No. 890,463. PATENTED JUNE 9, 1908.

E. A. SOULES.

SANDPAPERING MACHINE.

APPLICATION FILED JUNE 27, 1907.

3 SHEETS—SHEET 1.

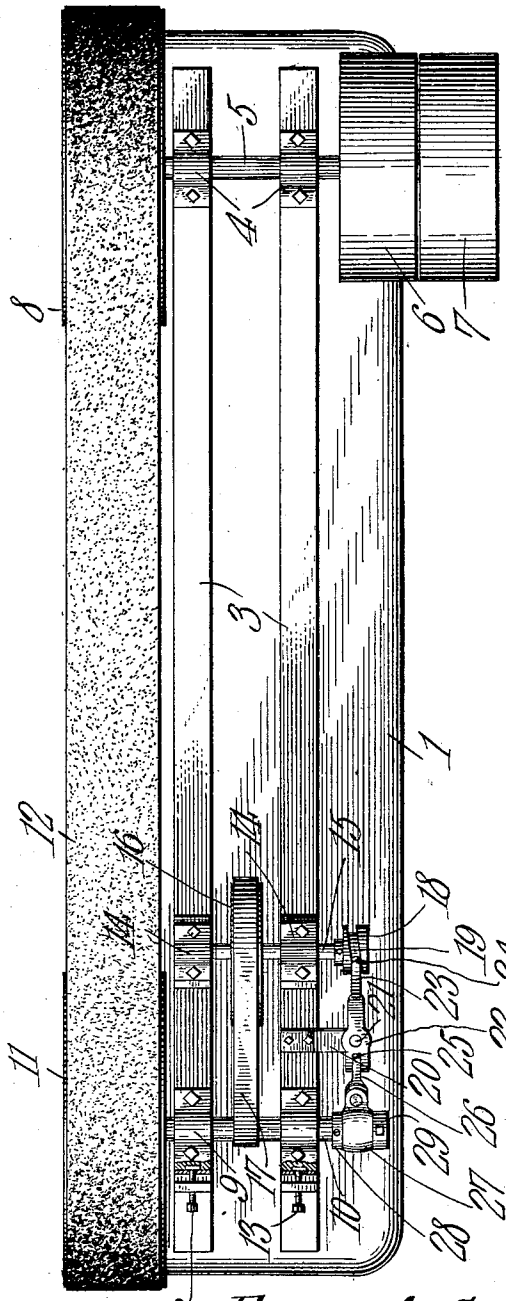


Fig. 1.

WITNESSES:

E. G. Stewart

F. T. Chapman

Edgar A. Soules, INVENTOR.

By C. A. Snow & Co.

ATTORNEYS

THE NORRIS PETERS CO., WASHINGTON, D. C.

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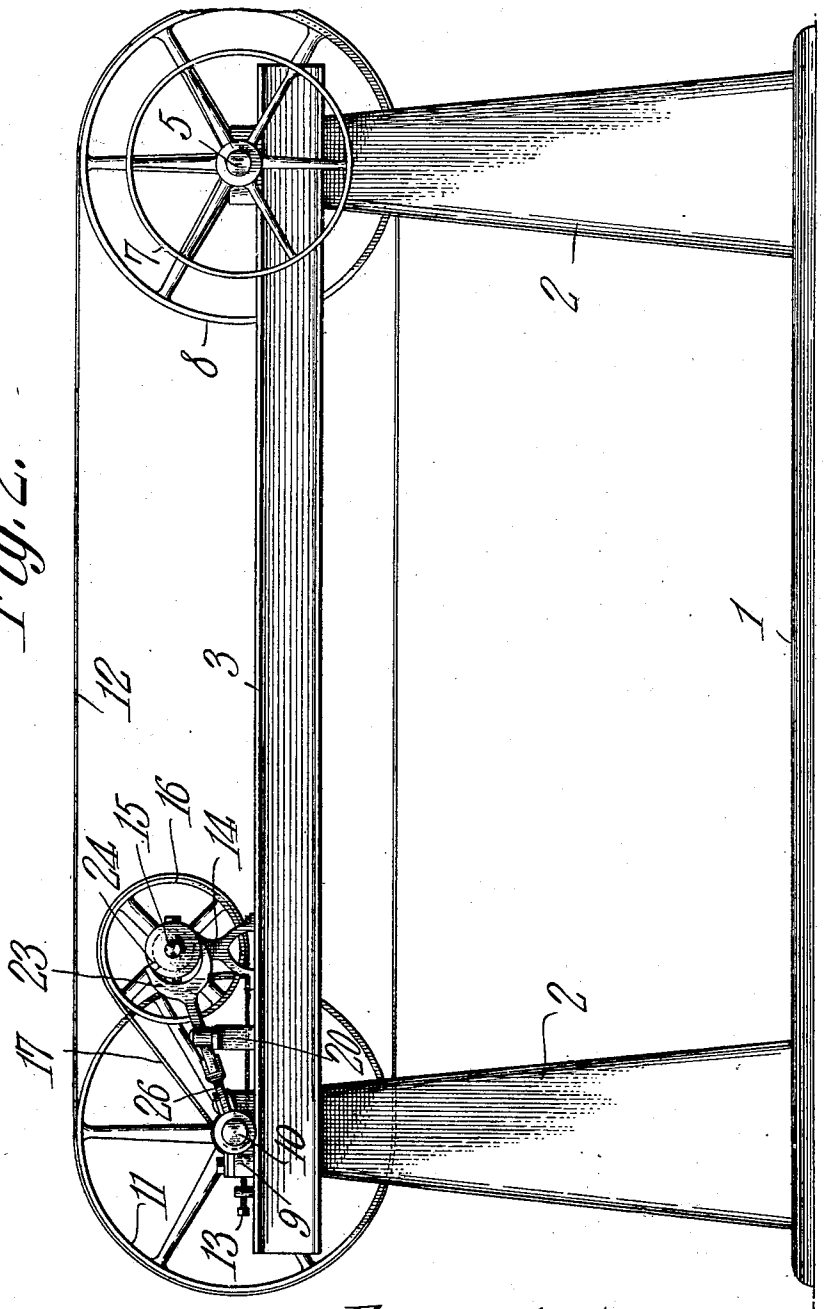
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3 SHEETS—SHEET 2.

Fig. 2.



WITNESSES:

E. J. Stewart

F. T. Chapman

Edgar A. Soules, INVENTOR.

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ATTORNEYS

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3 SHEETS—SHEET 3.

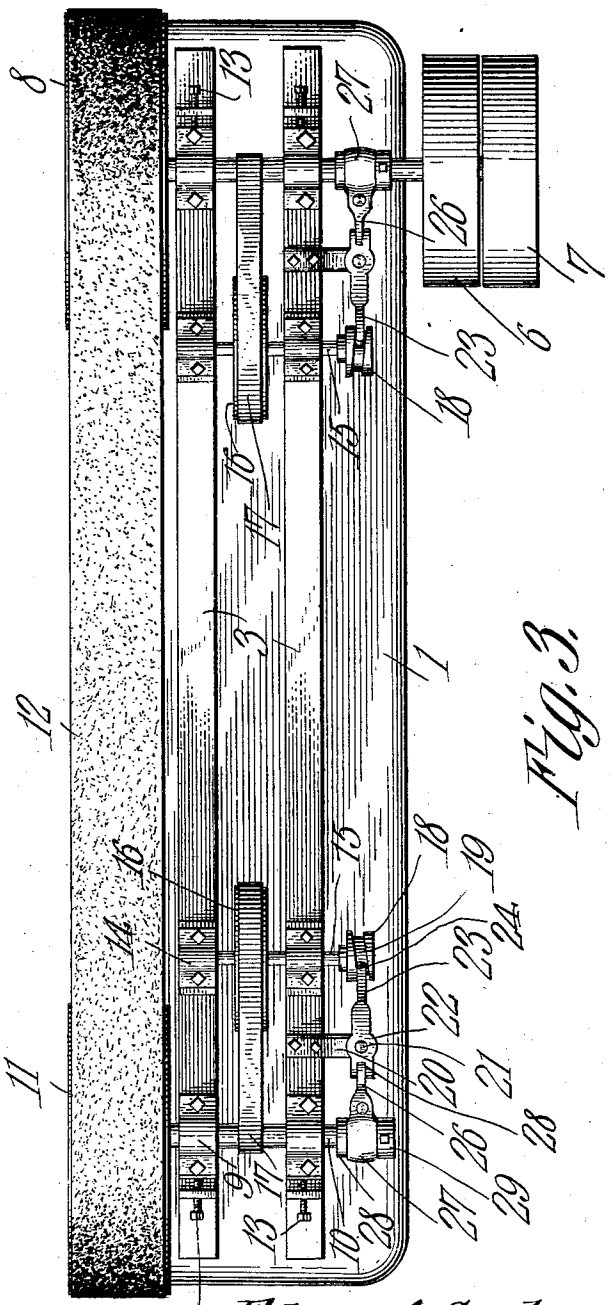


Fig. 3.

WITNESSES:

E. J. Stewart

F. T. Chapman

Edgar A. Soules, INVENTOR

By C. A. Snow & Co.

ATTORNEYS

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDGAR A. SOULES, OF STURGIS, MICHIGAN.

SANDPAPERING-MACHINE.

No. 890,463. Specification of Letters Patent. Patented June 9, 1908.

Application filed June 27, 1907. Serial No. 381,109.

To all whom it may concern:

Be it known that I, EDGAR A. SOULES, a citizen of the United States, residing at Sturgis, in the county of St. Joseph and State of Michigan, have invented a new and useful Sandpapering-Machine, of which the following is a specification.

This invention has reference to improvements in sand papering machines of that class where the sand papering is done by abrasive belts carried upon suitable pulleys and working continuously on the articles to be sand papered. In such machines one or more endless belts having abrasive surfaces are driven by suitable power and means are provided whereby the articles to be sand papered are brought into contact with the moving belt, which always travels in one direction, in such manner that if any single point on the belt be considered it will always travel in the same vertical longitudinal plane, considering, of course, that the abrasive surfaces move in horizontal planes. It is found in such machines that there is more or less choking caused by the abraded material clogging up the spaces between the abrading particles, and that the effectiveness of the abrading surfaces rapidly deteriorates.

It is the object of the present invention to provide a means whereby the choking of the abrading surfaces is prevented, and also a means whereby the particles of abrading material are caused to act upon the work in such manner as to repeatedly change the angle of cut and thereby tend to constantly sharpen the abrading particles, so that these particles continue sharp until practically worn out.

The invention consists in giving a lateral oscillation to the sand papering belt at either the drive end or the driven end, or both, so that there is a constant change of cutting surface which not only tends to clear the face of the material being cut and so prevent clogging and obstructing the cutting face of the abrasive material, but such motion produces a shear cut, that is, it is the resultant of the forward and side motions, causing first one side and then the other of each abrasive particle to do the cutting, whereby there is a constant sharpening of the cutting face. The means employed for producing this oscillatory movement of the drive or driven shaft or both is applicable to all kinds of abrasive cutting belts, whether running horizontal, vertical, or at any angle. Hence, the oscillation of the belt is productive of great saving in abrasive material, thus increasing the life of the belts whether they are used for cutting wood, leather, or any other substance that can be cut and polished with abrasive material.

The invention will be fully understood from the following detailed description, taken in connection with the accompanying drawings forming part of this specification, in which,—

Figure 1 is a plan view of a sand papering machine of the belt type, showing my invention applied thereto, but all parts of the machine unnecessary to the understanding of the invention are omitted; Fig. 2 is a side elevation of the same; and Fig. 3 is a plan view, showing the oscillating mechanism applied to both the drive and driven belts.

Referring to the drawings, there is shown a floor plate 1, only conventionally illustrated in the drawing, and near each end of the floor plate are located posts or standards 2 connected by struts 3 to form the framework of the machine. These parts are simply illustrative and may be varied at will.

In suitable bearings 4 on one end of the struts 3 is journaled a shaft 5 constituting the drive shaft of the machine, and this shaft carries tight and loose pulleys 6 and 7. Fast upon the end of the shaft remote from the pulleys 6 and 7 is a band-wheel 8 to be hereinafter referred to. At the other end of the struts 3 are other bearings 9 in which is journaled a shaft 10 carrying at one end a band-wheel 11 in line with the band-wheel 8, and these two band-wheels receive a belt 12 the surface of which is provided with or has embedded in it suitable abrasive material of any character desired. This belt is made endless and is stretched by adjusting screws 13 acting on the bearings 9. Any other means for rendering the abrasive belt tight may be used, and, as is common in some types of belt sand papering machines, there may be provided two belts with abrading material of different character or of different degrees of fineness. These various details, however, form in themselves no part of the present invention, and are therefore not illustrated in the drawings and need not be further referred to in the description.

The shaft 10 is so mounted in the bearings 9 that it may be reciprocated longitudinally for a distance, and this reciprocation may be effected by means which I will now proceed to describe.

The struts 3 carry other bearing boxes 14 in which is journaled a countershaft 15 carrying between the bearings a pulley 16 receiving motion by a belt 17 passing around said pulley and also around the shaft 10 between its bearings 9. By making the belt 16 of a size sufficiently large with relation to the diameter of the shaft 10 the speed of the shaft 15 may be made considerably less than that of the shaft 10. The end of the shaft 15 remote from the belt 12 is extended beyond the corresponding bearing box 14, and there carries a drum 18 having formed in it a cam groove 19, said drum being made fast upon the shaft in any suitable manner so as to rotate therewith.

Between the boxes 9 and 14 on the strut 3 remote from the belt 12 is a bracket 20 provided with a vertical stud 21. Upon this stud is mounted a rock-lever 22 having one end 23 forked, as best shown in Fig. 2, and this forked end has inwardly projecting fingers 24 engaging in the cam groove 19. The other end of the rock-lever is provided with a slot 25 extending therethrough perpendicular to the plane of reciprocation of the lever. Engaging in the slot 25 is the end of a finger 26 pivotally connected to a sleeve 27 mounted upon the shaft 10 between two fixed collars 28—29 on said shaft.

It will now be seen that when the drum 18 is rotated the cam groove 19, acting upon the rock-lever 22 through the fingers 24, will cause said lever to be oscillated about its pivot 21. The finger 26 fits quite snugly within the groove or slot 25 and therefore participates in this movement of oscillation, and the finger 26 being connected to the sleeve 27 the latter is constrained to oscillate also, and since this sleeve is prevented from movement on the shaft 10, the latter is also caused to reciprocate in its bearings 9, thus causing the band-wheel 11 to alternately approach toward and recede from the nearby strut 3. Now, since the pivot point of the rock lever 22 and the shaft 10 are in fixed relation, the finger 26 moves along the slot 25 for a limited distance because of the arc-shaped path through which the corresponding end of the lever 22 oscillates, while the pivotal connection between the finger 26 and the sleeve 27 permits the said finger to remain in the plane of the length of the rock-lever 22.

Now, let it be suppoesd that the machine is in operation. The abrading belt 12 is carried continuously over the surface or surfaces to be worked upon, while motion from the shaft 10 is transmitted to the shaft 15 through the belt 17 and pulley 16. The result of this is that the shaft 10 is reciprocated through a distance corresponding to the pitch of the groove 19 and the proportions of the connections between said groove and the sleeve 27, and the end of the abrasive belt 12 carried by the band-wheel 11 is given a movement of reciprocation as it travels from one band-wheel to the other.

The resultant of the longitudinal and sidewise travel of the belt is that the abrasive particles travel at angles to the general plane of travel of the belt, and, therefore, act upon the work first with one face and then with another face, thus wearing down the faces alternately and producing sharp edges which not only increase the cutting qualities of the abrading belts but tend to clear them from accumulations of abraded material by directing said abraded material first to one side and then to the other and discharging the same at the edges of the belt. This means that the belt is not only self-cleaning, but, because of the continual sharpening of the abrading particles its cutting qualities remain sensibly constant until the particles are practically worn out.

In Fig. 3 the reciprocating means are shown in connection with the drive shaft 5 as well as with the driven shaft, and it is to be understood that this reciprocating means may be used with either the drive shaft or the driven shaft, or both, as desired.

The machine shown is of the horizontal type, but it is quite evident that the invention is equally applicable to machines of the vertical type, or to machines in which the abrading belt is set at any angle to either the vertical or the horizontal.

I claim:—

1. In a sand papering machine of the abrading belt type wherein the belt is mounted upon band wheels and the latter are mounted upon shafts, a means for imparting a reciprocating movement to the abrasive belt, consisting of a counter-shaft, driving connections between the same and the shaft of an adjacent band wheel, and other connections between the counter-shaft and said band wheel shaft for imparting reciprocatory movement to the latter in the plane of its axis of rotation.

2. In a sand papering machine of the abrading belt type wherein the belt is mounted upon band wheels and the latter are mounted upon shafts, a means for imparting reciprocating movement to the abrasive belt, consisting of a counter-shaft, driving connections between the latter and an adjacent band wheel shaft, and other connections between the counter-shaft and said band wheel shaft for imparting reciprocatory movement to the latter in the plane of its axis of rotation, said last-named connections comprising a cam wheel upon the counter-shaft, a sleeve upon the adjacent band wheel shaft, a rock-

lever engaged by the cam wheel, and pivoted slip connections between the sleeve and the rock-lever.

3. In a sand papering machine of the abrading belt type wherein the belt is mounted upon band wheels and the latter are mounted upon shafts, a means for imparting reciprocating movement to the abrasive belt, consisting of a counter-shaft, a pulley upon the counter-shaft, a belt connection between the shaft of an adjacent band wheel and said pulley, and other connections between the counter-shaft and the adjacent band wheel shaft for imparting a reciprocatory movement to said band wheel in the plane of its axis of rotation at a slower speed than the speed of rotation of said band wheel shaft.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

EDGAR A. SOULES.

Witnesses:
J. A. LOOMIS,
JOHN W. LUTTNAN.