled therein. These rollers form an antifriction bed or support for the endless carrier.

Four rods (two only, 54 and 55, are shown at Fig. 1) project from the under side of the frame 42. As the rods not shown are equipped and arranged precisely like those shown, a brief description of the latter will suffice for all. These rods pass freely through the bar 56, secured to the bolts 43 and 44, and also freely through the short bar 57, adjustably secured below the bar 56 by means of the studs 58 and 59 and their nuts 60 and 61.

62 and 63 are coiled springs on the rods 54 and 55, whose ends are interposed between the frame 42 and the bar 57, the tension of these four springs being regulated by the nuts 60 and 61.

To protect the extreme ends of the spoon and prevent such ends being beveled off when first engaging and also leaving the polishing-belt, the four projections 64, 65, 66, and 67, Figs. 3, 4, and 5, rise from each of the spoon-holders and are each provided with inclined faces *a b c d e f g h* to be engaged by the collars 68 and 69 on each side of the polishing-belt pulley 5.

The height of the frame 42 is regulated, as before mentioned, by the nuts 47, 48, 49, and 50, which nuts are set to obtain more or less contact of the polishing-belt with the work, so that when the incline faces *a* and *c* strike the collars 68 and 69 the frame and its anti-friction-rolls will be depressed, Fig. 4, so as to permit the projections 64 and 65 to pass under said collars. As the collars pass down the inclines *b* and *d* the polishing-belt will approach the work, and these projections are so positioned with respect to the end of the work to be polished that the said inclines will keep the polishing-belt from contact with the spoon until ready to engage with its extreme forward end 35^a, Fig. 3. In other words, the frame 42 must not reach its highest point—viz., against the nuts 47, 48, 49, and 50—in advance of the engagement of the said belt with the spoon; otherwise, as before stated, it will round or bevel off the ends of the spoon. The rear projections 67 and 68 are also set to protect the other end of the spoon from the same trouble when the polishing-belt is leaving, or rather when the spoon is leaving the belt. Just as the extreme end 35^b of the bowl portion of the spoon is reached the inclines *e g* will engage the collars 68 and 69 and again cause the frame 42 to be depressed. These inclined faced projections are located in the grooves 70 and 71, so that they may be adjusted to suit different lengths of work to be polished. 72 represents set-screws for securing said projections in any of their adjusted positions.

It is absolutely essential that the travel of the endless carrier should be constant, for the least hitch or stop even for a second while the polishing-belt is in contact with the work would result in cutting a groove therein below the finished surface, and thus ruin the piece. To prevent this, the pulley is provided with the driving-pins 73 at intervals around its periphery to engage with the eyelets 74, Figs. 2 and 3, in the carrier 20. This arrangement will not only prevent slipping of said carrier, but will also avoid the necessity of having said carrier hugging the pulleys 18 and 19 as tightly as they otherwise would if some such an arrangement were not provided.

The spoons are automatically unlocked from contact with the jaws of the holders just before said holders pass around the periphery of the pulley 19 by means of the engagement of the handles 38 with the rod 75, projecting up from the standard 25, as shown at Fig. 2, so that when one of the holders has reached the under side of the pulley 19 the spoon will drop out of such holder, as shown at Fig. 1.

It will be observed that the above-described machine is particularly adapted for polishing uneven surfaces. Spoon-blanks and other articles of like character are more or less crooked, and therefore difficult to polish except by hand; but with my flexible bed all portions of the surface of the work are kept in contact with the polishing-belt, so that when a ridge or high part comes in contact with the polishing-belt the holder is depressed to allow said belt to pass over such high part, while the reaction of the depressible frame will carry the holders up for the belt to engage with the lowest part of the work.

That feature for the protection of the end of the work is a very important one in polishing and has not heretofore been successfully accomplished by automatic machinery, and therefore has always been done by hand; but even the best skilled hand-work is far inferior to the work done by this important feature of my improved automatic polishing-machine.

There are many details of construction in my machine that could be varied without departing from the spirit of my invention—*e. g.*, a solid polishing-wheel could be substituted for the belt, in which case the shipper-rod 7 would not be required. Other mechanism could be employed for reducing the linear speed of the endless carrier and also for imparting a reciprocating movement to the polishing-arbor.

While I show holders adapted to carry spoon-blanks, it will be understood that any other article adapted to be secured in the holders could be polished equally as well.

Having thus described my invention, what

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I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a polishing-machine, of an arbor carrying a polishing device, a work-holder, a depressible spring-actuated supporting frame or table for said holder, adjustable stops for limiting the upward movement of said frame, for the purpose set forth.

2. The combination, in a polishing-machine, of an arbor carrying a polishing device, a work-holder, a depressible spring-actuated supporting frame or table for said holder, adjustable stops for limiting its upward movement, said holder provided with projections rising above the work-holding bed of said holder, means connected with said arbor adapted to engage said projections and temporarily depress said frame and holder, for the purpose set forth.

3. The combination, in a polishing-machine, of the character described, of an arbor carrying a polishing device, an endless carrier, rotatable supports therefor, work-holders mounted thereon, a depressible spring-actuated frame directly under the polishing device, adjustable stops to limit its upward movement, said work-holders provided with projections, means connected with said arbor adapted to engage said projections and temporarily depress said frame until the end of the work in said holders is reached, whereupon, the said frame will be elevated to its normal position, for the purpose set forth.

4. The combination, in a polishing-machine, of the character described, of an arbor carrying a polishing device, an endless carrier, rotatable supports therefor, work-holders mounted thereon, a depressible spring-actuated frame carrying an antifriction-roller bed underlying said polishing device, adjustable stops for limiting the upward movement of said frame, said work-holders provided with projections at each end, means connected with said arbor adapted to engage said projections and temporarily depress said frame and thereby protect the extreme ends of the work in said holders, for the purpose set forth.

5. The combination, in a polishing-machine, of an arbor carrying a polishing device, an endless carrier, rotatable supports therefor, work-holders mounted thereon, a depressible spring-actuated frame carrying an antifriction-roller bed underlying said polishing device, adjustable stops for limiting the upward movement of said frame, said work-holders provided with projections at each end, means connected with said arbor adapted to engage said projections and temporarily depress said frame and thereby protect the extreme ends of the work in said holders, means for releasing the work from said holders after passing the polishing-field, for the purpose set forth.

6. The combination, in a polishing-machine, of an arbor carrying a polishing device and adapted to have both a rotatory and a longitudinally-reciprocating movement, an endless work-holding carrier, rotatable supports therefor, a depressible spring-actuated frame carrying an antifriction-roller bed underlying said polishing device, adjustable stops for limiting its upward movement, collars on each side of said polishing device, angular projections rising from said holders adapted to be engaged by said collars and thereby cause the temporary depression of the said frame, carrier and its holders, for the purpose set forth.

7. The herein-described work-holder having a supporting-bed for the work, means for temporarily securing the work therein, projections rising above said bed and located so as to protect the extreme ends of the work from a polishing device, for the purpose set forth.

8. The herein-described work-holder having a supporting-bed for the work, means for temporarily securing the work therein, projections rising above said bed and adapted to be adjusted so as to protect the extreme ends of the work from a polishing device, for the purpose set forth.

9. The herein-described work-holder having a supporting-bed for the work, means for temporarily securing the work therein, angular projections rising above said bed and adapted to be adjusted so as to protect the extreme ends of the work from a polishing device, for the purpose set forth.

10. The combination, in a polishing-machine, of a frame carrying an antifriction-roller bed, a support for said frame, said frame adapted to have a vertical movement thereon, means for limiting the movement of said frame in one direction, springs for returning said frame to its normal position, means for regulating the tension of said springs, for the purpose set forth.

11. The combination, in a polishing-machine, of a frame, carrying an antifriction-roller bed, a support for said frame, said frame adapted to have a vertical movement thereon, adjustable means for limiting the movement of said frame in one direction, springs for returning said frame to its normal position, means for regulating the tension of said springs, for the purpose set forth.

12. The combination, in a machine carrying a polishing device, a frame underlying said device, a support for said frame, said frame adapted to move on said support, stops for limiting its movement in one direction, springs underlying said frame for holding it against said stops, for the purpose set forth.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 6th day of December, A. D. 1901.

BENJAMIN C. HEMMING.

Witnesses:

A. K. LOVELL,

GEORGE W. FINN.