

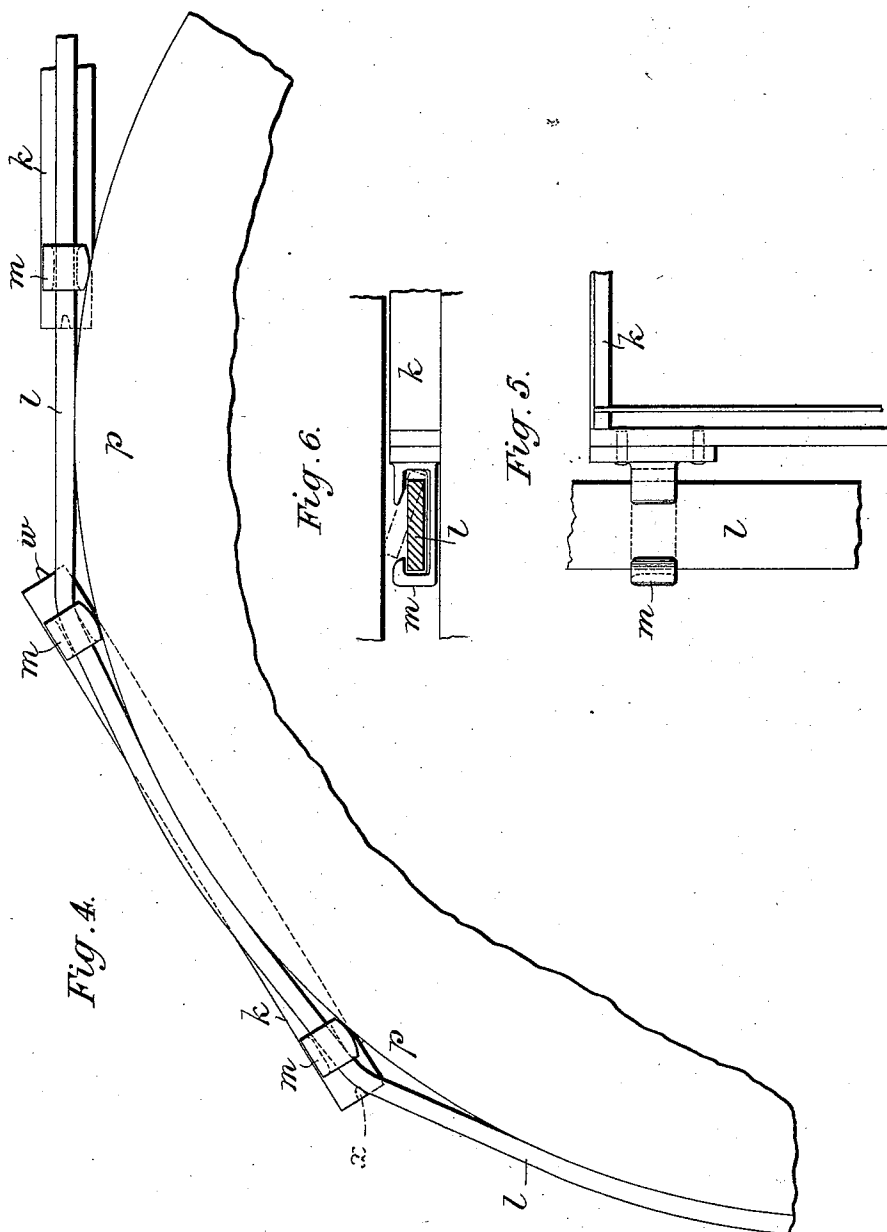
(No Model.)

3 Sheets—Sheet 2.

R. W. MONCRIEFF.
PAPER MAKING MACHINE.

No. 532,803.

Patented Jan. 22, 1895.



WITNESSES:

Fred White
C. K. Fraser.

INVENTOR:

Robert Wighton Moncrieff,
By his Attorneys:

Arthur C. Fraser & Co.

(No Model.)

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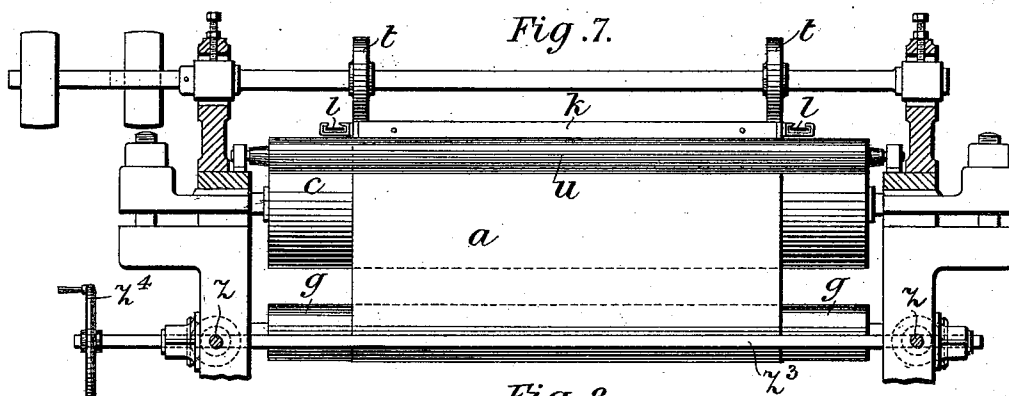


Fig. 7.

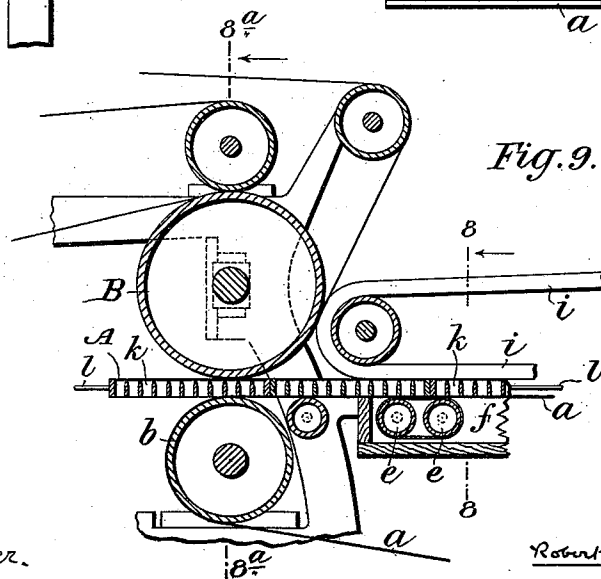
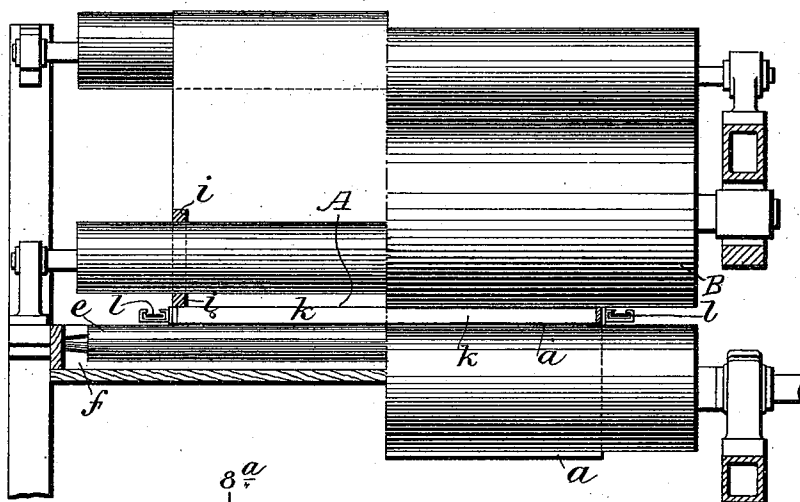


Fig. 9.

WITNESSES:

C. K. Fraser.

Thos. F. Wallace

INVENTOR:

Robert Highton Moncrieff.

By his Attorneys,
Arthur C. Fraser & Co.

UNITED STATES PATENT OFFICE.

ROBERT WIGHTON MONCRIEFF, OF RUSH MILLS, NEAR NORTHAMPTON,
ENGLAND.

PAPER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 532,803, dated January 22, 1895.

Application filed March 13, 1894. Serial No. 503,428. (No model.)

To all whom it may concern:

Be it known that I, ROBERT WIGHTON MONCRIEFF, of Rush Mills, near Northampton, England, have invented certain new and useful improvements in Paper-Making Machines, of which the following is a specification.

My invention has reference to paper making machines of the kind in which a number of separate traveling molds are employed, and its main object is to reduce the number of molds required for each size of sheet, and to simplify the mechanism whereby the molds are made to travel. Hitherto the separate molds have generally been jointed together at their ends so as to constitute a sort of endless chain of molds which has been made to pass round semicircular frames at the two ends of its travel by means of an arrangement of racks, spur wheels and other like devices.

Now according to this invention the separate molds are unconnected and strung loosely by means of eyes or similar devices at their ends upon endless bands or ropes which are caused to travel at considerably greater speed than the speed of the molds at the time the paper is being formed thereon, and an endless wire web is employed like that of an ordinary Fourdrinier machine (or alternatively two or more narrow endless wire webs) the web being driven at the ordinary speed of a paper forming wire web. The endless wire web and the dekle straps hold the molds between them in that part of the travel of the molds which is between the pulp feed and the couch rolls, and the molds therefore travel at this part of their course at the same speed as the wire web and the dekle straps, while the bands traveling at a greater speed run freely through the eyes of the molds. The endless bands pass round pulleys, preferably rubber covered, at the couch roll end of the machine, and round other similar pulleys at the feed end of the machine. Each successive mold after passing the couch rolls becomes gripped by means of its eyes between the bands and the pulleys at this end of the machine, and therefore begins to travel at the same speed as the bands, and this speed is maintained while the mold with the bands returns along the under side of its course

and passes round the pulleys at the feed end of the machine between which pulleys and the bands the eyes of the mold become again gripped. Between these pulleys and the pulp feed are rubber faced feed disks and rollers between which the mold comes on leaving the said pulleys. These rollers rotate at a relatively slow speed which is such as to feed each successive mold until it comes in close but gentle contact with the mold in front of it, the molds thus forming a level surface for the reception of the pulp, this level surface extending from a little beyond the pulp feed at the one end to a little beyond the couch rolls at the other end. A flat traveling mold surface is thus obtained without the use of carrying bars, links, mold frames and other devices, which have hitherto been found necessary where a chain of traveling molds has been employed.

In the accompanying drawings Figure 1 is a side elevation of a paper making machine constructed according to this invention. Fig. 2 is a plan, the endless wire web and most of the parts above the level of the same being removed, and only some of the rollers that support the wire web being shown. Fig. 3 is a partial end view looking toward the right of Figs. 1 and 2 showing the feed disks and rollers hereinbefore described between which the molds come at the feed end of the machine. Fig. 4 is a side view on a larger scale of one of the pulleys around which the molds are carried by the bands at the delivery end of the machine and also indicating the molds and bands. Fig. 5 is a plan and Fig. 6 a side view of a portion of one of the molds. Fig. 7 is a cross section on a large scale of the machine through the axis of the right hand disks *t*, looking toward the left, but with these disks and the roller *u* below in elevation. Fig. 8 is a cross section on the same scale as Fig. 7, the left hand half being through the box *f*, cut on the line 8—8 in Fig. 9, and the right hand half cut on line 8^a—8^a Fig. 9, but with the rolls in elevation looking toward the left. Fig. 9 is a fragmentary longitudinal section on the same scale as Figs. 7 and 8, cut through the couch rolls.

a is an endless wire web as in an ordinary Fourdrinier machine. This web passes at one

end of its travel around the lower couch roll *b* and at the other end around the breast roll *c*. Between these rolls it is supported by the rollers *d d* and by the rollers *e e* in the suction box *f*. At the under part of its travel it passes over and under the guide rollers *g g g*. The web *a* is driven at the speed at which the web in a Fourdrinier machine is ordinarily driven, the motion being preferably given by a belt passing around a pulley *h* on the lower couch roll *b*. The web *a*, or any equivalent provision, serves as a propeller for the molds. *i* is one of the ordinary dekle straps.

k k are the separate molds which preferably consist each as usual of side, end and cross bars, on the top of which is fixed and carried any suitable interstitial paper former, as the wire web *A*, Fig. 9. The sheets of pulp on the web *A* are couched by the upper couch roller *B*, Fig. 9. The molds are strung loosely upon endless bands *ll* that are caused to travel at considerably greater speed than the speed of the molds at the time the paper is being formed thereon. This loose connection of the molds to the bands is shown as formed by means of partly open eyes *m m* at the ends of the molds through which eyes the bands *ll* freely pass.

The separate molds at the part of their travel which is between the feed *n* and the couch rolls are held between the wire web *a* and the dekle straps *i* and therefore travel at the same speed as the wire web, while the bands traveling at a greater speed run freely through the eyes *m m* of the molds. After passing the couch rolls each successive mold becomes gripped by means of its eyes between the bands *ll* and pulleys *p p* around which the bands pass at this end of the machine. The mold thus gripped consequently begins to travel at the same speed as the bands, and this speed is maintained while the mold with the bands returns along the under side of its course and passes round pulleys *q q* at the feed end of the machine between which pulleys and the bands the eyes of the mold are again gripped. The bands *ll* receive their motion from the pulleys *p p*, the shaft *r* of which is driven by a belt passing around a pulley *s*. On leaving the pulleys *q q* each mold comes between rubber faced feed disks *t t* and rollers *u u* which check any excess of speed. The disks *t t* are driven by crossed belts *t' t'* from a pulley *t²* on the shaft *v* of the pulleys *q q* and rotate at such a rate as to feed in each successive mold until it comes into close but gentle contact with the mold in front of it. It will thus be seen that between the feed and the couch rolls there is always a level mold surface for the reception of the pulp.

In order to insure proper alignment of the molds they are each formed with two or more dowels *w* (Fig. 4) at one side and two or more recesses *x* at the other side, so that when one mold comes into contact with another at the feed end the dowels on the one will enter the

recesses in the other and bring the molds into alignment if they are not already so. The shaft *v* of the pulleys *q q* has its bearings in sliding cheeks *x* which can be adjusted backward and forward by screws *z* so as to regulate the tension of the bands *ll* as required. The screws *z* work in bearings *z'* and are connected by bevel gearing *z²* with a transverse shaft *z³* fitted with a hand wheel *z⁴* or other means for rotating it.

By means of my invention the number of the molds required is very greatly reduced. Hitherto as many molds have been required as will make an endless chain of them, but with my invention one or several molds in addition to those actually between the feed and the couch rolls suffice because owing to the speed of the bands *ll* every mold after passing the couch rolls is carried very rapidly to the feed disks *t t*. The speed of the bands *ll* relatively to the speed of the wire web *a* must of course be such as to bring each successive mold to the feed disks at the proper time.

If a mold has to be removed for examination or other reason the bands *ll* can readily be slipped out of the eyes *m m* in the manner indicated in dotted lines in Fig. 6, and the mold can be as readily replaced in a similar manner.

Whenever it may be desired to produce a continuous paper web on the machine it is only necessary to remove the molds *k k* and the paper will be formed on the wire web *a* in the ordinary way.

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

1. In a paper making machine, the combination with a number of separate traveling molds, of endless bands upon which said molds are loosely strung, and with which each of said molds, except where retarded, travels independently of the others, and means whereby the speed of said molds is retarded between the pulp feed and the couch rolls and the molds are made to travel during this portion of their course independently of the bands, substantially as and for the purpose set forth.

2. In a paper making machine, the combination with a number of separate traveling molds, of endless bands upon which said molds are loosely strung and with which each of said molds, except where retarded, travels independently of the others, and an endless wire web and dekle straps moving at a slower speed than said endless bands and between which the molds are held and with which they travel between the pulp feed and the couch rolls, substantially as and for the purpose set forth.

3. In a paper making machine, the combination with a number of separate traveling molds *k k* of the endless bands *ll* upon which said molds are loosely strung and with which each of said molds, except where retarded, travels independently of the others, an endless wire web *a* and dekle straps *i* moving at

a slower speed than said endless bands *ll* and between which the molds *kk* are held and with which they travel between the pulp feed and the couch rolls, and the disks *tt* and rollers *uu* feeding each successive mold to the said wire web and dekle straps, substantially as and for the purpose set forth.

4. In a paper making machine, the pulp feed, the couch rolls, and an endless mold course disposed in part between said members, in combination with a number of separate unconnected molds following each other in said course traveling at a relatively slow speed and in close juxtaposition between the pulp feed and the couch rolls and at a greater speed and not in close juxtaposition at the other parts of said course, and means for moving said molds, as set forth.

5. A mold for a paper making machine hav-

ing eyes at the ends for the passage of bands or ropes, and projections at the one side and recesses at the other to fit corresponding parts of neighboring molds as set forth.

6. In a paper making machine, the pulp feed, the couch rolls, and a mold course between said members, in combination with a plurality of separate unconnected paper forming molds movable from said pulp feed to said couch rolls, and means for moving said molds, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ROBERT WIGHTON MONCRIEFF.

Witnesses:

FRANK BAYES,
MATHEW MATHEWS.