D. H. Gilbert. Sheet 1, 2 Sheets.

Sizing Paper.

No. 2553. Patented Apr. 11, 1842.

Fig. 1

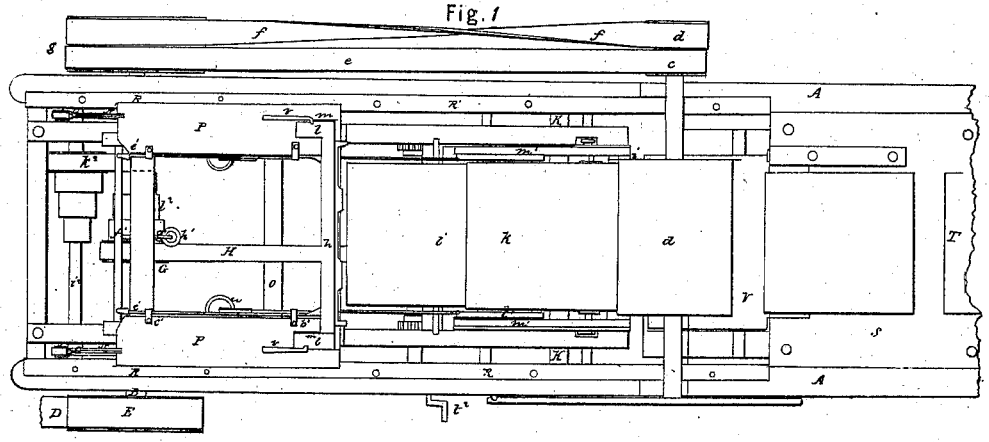


Fig. 5

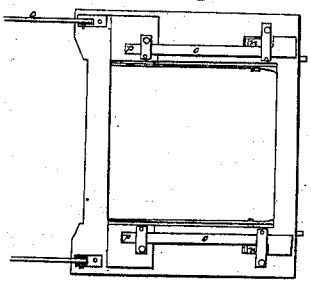
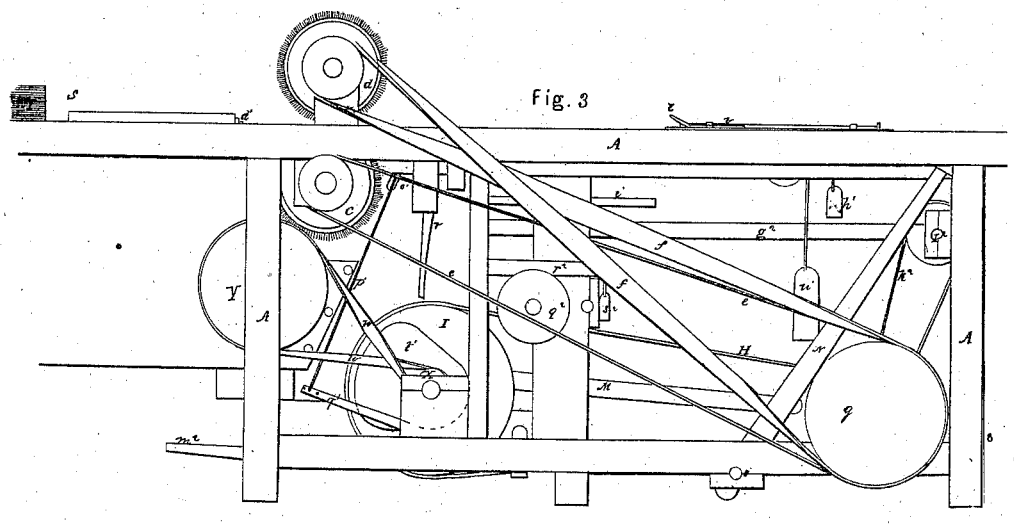


Fig. 3



D. H. Gilbert. Sheet 1, 2 Sheets.

Sizing Paper.

No. 2,553. Patented Apr. 11, 1842.

Fig. 2.

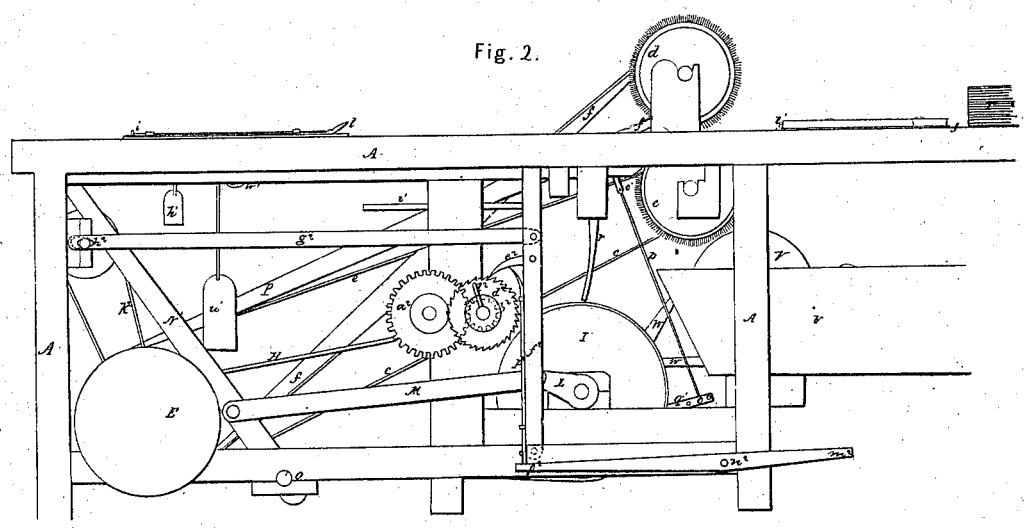


Fig. 7.

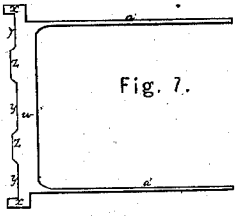


Fig. 6.

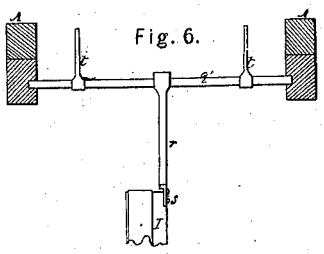
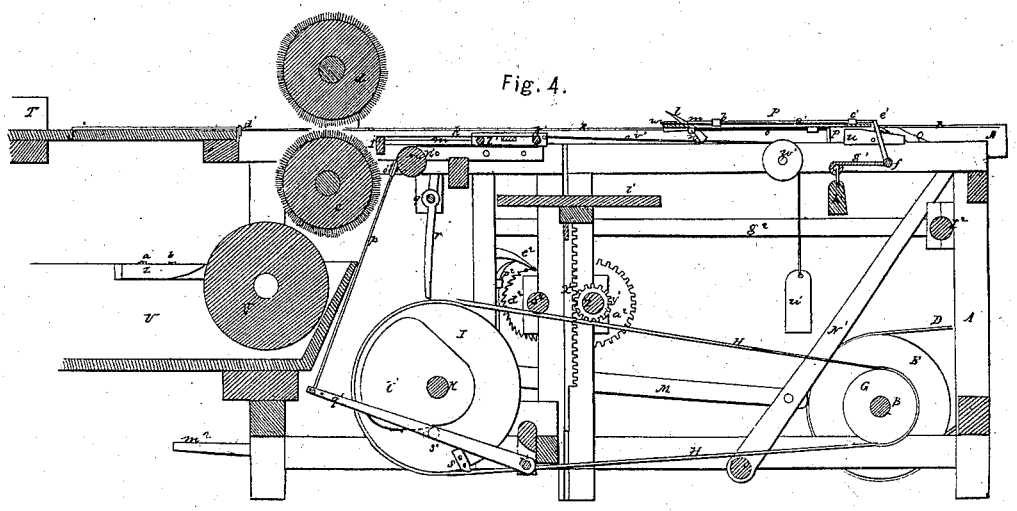


Fig. 4.



UNITED STATES PATENT OFFICE.

DAVID H. GILBERT, OF DORCHESTER, MASSACHUSETTS.

MACHINE FOR APPLYING PASTE OR SIZING, &c., TO SHEETS OF PAPER OR OTHER MATERIAL IN THE PROCESS OF MAKING CARDS, PASTEBOARDS, &c.

Specification of Letters Patent No. 2,553, dated April 11, 1842.

To all whom it may concern:

Be it known that I, DAVID H. GILBERT, of Dorchester, in the county of Norfolk and State of Massachusetts, have invented new and useful machinery for applying paste or sizing, or glutinous or other adhesive liquids to sheets of paper or other material in order to combine or connect said sheets together in the usual process of making cards or pasteboard and for other purposes, the following being a full and exact description of said machinery, which, taken in connection with the accompanying drawings thereof, hereinafter referred to, forms my specification.

Figure 1, represents a top view of my machine. Fig. 2, is an elevation of one side. Fig. 3, is an elevation of the opposite side. Fig. 4, is a longitudinal central, and vertical section. Such other drawings as may be necessary to a full explanation of the several parts, will be hereinafter referred to and described.

The operative parts of the machinery are supported upon a suitable wooden or metallic frame A, Figs. 1, 2, 3, 4. The power which gives motion to said parts is applied by a belt D passing over a drum or pulley E, or in any other convenient manner, to a horizontal and transverse revolving shaft B, Figs. 1, 4, the said pulley E being situated on one end of the said shaft.

Another pulley or drum G is placed in or about in the center of the shaft B, from which a belt H passes to and around the periphery of a larger pulley or wheel I, arranged upon a horizontal shaft K, having a crank L Fig. 2 upon one end, to which crank one end of a connecting rod M is jointed, the other end of said rod being similarly jointed to a vibrating lever N, whose foot or lower end is attached to a horizontal transverse shaft O, the connecting rod being jointed to said lever at a short and suitable distance above the shaft as seen in the drawings. The shaft O has another lever N′ applied to its opposite end in all respects similar to the lever N as seen in Fig. 3. Each of the levers N, N′ is connected to a sliding carriage or frame P by a pitman or link Q suitably jointed to the lever and carriage, so that when the crank L revolves, a reciprocating rectilinear and horizontal movement is imparted to the carriage or frame P. This carriage or frame is supported on proper slide or guide rails R, R, and is alternately moved toward and away from a table or board S—arranged at one end of the frame A as seen in Figs. 1, 2, 3, 4, the sheets of paper to be pasted or sized being laid in a pile or heap T on the rear end of said table.

A fountain or reservoir U of paste or sizing, (having a drum or cylinder V revolving therein, and put and kept in motion by a crossed belt W Figs. 3, 2, extending from a pulley X on the shaft K to and about a pulley Y on the shaft of the fountain roller, is placed and supported at some distance below the table as seen in the drawings. A scraper Z which may be adjusted by screws *a*, *b* to a suitable distance from the periphery of the cylinder V, regulates the film or coating of paste on the surface of the cylinder, which as the cylinder revolves is communicated to and received by the bristles of the revolving brush C, resting in contact with the cylinder, and also with another and similar brush *d*, arranged above it as seen in Figs. 2, 3, 4, both of the said brushes being revolved by belts *e*, *f*, proceeding from the circumference of a pulley *g*, Fig. 3, in the driving shaft.

As the carriage or frame P is driven forward or toward the table S, it passes between the brushes *c*, *d*, and on receiving a sheet of paper from the table, as it recedes it draws the sheet between the brushes, which impart to its upper and lower sides a coating of paste. The carriage has a nipping or finger bar or thin plate *h*, arranged transversely over that end of it which approaches the table S. This nipping bar rises from and shuts down upon the end of the frame P, so that as the carriage frame approaches nearly into contact with the edge of the table S, the attendant introduces the edge of a sheet of paper which he has previously taken from the heap T, between the finger bar and the end of the carriage, and the finger bar is then turned down so as to grasp the sheet and draw it away from the table, when the carriage frame recedes. The finger bar retains its hold upon the sheet until the carriage retreats as far back as it is intended it shall, when the bar flies upward, releases the sheet, and permits the edge which it held to drop downward to-

ward, or upon the table *i*—the opposite side of the sheet being supported upon the apron *k*.

The mechanism which raises and depresses the finger bar *h* may be thus described. Each end of the bar is attached to a lever *l* Figs. 1, 4, 3, 2, which turns about midway of its length and on its lower side upon a hinge or fulcrum *m*. Each lever *l* has an inclined plane *n* formed on its under side in rear of the fulcrum *m*, as seen in Fig. 4. A long bar or rod *o* supported in suitable guides is arranged on the lower face of each side of the carriage frame, so as to slide longitudinally somewhat aside from the rear arm of the lever *l*. One end of each of these bars or that in proximity with the lever contiguous to it, is bent around horizontally at right angles from the center of the machine, or so as to project by the inclined plane *n* of the lever as will be understood by reference to Fig. 5, which is a view of the underside of the carriage frame and sliding bars *o*, *o*. The opposite or rear end of each of the slide bars is bent downward at right angles to the bar, as seen at *p* Fig. 4.

A horizontal and transverse shaft *q*, Fig. 4, has an arm *r* projecting vertically downward from its center, which as the pulley I turns upon its shaft is met by a stud S Fig. 4, inserted in the side of the pulley and is forced in a direction toward the fountain roller, thereby turning the shaft *q* slightly on its bearings, so as to bring two other arms *t t*, projecting upward from the shaft, (see Fig. 6 which is a side view of the shaft *q* exhibiting the three arms *r*, *t*, *t*,) into contact with the front ends of the slide bars *o*, *o*, and force said slide bars rearward and consequently by the pressure of their bent front ends upon the inclined planes *n*, *n*, to raise these ends of the levers *l*, *l*, on which the planes are formed, and consequently at the same time, to depress the opposite ends and thus turn the finger bar *h* upon the frame. As the carriage recedes from the table *s*, the finger bar will remain down upon the frame grasping the edge of the sheet of paper until the rear end *p* of each slide bar meets or is driven against the front end of a stud *u* Fig. 4, so as to press forward the slide bar *o* and thus permit the finger bar to be borne upward by the action of a spring *v* Figs. 1, 3, which depresses its rear end.

As that edge of the sheet of paper which is grasped by the finger bar might possibly adhere to the carriage frame by reason of a small quantity of paste getting upon the end of the carriage frame, a thin plate *w*, Fig. 4, (see also Fig. 7, which represents a top view of this plate), is interposed between the finger bar and the frame, or rests immediately upon the frame as seen in the drawings. The front edge of the plate is formed thin and sharp, and with rectangular projections *x*, *x*, *z*, *z*, and corresponding indentations *y*, *y*, *y*, as seen in Fig. 7, the projections *x x* being at the ends of the plate and somewhat longer than the intermediate ones *z*, *z*. In rear of each of the projections *x*, one end of one of two rods *a'*, *a'*, is attached to the plate *w*, the rods extending backward through suitable guides *b' c' b'*, *c'*, as seen in Figs. 1, 4. When the carriage frame P is moved forward to receive a sheet of paper, the projections *x*, *x*, of the plate *w*, are brought into contact with the rear edge of the table *s*, or against small studs *d'* applied thereto, and thereby as the carriage advances, the plate *d* recedes and permits the finger bar to press the sheet of paper directly upon the carriage frame under it. As the plate *w* is very thin the finger bar may be filed away upon its lower side so as to receive or shut over the plate *w*, and permit the front edge of the bar to be brought into contact with the paper. When the carriage frame is driven back or has drawn the sheet of paper between the revolving brushes, the rear ends of the rods *a' a'*, meet two arms *e' e'* extending upward from a horizontal shaft *f'* (which has another arm *g'* projecting from it with a weight *h'* attached to its end as seen in Fig. 4,), and press the rods and plate *w* forward so as to cause the chamfered edge of the plate to pass under the edge of the sheet of paper, and thereby disengage it from the carriage frame, so that it will drop upon the table *i*.

It was before stated that the other or opposite end of the sheet still rested on an apron *k*, which when the carriage frame is driven forward is drawn from under the said end of said sheet, and permits it to fall upon the table *i*. I shall now proceed to describe the peculiar arrangement of this apron.

One edge or end of the apron is attached to a cross bar *i'* Figs. 1, 4. The apron is thence carried rearward and passed partly around a transverse roller *k'*, arranged in the rear of a carriage *l'*, which slides longitudinally and horizontally, on suitable guides or rails *m' m'* attached to the main framework. From the roller *k'*, the apron or cloth extends in an opposite direction to another roller *n'*, Fig. 4, passing over the same and being attached to a transverse piece of wood or metal *o'*. A string or cord *p'* connects the center of the piece *o'*, with the end of a lever *q'* Figs. 3, 4, 2, which turns on a fulcrum *r'*, at its opposite end, and has a roller *s'* arranged upon its side, the said roller being in contact with the periphery of a cam or eccentric *t'* fixed upon the shaft K. The depression of the lever *q'* by the cam *t'*, draws that end of the apron

attached to the piece of wood o', downward, thereby causing the carriage frame l' to advance forward, and drawing the apron from under the sheet of paper. The apron is stretched out or drawn backward by the action of weights u' Figs. 2, 3, 4, attached to strings v' each of which passes over a pulley w' Fig. 4, and is connected to the rear end of the carriage l'.

It was before mentioned that the sheets of paper are received upon a table i, which as the sheets multiply thereon must be gradually depressed. The table being suitably guided during its vertical movements, has at each end a toothed rack x', extending downward from its lower side, the said rack engaging with a pinion y' on a transverse revolving horizontal shaft z' (see Fig. 4).

A gear wheel A^2 Fig. 2, is fixed on one end of the shaft Z', the said gear wheel a^2 being turned by a geared pinion b^2 (represented in Fig. 2, by dotted lines), upon a cross horizontal shaft c^2 Figs. 2, 4. A ratchet wheel d^2 is fixed on the shaft c^2, by the side of the pinion b^2, the said ratchet wheel being caused to turn around, by the action of a pawl or click e^2, extending from an upright lever f^2 which turns upon a fulcrum at its foot or lower end, and is moved forward and back by a connecting rod g^2 extending therefrom to a small crank h^2, upon the end of a transverse horizontal shaft i^2 Figs. 1, 3, 4.

Motion is communicated to the shaft i^2 by a belt k^2 which is arranged upon a cone of pulleys l^2, on the driving shaft B, and also upon another and similar reversed cone upon the shaft i^2. Thus by this arrangement of mechanism the table will be regularly depressed as the heap of paper increases upon it.

Should the table fall faster than is desirable at any time the pawl or click e^2, may be lifted from the ratchet wheel by the attendant, placing his foot upon the end m^2 of a lever m^2, n^2, o^2, Fig. 2, and raising the upper end of a rod p^2 against the lower side of the pawl, thereby preventing the action of the pawl upon the ratchet, and consequently the fall of the table, until such time as the foot of the attendant is removed from the lever. In order that the table may keep its position when the pawl e^2 is raised—the shaft c^2, has a friction pulley q^2, (see Fig. 3), arranged on some convenient part of it—upon the periphery of which a lever r^2, is pressed by a weight s^2, so as to create a sufficient friction to retard the descent of the table.

A hand crank t^2, Figs. 1, 2, fixed upon the side of the ratchet wheel d^2 enables the attendant to elevate or depress the table at pleasure.

From the above it will be seen that both sides of a sheet of paper are covered with paste, as it is passed between the revolving brushes, and that the sheets of paper so treated, are deposited by the carriage frame and movable apron, in a regular pile or heap upon a board or table. On subjecting this heap or any part of it to the action of a standing press the whole of the mass so pressed may be caused to adhere together if requisite. But as I have used this machine and intend to use it more especially for the manufacture of playing and other cards, in general, the operation of uniting two or more sheets of paper or of causing their surfaces to be placed in contact with paste or adhesive matter, may be thus described.

If it is desirable to build upon the table i a pile or heap of paper, of which every succeeding two sheets are to be combined or pasted together, it only becomes necessary for the attendant who feeds the machine to remove two sheets of paper from the heap on the table S, whenever the carriage frame P approaches the table and to insert these two sheets (the one being placed exactly upon and over the other so that their edges shall coincide), between the finger bar h and the frame P. The former will then close down upon the latter, grasping the two sheets and when the carriage frame recedes, will draw the sheets between the brushes, so as to apply the paste to the upper surface of the upper sheet, and to the lower surface of the lower one. The two surfaces in contact viz. the under surface of the upper sheet, and the upper surface of the lower will not receive any paste. As the carriage frame advances again, two more sheets are received by it as before, and so on until the whole heap on the table S is pasted and deposited on the table i. Therefore as the pasted side of each sheet of the pile is in contact with the pasted side of one of the sheets next to it, and as its unpasted side is also in contact with the unpasted side of a sheet next to it, when the mass is pressed together the pasted sides of every succeeding two sheets of the mass will adhere while the unpasted sides do not stick together. Thus if we wish to manufacture pasteboard of three or more thicknesses of paper, we have only, after passing two sheets together as before described between the brushes, to feed the carriage frame with single sheets until we obtain the requisite number laid upon each other. We then pass two sheets together again through the brushes, and by continuing this process and that of pressing, we are enabled to produce a series of pasteboards of the required thickness.

Having thus explained my improved machinery, I shall claim—

1. Applying paste or adhesive matters to sheets of paper or other material by drawing said sheets by a sliding carriage frame

P, between two cylindrical or suitable brushes, revolving or moving in contiguity with each other, all substantialy as above set forth; also the combination of said carriage frame P with the table *i*, and also with the movable apron *k*, for the purpose of depositing the pasted sheets of paper in a regular pile upon said table, the said combined machinery being constructed and operating substantialy as herein before described.

2. I further claim the machinery for freeing or separating the sheet of paper from the finger bar and carriage P, so that said sheet may fall upon the table *i*, the said machinery consisting of the plate *w*, with its rods *a'*, *a'*, extending rearward therefrom—the weighted shaft *f'*, with its projecting arms and the stud *d'* of the table S, the same being arranged, combined together, and operating substantially as described.

In testimony that the foregoing is a true description of my said invention and improvement, I have hereto set my signature this tenth day of March in the year eighteen hundred and forty two.

DAVID H. GILBERT.

Witnesses:
R. H. EDDY,
C. L. PECK.