

(No Model.)

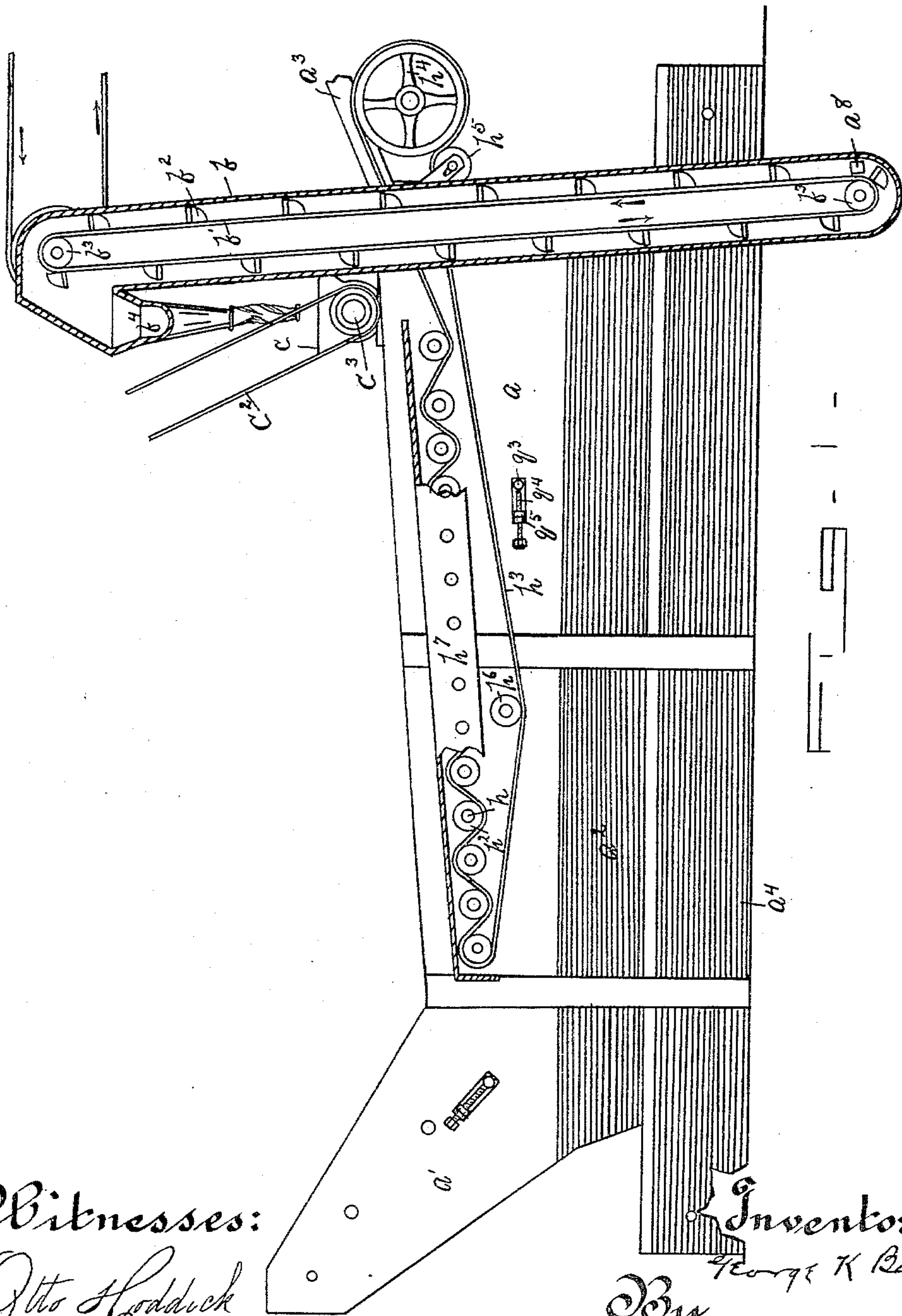
3 Sheets—Sheet 1.

G. K. BIRGE.

APPARATUS FOR FLOCKING WALL PAPER, &c.

No. 318,944.

Patented June 2, 1885.



Witnesses:

Otto Hoddick
F. Fuller,

Inventor,

George K. Birge

By

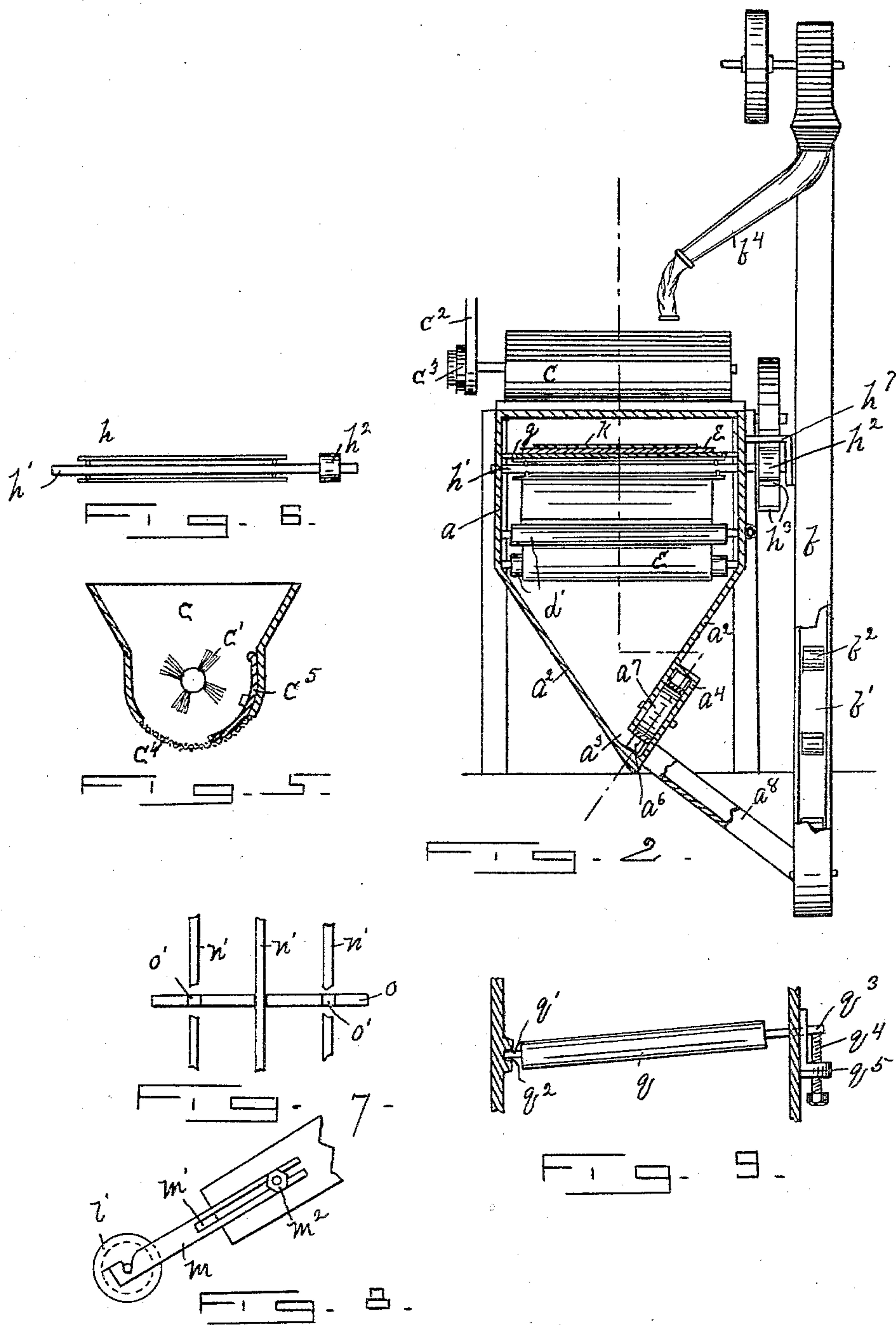
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3 Sheets—Sheet 2.

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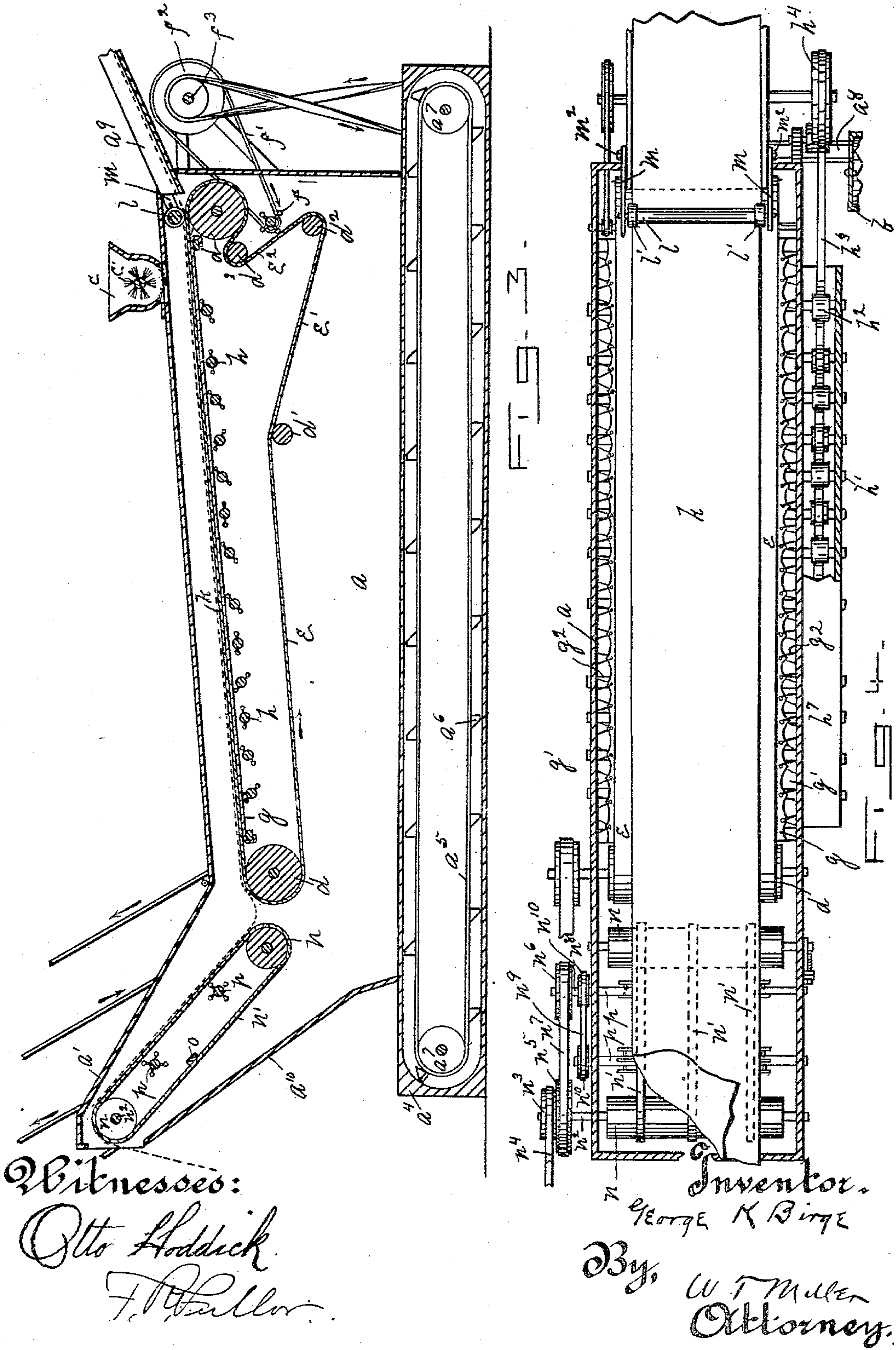
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UNITED STATES PATENT OFFICE.

GEORGE K. BIRGE, OF BUFFALO, NEW YORK.

APPARATUS FOR FLOCKING WALL-PAPER, &c.

SPECIFICATION forming part of Letters Patent No. 318,944, dated June 2, 1885.

Application filed January 20, 1885. (No model.)

To all whom it may concern:

Be it known that I, GEORGE K. BIRGE, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Apparatus for Flocking Wall-Paper, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention consists, first, in a closed box or compartment having therein an endless band or apron, which serves to move the paper being flocked through such compartment, a drum located below such apron and extending only partially across the width of the compartment, leaving spaces between such drum and the side walls, through which the surplus flock may fall to the bottom of the compartment, beaters arranged below the drum for agitating the loose flock upon the paper, and a hopper for supplying the flock continuously to the paper; second, in a flocking-compartment having its lower walls converging to a longitudinal trough for the reception of the surplus flock, and a conveyer operating in such trough to clear it of the collected flock; third, in the combination, with the flocking-compartment having the converging walls, trough, and conveyer, of an elevator for automatically carrying the collected surplus flock from the trough back to the hopper; fourth, in an improved arrangement of the endless band or apron by means of which the surplus flock which may have fallen upon the under portion of such band or apron is prevented from passing upward between the band or apron and its forward roller; fifth, in adjustable means for feeding the paper upon the moving endless band or apron as it enters the compartment; and, sixth, in other details of construction, all of which will be more fully hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of my improved machine, showing parts in section. Fig. 2 is a vertical transverse section of the same looking toward the elevator. Fig. 3 is a vertical longitudinal section of the

same taken in the line $x x$ of Fig. 2. Fig. 4 is a top plan view of the same with the hopper and upper wall of the compartment removed. Fig. 5 is an enlarged section of the hopper; and Figs. 6, 7, 8, and 9 are detached detail views.

Referring to the drawings, a is the box or compartment in which the flocking is to be done, and a' is an upward end extension for the accommodation of the cleaning-off apparatus. The lower walls, $a^2 a^2$, of this compartment converge downwardly to the longitudinal trough a^3 .

At the lower side of one of the walls a^2 is the box or casing a^4 , in which is arranged the endless band a^5 , having the scrapers a^6 , which, in the revolution of the band upon its rollers $a^7 a^7$, pass along the trough a^3 . At the front end of this trough is the spout or passage a^8 , connecting the end of the trough with the upright casing b , in which is arranged the endless elevator-band b' with its buckets b^2 , which passes around the rollers $b^3 b^3$. At the top of the elevator is located the spout b^4 , extending down and across to a point over the hopper c , located upon the top of compartment a and near its front end.

The apparatus just described is designed to automatically collect and return again to the hopper the surplus flock which does not adhere to the size upon the paper.

At the ends of compartment a , near its top wall, are pivoted the large rollers $d d$, and at the forward end the smaller rollers d' , d^2 , and d^3 . Upon these rollers is arranged the endless band or apron e . The upper portion of the apron e , between the rollers $d d$, has a slight inclination or fall toward the left-hand roller d , while the under portion of this apron passes first over roller d' , then downwardly at a slight inclination to and around roller d^2 , and from there up to and over roller d^3 , located close behind the large forward roller, d , under and around which the apron then passes. In this manner a dip is formed in the apron e , having the slightly-inclined portion e' and almost vertical portion e^2 .

Near the upper side of the portion e^2 of apron e is arranged the revolving beater f , operated by belt f' from pulley f^2 , located upon shaft f^3 . The object of this dip in the apron and the beater is to prevent the surplus flock which

may have fallen upon the under portion of the apron from passing between such apron and the forward roller, d , where it is liable to clog, thereby injuriously affecting the even running of the apron around the roller. As the surplus flock passes down the dip in the belt it is impossible, with the aid of the beater f , for any of the same to rise over and around the roller d^3 and under the forward roller, d .

Between the rollers d and just underneath the endless band e , is the drum g , of canvas or other flexible fabric or material. This drum is preferably about the width of the apron e , thus leaving considerable space, as shown at $g' g'$, between its outer edges and the side walls of the compartment a . The drum g is secured in place by the cords or laces g^2 .

Prior to my invention apparatus of this character has been arranged with the drum forming a close bottom extending from wall to wall. This had the effect of confining the surplus flock above the flocking-space and clogging the same, so as to necessitate often stoppages in order to clear the apparatus of the surplus flock. The side spaces which I leave in my construction entirely obviate this difficulty, as the surplus flock passes over the edge of the paper being operated upon and down through the spaces $g' g'$ to the bottom of the compartment, where it is collected and returned to the hopper in the manner already described. Below this drum g are arranged a series of revolving beaters, h , of the form shown particularly in Fig. 6. The axes h' of these beaters project beyond the compartment a , and are provided with the pulleys h^2 . An endless belt, h^3 , operated by the pulley h^4 , passes in contact with these pulleys, alternately under and over the same, as clearly shown in Fig. 1, which has the effect of alternating the direction of the revolution of the beaters.

h^5 is a belt-tightener operating upon the belt h^3 , and h^6 is a roller or pulley which serves to keep the lower portion of the belt away from the upper portion.

The form of beaters herein shown might be replaced by those operated by cams and having a slapping action; but I prefer those which revolve, as by alternating the direction of their revolution the flock upon the paper is more effectively agitated. A housing, h^7 , is placed over the pulleys h^2 and belts h^3 for safety. The paper k to be flocked (shown by the dotted line in Fig. 3, and in full in Fig. 4) enters the compartment a through the slide a^9 , having previously had its surface prepared with size, as desired, in the printing-machine. As it strikes the endless apron e it passes under a friction device consisting of the rod l , having the enlarged end friction-rollers, $l' l'$, which presses the paper at its edges only down upon the moving endless apron e , thus by its friction enabling the apron to carry the paper forward. This rod l with its friction-rollers $l' l'$ is mounted in two supports, $m m$, slotted at m' . (See Fig. 8.) By means of the screw-bolts m^2 , upon which the supports $m m$ are ad-

justable, the amount of friction of the paper upon the apron e can be properly regulated.

In the portion a' of the compartment a is located the cleaning-off apparatus, which is arranged as follows: nn are two rollers, around which are arranged three or more narrow endless straps or belts, n' , so placed that they will support the paper as it passes over them out of the compartment. A guide, o , consisting of a wooden strip with recesses o' , (see Fig. 7,) is arranged so that the endless belts or strips rest within the recesses o' , and are thereby kept in position upon the rollers $n n$.

Extending across the compartment a' , and between the rollers $n n$, are the revolving beaters $p p'$, the arms of which strike the endless bands $n' n'$ and the paper lying thereon. This apparatus just described is intended to remove from the paper, just as it leaves the compartment, any surplus flock which may happen to remain thereon. The flock thus removed passes down the sloping rear wall, a^{10} , of the compartment and falls into the trough a^3 where it is returned to the hopper with the rest of the surplus flock, as has been already described. The top roller, n , of the cleaning-off apparatus is mounted on the shaft n^2 . Upon this shaft is the fast pulley n^3 , with its operating-belt n^4 . n^5 is another fast pulley upon the same shaft, around which and the pulley n^6 passes the belt n^7 . This pulley n^6 turns the shaft n^8 , upon which one of the beaters, p , is mounted, the other beater being revolved by the belt n^9 , passing over the pulleys $n^{10} n^{10}$.

In Fig. 9 I have shown an adjusting device, which is located within the compartment a and in contact with the endless apron e . It consists of the roller q , one end of which, q' , rests loosely in a socket, q^2 , in the side wall of the compartment, the other end, q^3 , passing through the opposite wall and engaging with an adjusting-screw, q^4 , movable in a socket, q^5 . By moving the screw q^4 the inclination of the roller q is so adjusted with relation to its contact with the endless apron e as to check any tendency of the apron's departing from its true position upon its rollers $d d$.

Within the hopper c , where the loose flock is placed and fed down upon the sized paper, is placed the revolving brush c' , operated by the belt c^2 , which may be placed upon any of the series of pulleys c^3 , which allow for a variation of the speed of the revolving brush. The bottom of the hopper consists of the wiregauze c^4 , through which the flock is sifted by the action of the brush c' , and a sliding gate, c^5 , serves to regulate the supply of flock from the hopper to the surface of the passing paper.

The operation of the entire apparatus just described is as follows: The sized paper as it passes into the compartment is covered from the hopper c with a layer of flock, which is violently agitated and thrown about upon the surface of the paper while it is passing through the compartment by the beater located underneath. The surplus flock, which

is thrown by the beating action over the side edges of the paper and apron upon which the paper rests, falls down into the trough in the bottom of the compartment, and is there carried to one end, from which it passes to the bottom of the elevator, it being then elevated and returned to the hopper, as has been already described. The surplus flock from the cleaning-off machine is likewise operated upon. It will thus be seen that the operation of my improved apparatus is practically continuous, as there is no clogging or filling up of the parts with the surplus flock, as is now common in machines of this character.

I am aware that a closed flocking-box having a flexible bottom, an endless apron, beaters, and a hopper has heretofore been used, and I do not, therefore, claim such construction; but

What I do claim is—

1. An apparatus for flocking paper, &c., consisting, essentially, of a closed box or compartment having therein an endless band or apron which serves to move the paper being flocked, a drum located below such apron and extending only partially across the compartment, leaving spaces between such drum and the side walls, through which the surplus flock may fall to the bottom of the compartment, beaters arranged below the drum for agitating the loose flock upon the paper, and a hopper for continuously supplying the flock to the sized paper, substantially as shown and described.

2. A flocking-compartment having its lower walls converging to a trough for the reception of the surplus flock, substantially as shown and described.

3. A flocking-compartment having its lower walls converging to a trough for the reception of the surplus flock, and a conveyer operating in such trough to clear it of the collected flock, substantially as shown and described.

4. The combination of a flocking-compartment

having its lower walls converging to a trough for the reception of the surplus flock, a conveyer operating in such trough to clear it of the collected flock, and an elevator for automatically carrying the collected surplus flock from the trough back to the hopper, substantially as shown and described.

5. In an apparatus for flocking paper, &c., the combination, with the endless band or apron *e*, the large rollers *d d* and the smaller rollers *d' d' d'*, so arranged with the apron as to form a dip therein, substantially as shown, of the beater *f*, acting upon the apron, substantially as and for the purpose stated.

6. In an apparatus for flocking paper, &c., the combination, with the endless band *e*, of the adjustable rod *l*, with its side friction-rollers, *l' l'*, substantially as and for the purpose stated.

7. In an apparatus for flocking paper, &c., the combination of the rollers *n n*, the thin endless bands *n'* the guide *o o'*, and the revolving beaters *p p*, the line of the endless bands being in an upwardly-oblique direction.

8. In an apparatus for flocking paper, &c., the combination, with the endless apron *e* or the drum *g*, or both, of a set of beaters which alternate in the direction of their revolution, substantially as and for the purpose stated.

9. In an apparatus for flocking paper, &c., the combination, with the drum *g* or apron *e*, or both, of the revolving beaters *h*, with their pulleys *h'*, and the endless belt *h'*, passing alternately under and over the pulleys, in order to alternate the direction of the revolution of beaters, substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE K. BIRGE.

Witnesses:

W. T. MILLER,
OTTO HODDICK.