

No. 704,434.

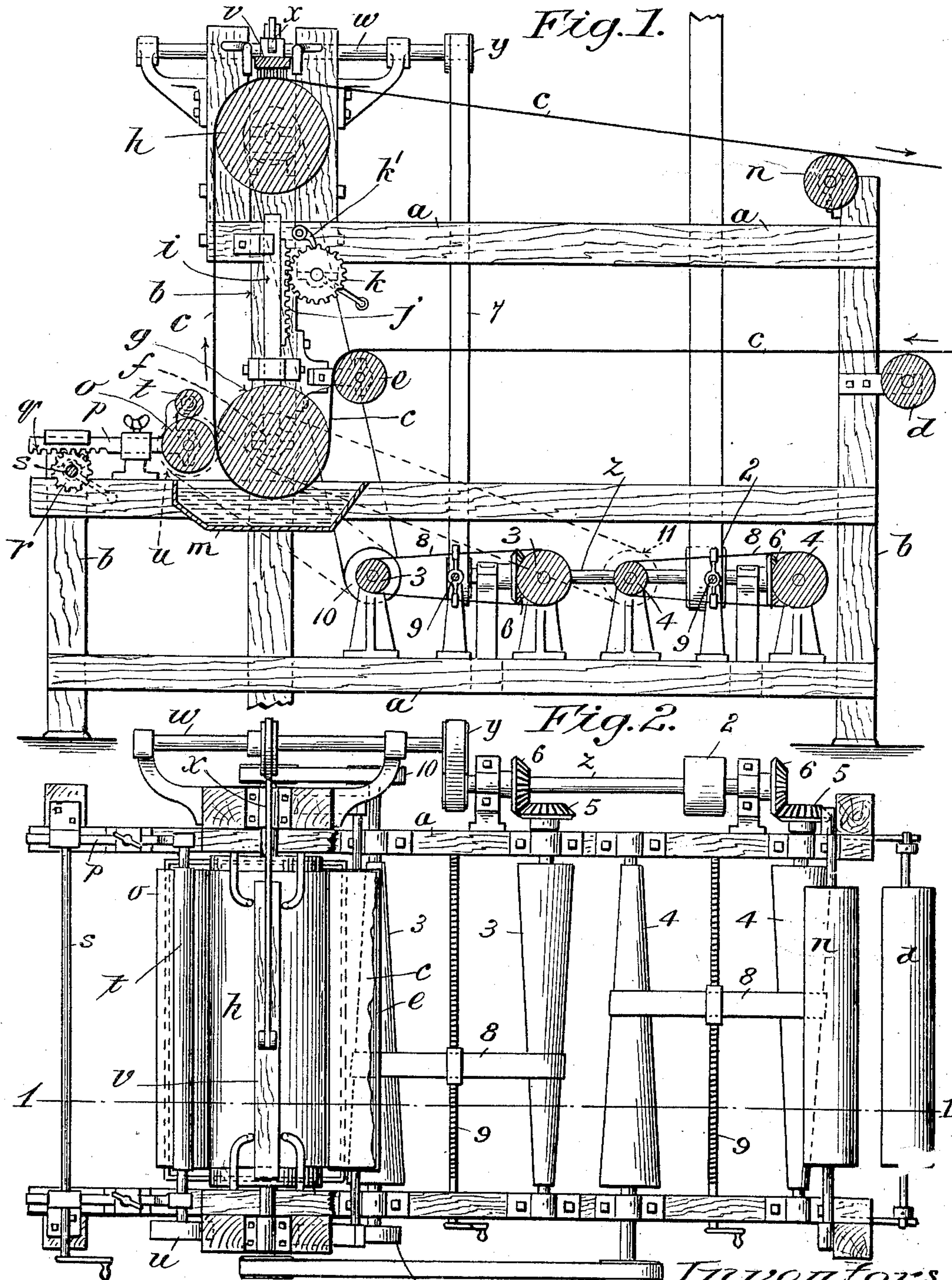
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J. CHEVALIER & N. & E. LAJOIE.

PAPER COATING MACHINE.

(Application filed Jan. 31, 1902.)

(No Model.)



Witnesses:
J. D. Garfield
H. J. Clemons

Inventors:
Joseph Chevalier
Napoleon Lajoie
Edmond Lajoie
by Chapman & Co. Attorneys

UNITED STATES PATENT OFFICE.

JOSEPH CHEVALIER, OF HOLYOKE, AND NAPOLEON LAJOIE AND EDWARD LAJOIE, OF CHICOPEE, MASSACHUSETTS.

PAPER-COATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 704,434, dated July 8, 1902.

Application filed January 31, 1902. Serial No. 91,965. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH CHEVALIER, residing at Holyoke, and NAPOLEON LAJOIE and EDWARD LAJOIE, residing at Fairview, in the city of Chicopee, in the county of Hampden and State of Massachusetts, citizens of the United States of America, have jointly invented new and useful Improvements in Paper-Coating Machines, of which the following is a specification.

This invention relates to paper-coating machines, and has for its object the improvement in machines of this class whereby the coating of material may be more uniformly applied to the paper and whereby it may be more cheaply applied, the economy being effected largely by the provision of means for spreading the coating material upon the paper without resorting to the usual method of working it onto the surface of the paper by means of a number of brushes. These latter to produce an even surface free from lines must be made of fine material and are very expensive and wear out rapidly, as they must be kept constantly in motion to properly lay the coating material and to incorporate it thoroughly into the surface of the paper to permit it to withstand the subsequent glazing operations.

The invention consists in the construction set forth in the following specification and clearly pointed out in the claims appended thereto.

Referring to the drawings forming part of this application, Figure 1 is a longitudinal sectional elevation of a machine embodying our invention. Fig. 2 is a plan view of the machine, certain parts of the frame being broken away.

Referring now to the drawings, *a* indicates the longitudinal frame parts of the machine, and *b* the posts thereof. The paper is run through the machine in a continuous web and is indicated by *c*. The roll of paper from which this web is drawn is not shown in the drawings, but is supported in any convenient manner at the rear of the machine, and the paper is drawn therefrom and passes over a roll *d*, supported on the rear posts of the machine in a horizontal position. From thence it passes over the guide-roll *e*, supported on

arms secured to the front posts of the frame. In suitable bearings *f*, vertically adjustable on these front posts, there is a larger roll *g*, which constitutes one of the feed-rolls, the location thereof relative to the guide-roll *e* being such that the paper running from the latter onto said feed-roll will run in a substantially vertical plane and be guided into close contact with the feed-roll at a point substantially horizontally opposite the axis of the latter. The second or auxiliary feed-roll is indicated by *h* and is located vertically over the roll *g*. This roll *h* is in fixed bearings; but the roll *g* may, as stated, be adjusted toward and from it. This may be done in any desirable way; but preferably the bearings *f* thereof are formed in the lower end of two arms *i*, adapted to slide vertically on or near the inner surface of the two front posts between which the roll is located, and on these arms there is provided a rack *j*, with which gear-wheels *k* engage, these gears being mounted on a shaft extending across the machine, to which a crank or hand-wheel may be fixed, whereby it may be rotated and the roll thus adjusted. Suitable pawls *k'*, one of which is shown in Fig. 1, serve to lock the gears, and thus hold the roll *g* in its adjusted position. Below this roll *g* is a shallow pan *m* for containing the liquid coating material, the roll being so adjusted that its lower portion will be submerged in said material. The web of paper thus passing through the coating material as it is drawn forward by said feed-roll, the contact of said web with the surface of this roll extending above the surface of the coating material, the latter cannot come in contact with that side of the web next to the roll. From said feed-roll *g* the web is carried up over the auxiliary roll *h*, and from thence it runs over the roll *n* at the rear of the machine, passing beyond to the driers. By means to be described farther on the said roll *h* is adjusted to rotate at a somewhat greater speed than does the roll *g* to the end that the paper may always be held tightly against the latter roll in its passage through the coating material, whereby a uniform feed is assured and whereby the coating material may be prevented from entering between the paper and the surface of the roll. Both the

roll *g* and the auxiliary roll *h* are made of brass with a highly-finished surface; but the guide-rolls may be of wood or metal, as desired. The longitudinal frame members extend beyond the front of the roll *g* somewhat, and supported thereon is the roll *o*. The ends of the shaft on which this roll is fixed are supported in bearings in the ends of two horizontally-adjustable arms *p*, each of which has a rack *q* thereon, with which pinions *r* engage, these being secured to a shaft *s*, extending across the front end of the machine and provided with a crank for rotating it. The roll *o* is of brass and is faced with rubber or some similar yielding material and is provided with a wiper-roll *t*. On one end of the roll *o* there is secured a pulley *u*, (shown in Fig. 2 and in dotted lines only in Fig. 1,) whereby the roll may be rotated. As the machine is ordinarily used this roll is not rotated by a belt, but its face is set up against the feed-roll *g*, and as the latter revolves this roll *o* is revolved by reason of its contact with the feed-roll. If it is desired to put a thick coating of material on the web of paper, then the roll *o* is set to bear lightly against the feed-roll; but if it is desired to put on a thinner coating then the roll is set up to bear with greater pressure against the feed-roll. The face of the latter being of some yielding material, it is obvious that under pressure the contacting surface thereof must flatten out more or less, and as the coating material adhering to the paper passes between the feed-roll and this roll *o* it is kneaded into the surface of the paper, and all surplus material is rolled back into the pan *m*. After the paper emerges from between the rolls *g* and *o* it is run vertically up to and over the roll *h* and at the top of this latter roll passes under an endwise-reciprocating brush *v*, whereby any inequalities in the coating material as applied by the roll *o* may be eliminated and the material be given a uniform surface. There are many ways in which this reciprocating brush may be operated, but preferably the manner shown herein is adopted, and it consists in mounting a short shaft *w* in any suitable manner, whereby it may be supported substantially in the plane of the top of the brush and transversely of the end of the latter. On this shaft at the opposite end of the brush there is mounted an eccentric, the strap of which connects with a rod *x*, extending over the brush and having its end pivotally secured thereto. On one end of the shaft *w* is a pulley *y*, by which the shaft is rotated.

For the purpose of adapting this machine to the various classes of work to which it may be applied it is necessary that the various rolls of the machine be provided with a driving mechanism whereby they may be rotated at the different rates of speed required on different classes of work. To that end I construct a driving mechanism as follows: A main driving-shaft *z* is provided, on which there is

a suitable pulley 2, whereby it may be rotated by a belt. This shaft is preferably supported on the frame of the machine, as shown. In suitable bearings there are located at right angles to the driving-shaft two sets of cone-pulleys, (indicated by 3 and 4.) On the shafts of the driving-cones are beveled gears 5, engaging with similar gears 6 on the main shaft *z*. On the end of said main shaft there is a pulley from which by a belt 7 movement is transmitted to the shaft *w* over the pulley *y*. The driving and driven cones are provided with the usual belt 8 and with a screw shipper-rod 9, whereby these belts may be shifted. On the end of the driven cone 3 there is a pulley 10, from which a belt runs over a pulley on the auxiliary feed-roll *h*, rotating the latter, and on the driven cone 4 there is a pulley 11, from which a belt runs to a pulley on the roll *g*. Means are thus provided for varying the speed of the roll *h* relative to the roll *g*. For the purpose of maintaining the proper tension on the web of paper, whereby it may be held under as great a strain as possible in passing around the roll *g*, the driving-cones for the two rolls *g* and *h* are so adjusted that the roll *h* will rotate at a somewhat greater rate of speed than the roll *g*, thus maintaining a constant drag on the paper, which will keep it drawn tightly around the roll *g*.

There are certain classes of work which require a paper which has applied thereto only an exceedingly thin coating of material thereon, and it has been found in practice that this cannot be properly applied, however tightly the roll *o* may be set up against the roll *g*, if said roll *o* is permitted to turn on its axis by the contact therewith of the feed-roll; but to produce the desired effect the roll *o* must be first adjusted to a proper contact with the feed-roll *g* and then be rotated in a direction contrary to that of the feed-roll, whereby the coating material may be rubbed into the paper in an exceedingly thin layer to produce the desired effect and lay upon the paper what is known in the art as a "skin-coat." To adapt the machine to this class of work, a second pulley 12 is secured to the driving-cone 3 on the end thereof opposite to the one on which the pulley 10 is secured, and from this pulley a belt runs to the pulley *u* on the roll *o*. It is only when the roll *o* is used in this manner that the wiper-roll *t* is brought into service. When the roll *o* operates in the reverse direction, the wiper-roll may be lifted off from the roll *o* in the usual manner.

Having thus described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

1. A paper-coating machine comprising two feed-rolls adapted to be partially encircled by the paper located in separated relation one above the other; a receptacle for liquid coating material within which a portion of the lower feed-roll is immersed, means for adjusting said lower feed-roll toward and from the

upper roll, and means for rotating the latter at a higher rate of speed than the former; a roll having an adjustably-yielding contact with said lower roll, and means for rotating said upper feed-roll at a higher rate of speed than the lower roll.

2. A paper-coating machine comprising two feed-rolls adapted to be partially encircled by the paper, a receptacle for the liquid coating material, one of said rolls being in contact with the latter, a roll having a yielding contact with the feed-roll running in the coating material, and adjustable relative thereto, means for rotating said feed-rolls at different rates of speed, and means for rotating said roll in contact with the feed-roll at different rates of speed.

3. A paper-coating machine comprising two feed-rolls, and means for rotating them at different rates of speed, composed of separate cone-pulleys for driving each of said feed-rolls, shiftable belts for said cone-pulleys whereby the feed-rolls may be rotated at different rates of speed, combined with a roll having a yielding contact with one of said

feed-rolls, and means for adjusting said roll relative to said feed-roll.

4. A paper-coating machine comprising two feed-rolls adapted to be partially encircled by the paper located in separated relation one above the other; a receptacle for liquid coating material within which a portion of the lower feed-roll is immersed, means for adjusting said lower feed-roll toward and from the upper wiper-roll, and means for rotating the latter at a higher rate of speed than the former; a roll having an adjustably-yielding contact with said lower roll, means for rotating said wiper-roll at a higher rate of speed than the lower roll, a brush bearing on said upper feed-roll, and means for imparting reciprocating movements to said brush, endwise.

JOSEPH CHEVALIER.
NAPOLÉON LAJOIE.
EDWARD LAJOIE.

Witnesses:

K. I. CLEMONS,
WM. H. CHAPIN.