2 Sheets--Sheet 1.

G. L. JAEGER.

Machines for Sizing, Coloring and Varnishing Sheets of Muslin, &c.

No. 151,596. Patented June 2, 1874.

Fig. 1.

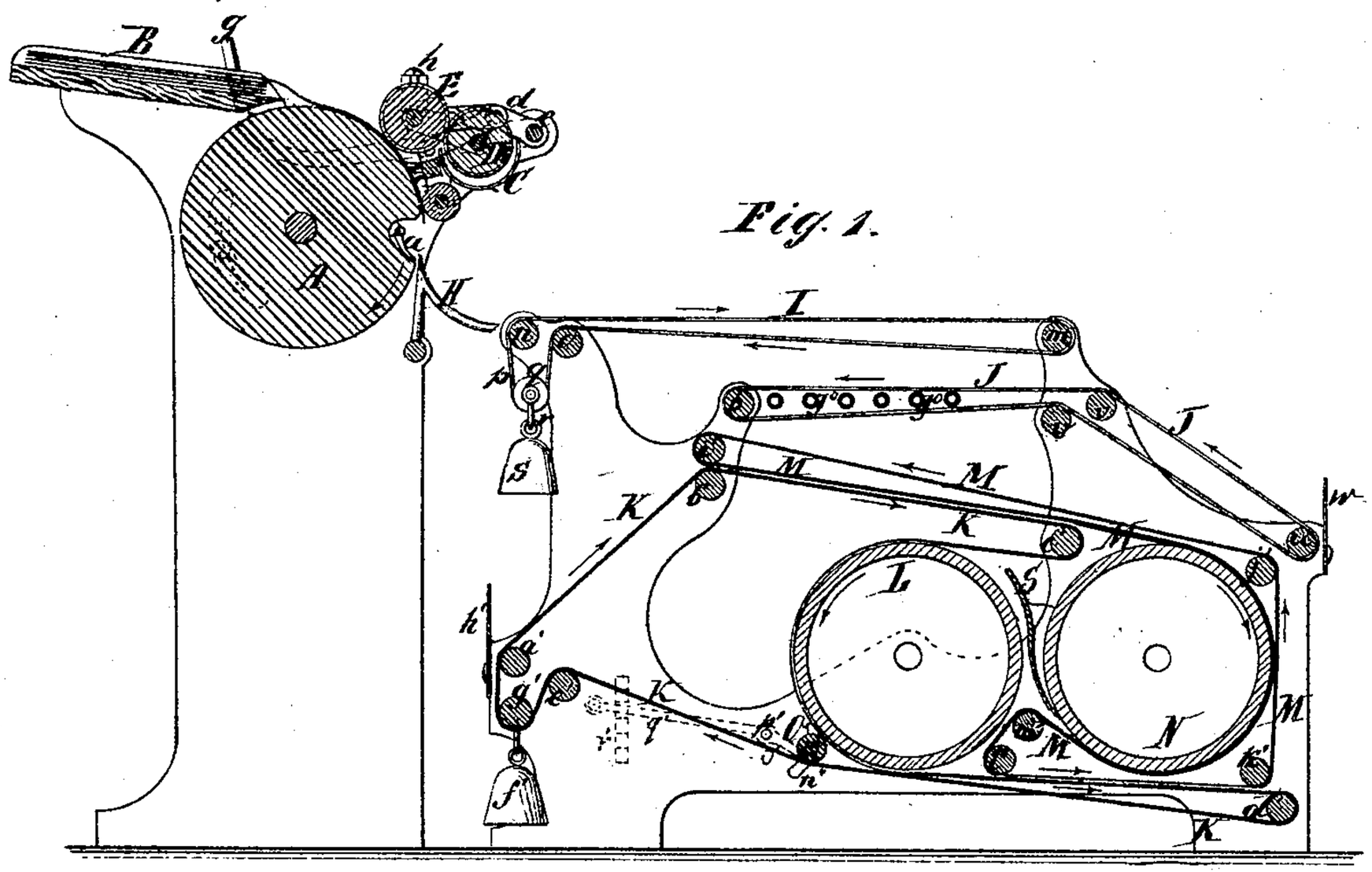


Fig 2.

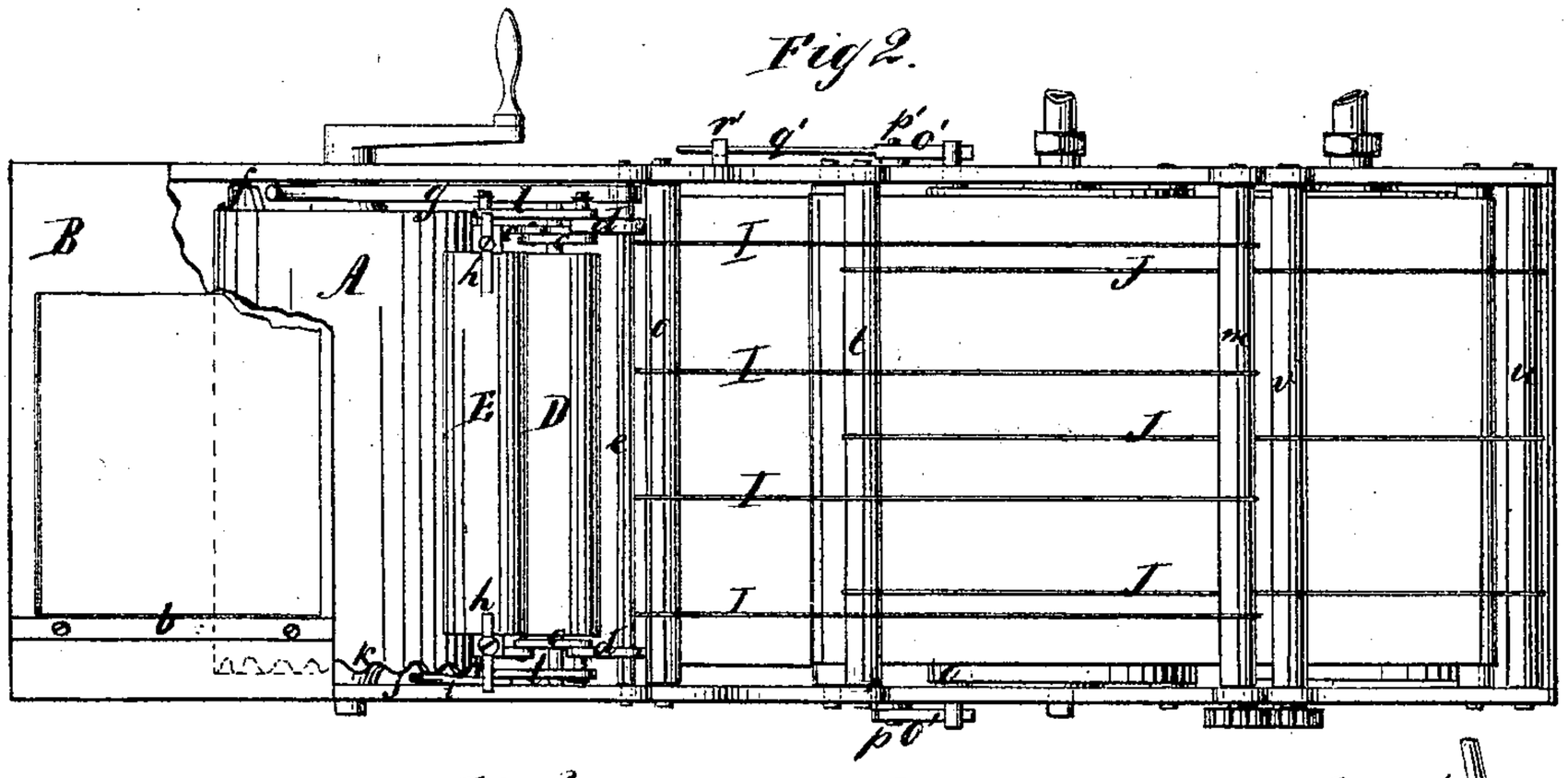


Fig 3.

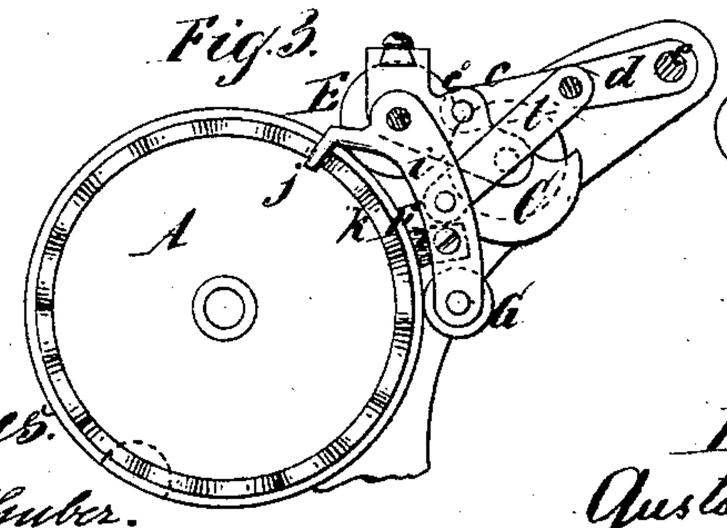
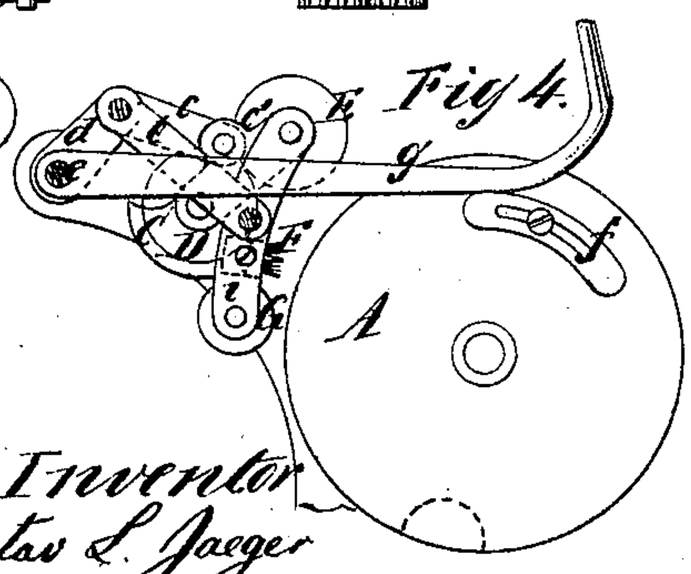


Fig 4.



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2 Sheets--Sheet 2.

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Fig. 5.

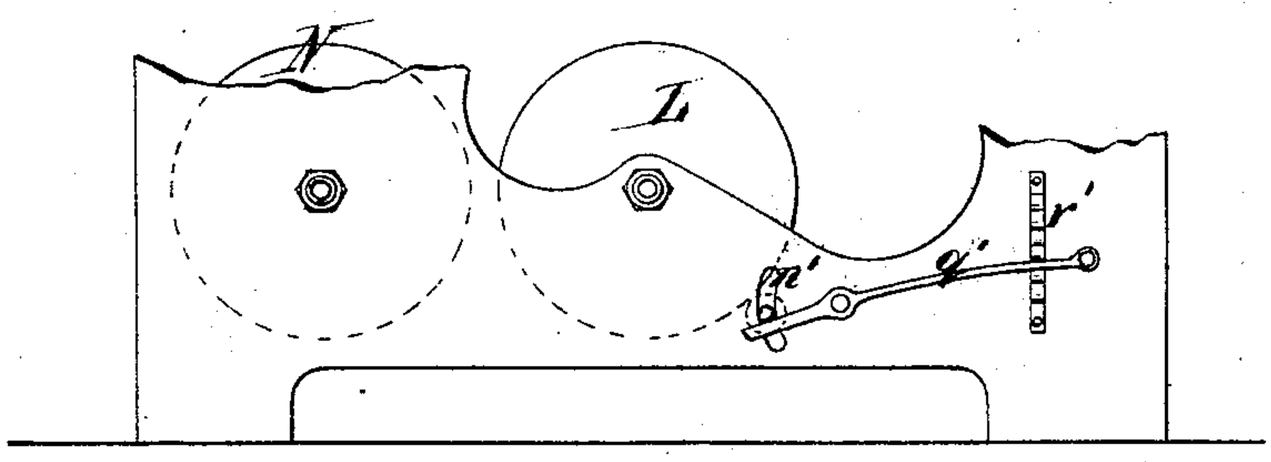
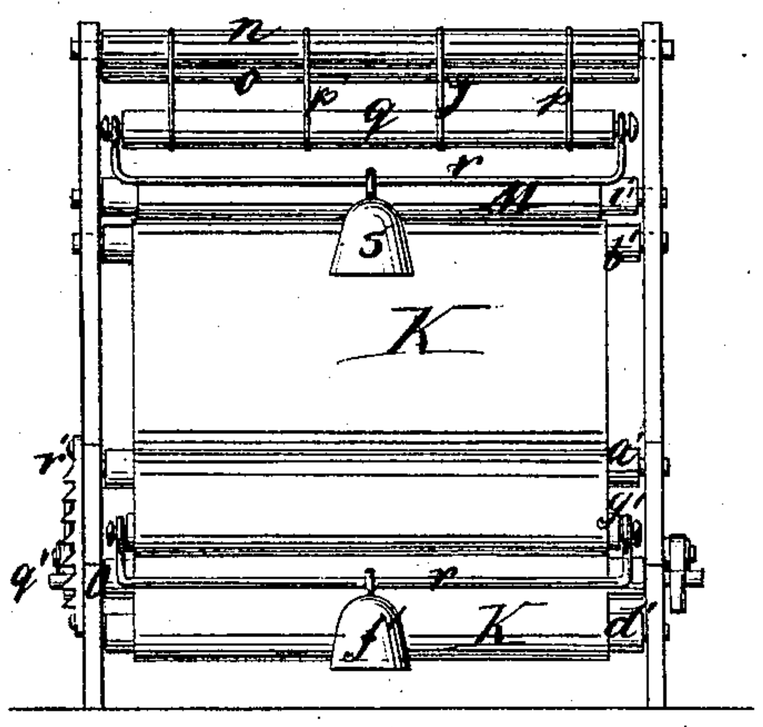


Fig. 6.



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UNITED STATES PATENT OFFICE.

GUSTAV L. JAEGER, OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINES FOR SIZING, COLORING, AND VARNISHING SHEETS OF MUSLIN, &c.

Specification forming part of Letters Patent No. **151,596**, dated June 2, 1874; application filed May 6, 1874.

To all whom it may concern:

Be it known that I, GUSTAV L. JAEGER, of the city, county, and State of New York, have invented a new and useful Improvement in Machines for Sizing, Coloring, and Varnishing Sheets of Muslin and other Fabrics; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 represents a longitudinal section of this invention. Fig. 2 is a plan or top view of the same. Fig. 3 is an end view of the sheet-carrying cylinder and the sizing apparatus, in a larger scale than the previous figures. Fig. 4 is a similar view of the same parts, showing the opposite end. Figs. 5 and 6 are details, which will be referred to as the description progresses.

Similar letters indicate corresponding parts.

This invention relates to a machine which serves to size, color, or varnish sheets of muslin, paper, or other material, and to deliver these sheets in a dry and finished state. With the sheet-carrying cylinder is combined a sizing apparatus composed of a fountain, a delivery-roller, a distributing-roller, and a reciprocating brush, and the effective surface of the distributing-roller is determined by one or two scrapers, so as to prevent the surface of the sheet-carrying cylinder from being soiled. The distributing-roller and the reciprocating brush are hung in arms, which are raised at the proper intervals by a cam on the end of the sheet-carrying cylinder, said cam being adjusted according to the length of the sheets to be sized, so that as soon as the entire surface of a sheet has been sized, the distributing-roller and the vibrating brush are thrown out of contact with the sheet-carrying cylinder. The sheets, after having been sized, pass on a series of endless aprons, and finally round steam-drums, for the purpose of drying and calendering. The aprons are stretched and kept in the proper path by weighted rollers, and with the last steam-drum is combined an adjustable pressing-roller, so that by running the steam-drum faster than the apron, a polishing or smoothing effect is produced on the sheets carried by said apron.

In the drawing, the letter A designates a cylinder, which is provided with a griper or gripers, *a*, similar to those of the paper-cylinder of a printing-press, so that as the cylinder revolves in the direction of the arrow marked on it in Fig. 1, said gripers will take hold of sheets of muslin, paper, or other material fed to the cylinder over the feed-table B. This table is provided with a gage, *b*, which is set according to the width of the sheets to be sized. The sizing is taken from a fountain, C, in which runs a roller, D, that takes up the sizing and transfers it to the distributing-roller E, the axle of which has its bearings in arms c^0, which are connected by straps *c* to the ends of levers *d*, extending from a rock-shaft, *e*, so that by turning this rock-shaft to the position shown in Fig. 3, the distributing-roller is brought to bear upon the surface of the sheet-carrying roller, and by turning the rock-shaft to the position shown in Fig. 4, the distributing-roller is raised out of contact with the sheet-carrying cylinder. The position of the rock-shaft *e* is governed by a cam, *f*, which is secured to one end of the sheet-carrying cylinder, and which acts on a lever, *g*, extending from said rock-shaft. (See Fig. 4.) This cam is adjustable, so that it can be set according to the length of the sheets to be sized, and that the distributing-roller will be raised out of contact with the cylinder as soon as the sheet has been completely covered. By this arrangement the surface of the cylinder is preserved from being soiled by sizing. The length of the distributing-roller and of the sizing-roller is equal to that of the sheet-carrying cylinder; and if sheets are to be sized the widths of which are less than the length of the cylinder, a portion of the distributing-roller comes in contact with that portion of the surface of the cylinder which is not covered by the sheet, and the surface of said cylinder is liable to be soiled. This difficulty I have obviated by applying to the distributing-roller a scraper, *h*, Fig. 2, that is secured to the journal-box of said roller, and can be made to

act on a greater or smaller part of the roller, so as to free this portion from sizing, and prevent the surface of the cylinder from getting soiled. Said scraper may be made in various forms, and, if desired, two such scrapers may be applied, one acting on either end of the roller. The axle of the distributing-roller E extends beyond its bearings, and on its ends are fitted loosely two levers, *i*, (one on each end,) between which is secured a brush, F, and an additional distributing-roller, G, (one or both.) From one of the levers *i* projects a toe, *j*, Fig. 3, which engages with ratchet-teeth *k* on one end of the cylinder A, being held in gear with these ratchet-teeth by a suitable spring, so that, when said cylinder revolves, a reciprocating motion is imparted to the brush F and roller G. By this mechanism the sizing, previously deposited on the sheet carried by the cylinder A, is uniformly distributed throughout the body of the sheet. The levers *i*, which support the reciprocating brush and roller, connect, by straps *l*, with the levers *d* on the rock-shaft *e*, so that, whenever said rock-shaft is turned by the action of the cam *f*, the brush F and roller G are thrown back out of contact with the surface of the cylinder A.

By referring to Fig. 3 of the drawing, it will be seen that the levers *d*, arms c^0, and straps *c*, which carry the distributing-roller and the reciprocating brush, are so arranged that they act like toggle-levers, the center connection of which has passed the line of equilibrium, and thereby the distributing-roller and the brush are locked in contact with the cylinder A. If the center connection of the toggle-levers should not pass the line of equilibrium, the distributing-roller and the brush would bear upon the cylinder with a slight and yielding pressure, and the correct distribution of the sizing would not be insured. The roller G beneath the reciprocating brush F also serves to assist in throwing off the sheets from the cylinder A. When this cylinder has reached the position shown in Fig. 1, the end of the sheet, being released by the gripers, passes on the separator H, and by this device the sheet is delivered to the first apron, I. The separator may be made of one piece, extending over the entire length of the cylinder A, or it may be made in sections, as shown in the drawing. The apron consists either of a series of parallel cords, or it may be made of a sheet of canvas or other suitable material. The apron I extends over three rollers, *m n o*, being drawn down over the rollers *n o*, so as to form a bight, *p*, into which is placed a roller, *q*, from the gudgeons of which is suspended a yoke, *r*, that serves to support a weight, *s*, Figs. 1 and 6. By the action of this weight the apron is kept taut without requiring any attention, and, by adjusting the weight from one side to the other, the apron can be made to run straight, which is a great desideratum in all machines in which endless aprons are employed. The roller *m* receives a revolving motion by suitable gearing, so that the apron I moves in the direction of the arrows marked thereon in Fig. 1. While being carried along by this apron the surface of the sheet is partially dried, and from said apron the sheet drops down on the inclined portion of the second apron, J, which is stretched over rollers *b u*, and intermediate guide-rollers *v*, and which may also be provided with a tension mechanism similar to that applied to the apron I. Under this apron will be arranged a steam-coil, J^0, so as to promote the drying process by artificial heat. A stop, *w*, prevents the sheet from sliding down over the end of the inclined portion of the apron J.

As the sheet passes over the roller *b* of the apron J it drops down upon the inclined portion of an apron, K, which runs over the rollers *a' b' c'*, round a drum, L, and rollers *d' e'*, back to the rollers *a'*, and it is kept taut by a weight, *f'*, hung to a yoke suspended from the gudgeons of a roller, *g'*, which is placed in the bight of the apron formed between the rollers *a'* and *e'*. (See Fig. 1.) A stop, *h'*, prevents the sheet from sliding off over the inclined portion of the apron K. As the sheet moves with this apron in the direction of the arrow marked on it in Fig. 1, it is carried in between a portion of the apron K and a portion of the other apron M, which passes over rollers *i' j' k' l' m'*, and round a drum, N, back to roller *i'*. On passing over the roller *c'* of the apron K, the sheet is caught between the apron M and drum N, and carried round until it passes over the roller *m'*. At that point the end of the sheet is carried up so as to come in contact with the drum L, and, before the sheet is fully released by the apron M, it is caught between the apron K and drum L, and, after having passed through between this drum and its apron, it is finally discharged by the apron K over the roller *d'*. A shield, S, serves to guide the sheet from the apron M to the drum L. The drums N and L are heated with steam, and they revolve at velocities either larger or smaller than their aprons, so that they produce a calendering action on the sheet which is retained by the aprons.

By following the course of the sheet, as above stated, it will be noticed that in passing between the apron M and drum N, one side of the sheet is exposed to the calendering action of the drum N, and as the sheet is carried between the apron K and drum L, its other side is exposed to the calendering action of the drum L, so that said sheet, on leaving the machine, is not only thoroughly dried, but also smoothed and finished on both sides. It must be remarked, that during its passage between the aprons and drums, the sheet firmly adheres to and moves with the aprons, so that the drums, on account of their different velocity, will produce the required calendering

action. This calendering action is governed by one or more pressing-rollers, O, (one only being shown in the drawing,) which serve to press the aprons up against their drums with more or less force. These pressing-rollers have their bearings in slots n', (best seen in Figs. 5 and 6,) and their axles extend through these slots and rest upon arms o', which extend from a rock-shaft, p'. On this rock-shaft is secured a spring-lever, q', which serves to turn the rock-shaft and to press the roller up against its apron and drum with the required force. This force is determined by a rack-bar, r', with which the lever q' can be made to engage, and which retains said lever and its pressing-roller in the required position. If the pressing-roller O receives a positive motion by gear-wheels or belts, and it moves at a superficial velocity different from that of the drum against which it bears, sheets of muslin, paper, or other material passing through between the pressing-roller and the drum, will be calendered. In this case, the apron shown between the pressing-roller and the drum will be dispensed with.

My machine can be used not only for sizing sheets of muslin, paper, or other materials, but also for coloring and varnishing the same.

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

1. The combination of one or two scrapers, h, with the distributing-roller E and cylinder A, substantially as shown and described.

2. The combination of the reciprocating brush F with the distributing-roller E and a serrated or notched cylinder, A, substantially as set forth.

3. The cam f and lever g, in combination with the cylinder A, distributing-roller E, and brush F, substantially as shown and described.

4. A tension mechanism for an endless apron, composed of a roller placed in a bight formed by said apron, combined with a yoke suspended from the gudgeons of said roller, and a weight suspended from said yoke, substantially in the manner herein shown and described.

5. A surface-drying apparatus, consisting of endless aprons I and J, combined with each other and with a cylinder, A, sizing-roller D, and distributing-roller E, the apron J being situated beneath the apron I, and provided with an inclined portion for receiving a sheet of muslin, paper, or other material delivered by the apron I, all as herein set forth.

6. The combination of aprons I, J, K, and M and drums L N with each other, and with a cylinder, A, and rollers D E, all constructed and operating substantially in the manner shown and described.

7. The combination of a lever, q', and rack r' with a pressing-roller, O, and drum L, substantially as and for the purpose set forth.

8. In a machine for sizing, coloring, and varnishing sheets of muslin or other material, the combination of one or more endless surface-drying aprons, a delivery-apron, and one or more calendering or finishing drums and aprons, substantially as described.

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