(No Model.) 2 Sheets—Sheet 1.

C. BAEDER.

MANUFACTURE OF SAND PAPER.

No. 265,940. Patented Oct. 17, 1882.

FIG. 1.

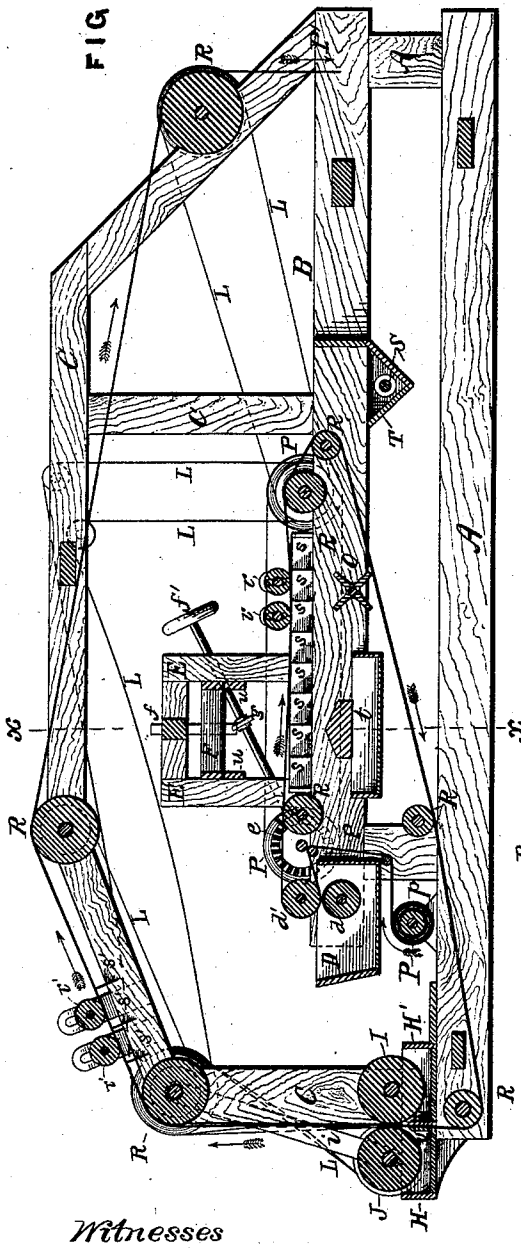
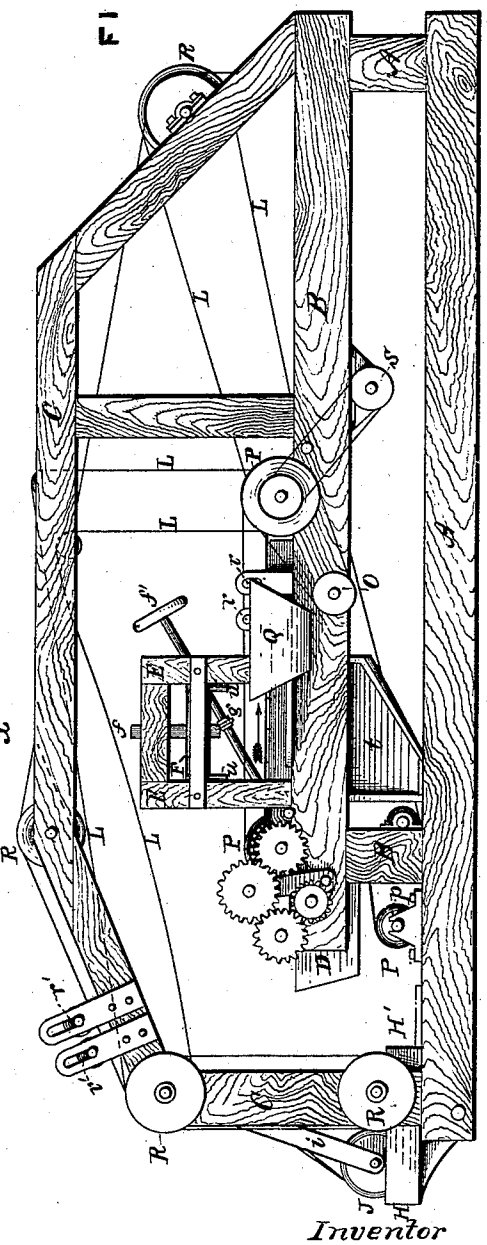


FIG. 2.



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(No Model.) 2 Sheets—Sheet 2.

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MANUFACTURE OF SAND PAPER.

No. 265,940. Patented Oct. 17, 1882.

FIG. 3.

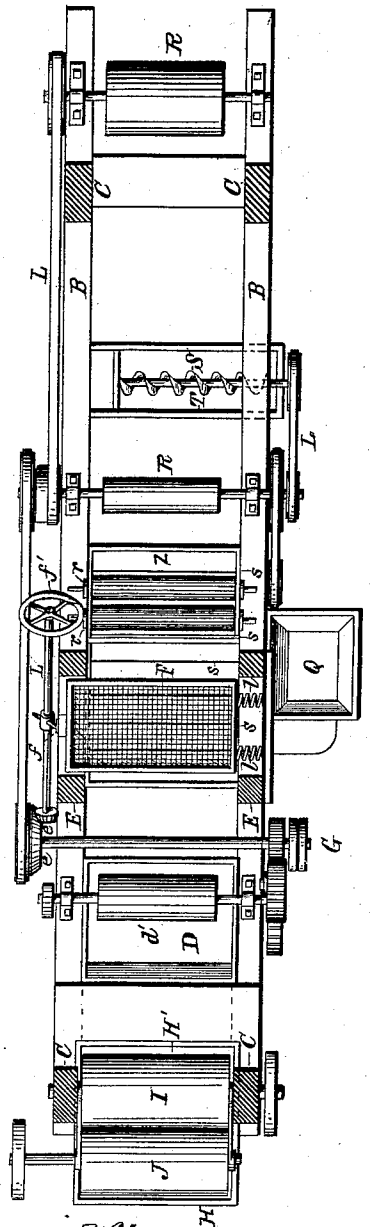
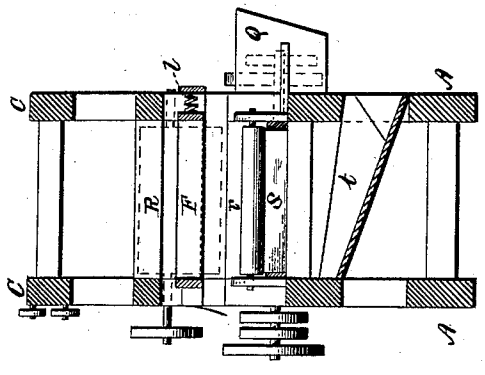


FIG. 4.



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UNITED STATES PATENT OFFICE.

CHARLES BAEDER, OF JENKINTOWN, PENNSYLVANIA.

MANUFACTURE OF SAND-PAPER.

SPECIFICATION forming part of Letters Patent No. 265,940, dated October 17, 1882.

Application filed June 17, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES BAEDER, of Jenkintown, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in the Manufacture of Sand-Paper, of which improvements the following is a specification, reference being had to the accompanying drawings, which form a part thereof.

My invention is applicable alike to the manufacture of emery-paper or glass-paper, and to the use of cloth instead of paper in such manufactures. It will therefore be understood that although the term "sand-paper" is used in the following specification, the description is equally applicable to these other analogous manufactures.

The ordinary method of making sand-paper is to pass the paper over a roller revolving in a trough of melted glue, so that the roller spreads the glue on the under side of the paper. The paper is then passed over other rollers, so that the glue-coated surface is brought uppermost, and the sand is sprinkled over it while the paper is being drawn along the surface of a table or apron. From this table or apron the glued and sanded paper is conveyed to racks or frames, upon which it is left to dry. When thus finished the surface of the paper is often found to be uneven. The sand is not uniformly applied, and is thicker and adheres more closely at some places than at others, and both glue and sand are generally found upon the under surface or back of the paper along the edges. The removal of this superfluous glue and sand is very desirable; but it is so difficult that frequently it is found necessary to trim off the overflowed edges of the sheet, thus wasting a large portion of the product. Moreover, the sand is readily detached when the paper is used, and the surface is thus rapidly worn off.

The object of my invention is to obviate all these difficulties, and to produce a sand-paper having a durable, firm, and uniform abrasive surface, while its opposite side shall be free from glue and sand, and I accomplish this result as follows: After the paper has passed from the gluing-roller, from which it receives the coating of glue upon one side, I subject the opposite side to the action of scrapers, which remove any glue that has found access to that side, and after the sanding process has been effected and while the glue is still soft I subject the coated surface to positive pressure, so as to embed the sand in the glue, and at the same time repeat the scraping of the uncoated surface. I then finally pass the paper through sizing-rollers, by which the sand is still further secured upon the surface, and from these rollers I lead the finished sized paper to the drying-racks. By this pressure the sand is forced deeply and tightly into the glue upon the coated side of the sheet and uniformly distributed thereon, while the continuous application of the scrapers to its under surface during the process of manufacture and before the glue has become hard insures the removal of any glue and sand that have found their way onto the uncoated side of the paper, and the sizing operation prevents the sanded surface from being so rapidly worn away in use.

In the accompanying drawings, Figure 1 is a vertical longitudinal section through the center of a machine embodying my improvements and adapted to the conduct of my improved process. Fig. 2 is a side elevation of the same. Fig. 3 is a plan or top view of the machine with the upper portion of the frame-work removed, and Fig. 4 is a vertical transverse section on the line *x x* of Fig. 1.

A stout frame-work consisting of the pieces A A, B B, and C C affords bearings for the various revolving shafts, and supports the gluing and sanding and sizing devices.

D is the glue-trough, which is kept supplied with melted glue to a depth sufficient to nearly immerse the roller *d*. A second roller, *d'*, is arranged above the roller *d* and nearly in contact therewith. The several carrying-rollers R R R R R R R R are placed in the various positions indicated to support and convey the sheet of paper through the machine, and are all positively rotated by means of belting L L L L, &c., driven from the main shaft or pulley G.

Adjacent to the glue-trough D is the sanding device, which consists of a screen or sieve, F, sliding laterally on ways *u*, mounted upon the frame-work E. The pendent strip of steel *f*, fixed at its upper end upon the frame E, presses against one side of the sieve F, while

at the opposite side are mounted springs *l l*. A shaft, *f'*, provided with a cam, *g*, bearing against the strip *f*, is rotated by means of bevel-gears *e e*, and serves, with the springs *l l*, to give the sieve F a rapid reciprocating or oscillating motion from side to side of the machine.

A sand-box, Q, is arranged conveniently at the side of the sieve, from whence the workman can replenish the latter as the sand is sifted through it, while a trough or chute, *t*, is placed beneath to receive the loose sand which falls off from the sheet.

Beneath the sieve F, and also adjacent thereto, is a series of steel blades or scrapers, *s s s s s s*, parallel to one another and fixed tightly upon the frame *z*, which fits snugly between the sides of the main frame B B. These blades extend across the entire width of the paper, strip, or sheet, and are moderately sharpened upon their upper edges. They may be separately adjustable vertically in the frame *z*, or may be fixed therein, in which latter case I construct the frame *z* so that it can be adjusted vertically. The number of the scrapers *s* may be varied for work of different characters; but ordinarily I have found that a series of six or seven blades arranged as shown gives good results.

Pressure-rollers *r r* of metal, turned true, are arranged above the space between the pairs of scrapers *s*, their journals being mounted in slotted standards, beyond which they project, as indicated in Figs. 2 and 3, so that they can be weighted in case additional pressure is required. The slots of the bearings are so arranged as to permit the descent of the rollers to a depth of about one-half their diameter between the scrapers. The number of the rollers *r r* may be varied with that of the scrapers, and I have obtained good results by placing a supplemental series of scrapers and rollers at a considerable distance (in the path of the paper) from the first series. This supplemental series is indicated in Fig. 1 at *r r* and *s' s'*.

T is a sand-collector or trough to receive the surplus sand which falls off from the traveling sheet after it passes the rollers *r r*, and is provided with a screw, S, by which the sand is discharged at one end into a suitable receptacle. O is a revolving beater, which aids in detaching the loose sand from the surface.

The heavy pressure-rollers I J, the latter of which is journaled upon the swinging arms *i*, are positively rotated by belting L L. The surfaces of the rollers I J are carefully turned true, so that the contact and pressure between them is exact and uniform, and the lower portions of their peripheries are immersed in hot-water vessels H H', respectively, so as to soften any glue that may stick to them and permit its removal by the hard-rubber scrapers *v v*. In addition to the scrapers *v v*, I contemplate using brushes which revolve in contact with the rollers I J to clean them.

The operation of the apparatus in the conduct of my improved process is as follows: The paper is fed from a roll or continuous sheet, P, and moves in the direction of the arrows. Starting from roller *p* it passes between the gluing-rollers *d d'*, from the former of which its under surface receives a coating of the melted glue. As the sheet passes over the roller *d'* the glued surface is brought uppermost and drawn beneath the sieve F. The vibration of the sieve F showers the sand down in excess upon the glued surface, to which a portion of it adheres. At this stage the action of the scrapers *s s* begins, the sheet being pressed against their edges at first by its own weight and subsequently, as the sheet moves forward, by the positive pressure of the rollers *r r*, which is limited only by the tensile strength of the sheet. The rollers *r r* not only insure the more efficient action of the scrapers in removing glue and sand from the under surface of the sheet, but distribute the excess of sand evenly over the upper surface, and press the bottom layer of sand into the glue, thus insuring a uniform and permanent sanded surface. As the sheet passes on it is again turned over, as shown, upon the roller above the trough T and slightly shaken by the revolving beater O, by which means the surplus sand is thrown off into the box T, whence it is removed by the screw S and restored to the sand-box Q. After this separation of the surplus sand the sheet, now provided with its proper quantity, is drawn up between the heavy pressure-rollers I J, which firmly embed the sand into the still soft glue and smooth out any accidental inequalities that may have passed the first rollers.

Beyond the pressure-rollers I J, I arrange, in a suitable frame, a second trough similar to D, provided with a pair of rollers similar to *d* and *d'* in construction, arrangement, and operation, and being a duplication of that apparatus I have deemed it unnecessary to show it in the drawings. This second trough is supplied with a proper sizing preparation, and the glued and sanded paper passes from the pressure-rollers I J between these sizing-rollers, from the lower one of which the sanded surface receives a thin coat of sizing, and then the paper passes on and moves upward over the supporting-roller and between the light rollers *r' r'* and the scrapers *s' s'*, which scrapers remove any sizing that may have accumulated on the under edge of the paper, while the light rollers smooth down the sized surface of the paper, and thus the sand is further secured by an outer surface, which gives it great additional cohesion and prevents it being rapidly worn off in use. From these light rollers and scrapers the finished sheet passes over the remaining carrying-rollers to a point, as P', from which it is led off to the drying-racks. By this means I accomplish at one passage through the apparatus what would otherwise require two separate operations, involving a loss of half of the time.

It is obvious that various modifications of the arrangement above named may be em-

ployed without departing from the principle of my invention, and that variations of the number, weight, and position of the pressure-rollers and of the number of the scrapers may be found advantageous for different grades of product. Thus, for instance, where very fine emery cloth or paper is to be manufactured, sufficient pressure may be obtained from the light rollers such as *r r*, and the use of the heavy pressure-rollers I J may be dispensed with. I do not deem it necessary to describe all these variations in the process or apparatus, which will be obvious to the experienced workman in conducting the manufacture, and therefore while I have described an arrangement and mode of treatment which give good results for the manufacture of the ordinary grades of sand-paper, I do not wish to be understood as disclaiming other changes in detail by which my improved process can be carried out.

Having thus described the nature and object of my improvements, what I claim as new, and desire to secure by Letters Patent, is—

1. As an improvement in the process of manufacturing sand-paper and similar products, subjecting the glued and sanded surface, while the glue is still soft, to positive and uniform pressure, substantially as set forth.

2. As an improvement in the manufacture of sand-paper and similar products, subjecting the glued and sanded surface continuously to a secondary sizing operation, substantially as and for the purpose described.

3. In an apparatus for the manufacture of sand-paper and similar products, the combination of rollers and scrapers, substantially as described, whereby the sheet is simultaneously rolled upon its upper surface and scraped upon its under surface while the glue is still soft, for the purpose set forth.

4. In an apparatus for manufacturing sand-paper and similar products, scrapers applied and operating upon the under side of the paper, substantially as and for the purposes specified.

5. The combination, with the gluing-roller and the sieve, of the pressure-rollers *r r*, revolving in slotted bearings, substantially as and for the purposes specified.

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