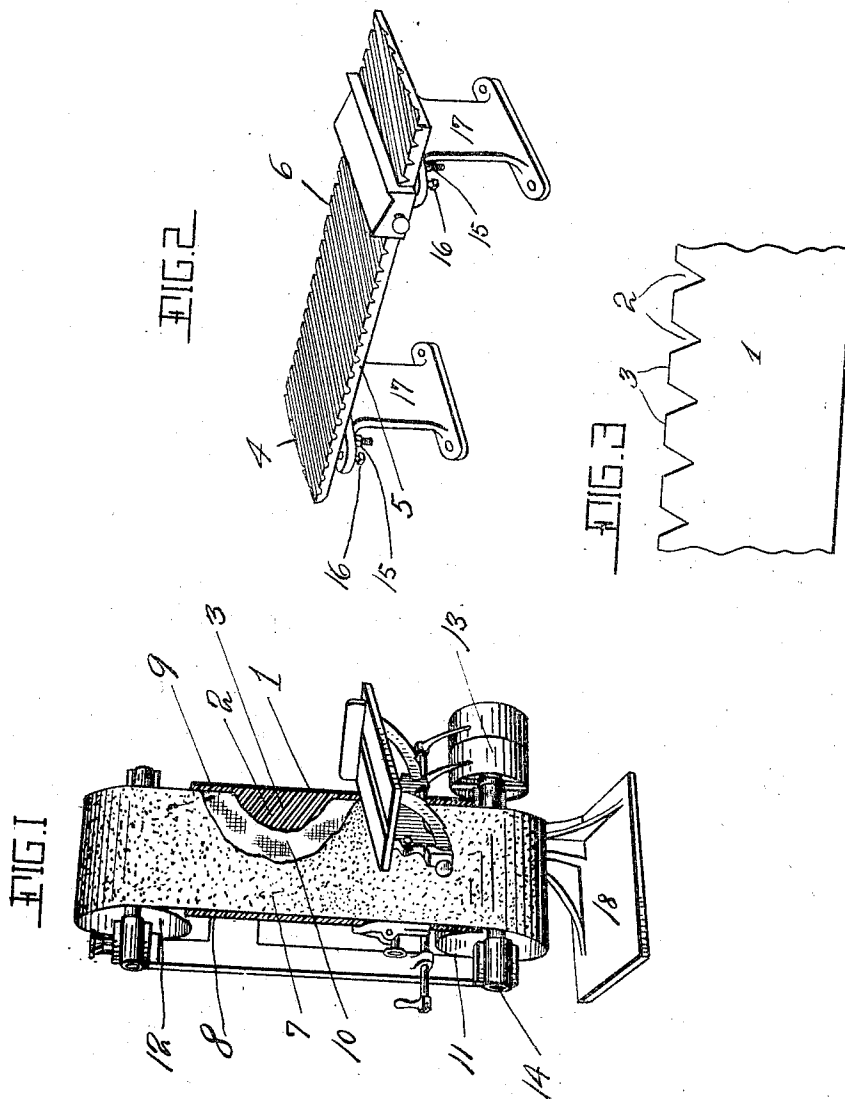


1,036,783.

E. J. BEIN.
 ABRASIVE APPARATUS.
 APPLICATION FILED AUG. 2, 1907.

Patented Aug. 27, 1912.



Witnesses
Frank H. H. H. H.
George L. Pafort.

Emile J. Bein Inventor
 By his Attorney
Alexander C. Prouffit.

UNITED STATES PATENT OFFICE.

EMILE J. BEIN, OF NEWARK, NEW JERSEY.

ABRASIVE APPARATUS.

1,036,783.

Specification of Letters Patent. Patented Aug. 27, 1912.

Application filed August 2, 1907. Serial No. 336,818.

To all whom it may concern:

Be it known that I, EMILE J. BEIN, of Newark, New Jersey, have invented certain Improvements in Abrasive Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings designating like parts.

This invention relates to abrasive apparatus, and is of particular utility when applied to machines of the type forming the subject matter of my United States Letters Patent No. 561,557, dated June 9, 1896, and No. 833,726, dated October 23, 1906, the distinguishing feature of these machines, respectively, being an endless flexible belt, surfaced with grains of abrasive material, which traverses a worktable or platen, vertical or horizontal, provided to sustain the belt against the stress of the work pressed against the belt for its abrasive action.

In accordance with my invention, I construct the worktable with a grooved, corrugated, or otherwise interrupted surface, and in coöperation therewith, and with the abrasive belt, I provide an auxiliary driving and cushion belt, these structural novelties subserving functions which may be summarized briefly as follows:—First:—the interrupted surface presents a series of projecting or salient portions which cause the portions of the belt in transit immediately over them to bite into the piece of work held thereagainst, while the intervening portions of the belt opposite the grooves or cut-away portions act with less abrasive effect on the work, the latter being usually moved to and fro, so that each portion is subjected in turn to the biting action; second:—the reduction in area of the region of contact between the belt and work, and the belt and work table, reduces the friction, and consequently the heat developed, to an extent which may reach fifty per cent., so that the operator may readily hold in his bare hand even a small piece of metal work without discomfort from heat, while the work piece is being cut down rapidly and extensively; third:—the auxiliary belt, being preferably free from the abrasive belt,

permits the latter to lag behind somewhat, on each revolution, so that each portion of the area of the abrasive belt is presented in turn opposite any given portion of the auxiliary belt, preventing undue wear upon any portion of either belt; fourth:—when, as I prefer, the grooves extend wholly across the worktable from side to side, at an angle of say 45° to the direction of travel of the belts, there is set up in the grooves a brisk, transverse circulation of air, owing to the slant of the grooves, serving not only to cool the worktable, belts and work, but also to carry off to the side the particles of metal cut from the work, and which normally tend to fill up and clog the interstices between the abrasive particles, preventing them from biting into the work, and increasing the friction; fifth:—a cushion is formed between the worktable and the abrasive belt by the air imprisoned in the grooves, and also by the auxiliary belt, which preferably will be formed of elastic material for that purpose, (and to enable it to be stretched into driving interior contact with the relatively unyielding abrasive belt), and by this cushion, the harsh and destructive action suffered normally by the abrasive belt, between a workpiece and the roughened surface of the hard worktable, is prevented, obviating the tendency to “knock down” the abrasive grains, and even tear the abrasive belt; the abrasive grains are usually secured to the belt by an adhesive and so the reduction of friction and heat already detailed, removes a contributing factor in the “knocking down”, viz., the softening of the adhesive, and loosening of the abrasive grains.

The various features of my invention will be illustrated and described fully in the accompanying drawings and specification, with especial reference to the embodiment selected as a convenient form to enable ready and complete understanding of my invention, which will be pointed out also in the claims, the latter covering the use of my improvements in any field to which they may be adapted by their nature.

In the drawings: Figure 1 is a view, in

perspective, of a vertical "sand belt machine" in the construction of which my improvements have been embodied; Fig. 2 is a similar view taken separately, of a modified form of table for a horizontal machine of the same type, illustrating also the mode of adjustable attachment; Fig. 3 is a view in side elevation, on an enlarged scale, of a portion of the work table, showing the grooves.

The part designated by the reference numeral 1 is the worktable or platen of a "belt sander" of the type forming the subject of my United States Letters Patent No. 833,726 above mentioned, to which reference may be made for a more detailed description of the construction and operation of the machine as a whole, and in accordance with my invention the worktable has an interrupted surface, the interruptions being formed in the instance illustrated, by grooves 2 cast, or formed in any convenient manner, in the face of the worktable, which preferably will be machined to give the salient portions 3 a smooth finish. The grooves may be all V shaped, as shown in Fig. 3, spaced apart at intervals about equal to their width, and of similar depth, or they may be of any suitable and convenient contour, as the semicircular grooves 4 in Fig. 2, occupying part of the worktable 5, while the other part has grooves 6, like the grooves 2 already described, so that the operator may avail of any difference in operation of the forms of groove by placing the work against the abrasive sheet, band or belt 7 opposite the appropriate part of the table. The portions of the belt (see Fig. 1) contacting with the workpiece opposite the salients 3, will bite into the workpiece with high abrasive efficiency, and a rapid abrasion of the workpiece can be secured by moving the latter to and fro over the salients, between which the belt will act with diminished abrasive effect, as it will yield into the grooves 2, and form constantly changing transverse depressions with a shifting trend which moves sidewise the metallic particles cut from the work, and prevents them from clogging the interstices between the abrasive particles, thus keeping the latter in a condition of high abrasive efficiency and avoiding a source of friction. These grooves may, and preferably will, be formed at such an angle (of say about 45°) to the direction of movement of the abrasive belt 7, that air will be drawn into the grooves at the side 8, and be discharged at the side 9, cooling the worktable, belt, and any workpiece pressed there against, aiding to carry off laterally the particles of metal cut from the workpiece, and forming an air cushion between the belt and the worktable.

An important feature of my invention is

found in the auxiliary endless band or belt 10, preferably formed of elastic fabric, to give it cushioning quality, and also to permit the band to be stretched into snug contact with the interior of the abrasive belt 7, when, as I prefer, the auxiliary belt is utilized as a driving belt, receiving its actuation from one of the drums 11, 12 around which the belts may be stretched as a convenient support, a fast and loose pulley 13 on the drum shaft 14 serving for transmission and control of the power received from any suitable source (not shown).

To enable interchange of worktables having surfaces suited to the work in hand, and to permit leveling, or adjustment, of the worktable, I have shown draft bolts 15 and set screws 16, by which the respective table selected may be secured in desired position upon the supports 17 mounted on the base 18, the latter being of any convenient and suitable construction.

Having described my invention thus fully, it will be understood that I do not limit myself to the specific materials, nor the exact construction and arrangement of parts illustrated, nor in general otherwise than as set forth in the claims read in connection with this specification.

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

1. A worktable having a surface provided with transverse angularly disposed grooves, and with intervening salient portions to support a movable member, substantially in the manner and for the purpose set forth.
2. A worktable to be traversed by an abrasive sheet; said worktable having a surface provided with means to impart a transverse direction to the air current set up by said moving sheet, substantially in the manner and for the purpose set forth.
3. A worktable to be traversed by an abrasive sheet, said worktable having a surface provided with transverse depressions into which said sheet may enter to form channels for lateral clearance of the particles cut from the work by the abrasive action of said sheet in traversing the intervening salient portions, substantially as described.
4. The combination with a worktable having an interrupted surface; of an abrasive member arranged to traverse said interrupted surface, and having a movement relatively thereto during such traversal; substantially in the manner and for the purpose, set forth.
5. A worktable to be traversed by an abrasive sheet; said worktable comprising a hard, working-surface provided with channels open throughout their length for free circulation of air under the influence of a portion of said abrasive device as it travels

over said channels, the latter constituting cooling and cushioning devices to prevent destructive action upon the work and upon said sheet between said worktable and the work pressed thereagainst, substantially as described.

and State of New Jersey, this thirteenth day of July, 1907.

EMILE J. BEIN.

In presence of—

S. R. CAIRNS,

CHAS. E. HILLYER.

Signed at Newark, in the county of Essex