

No. 730,857.

PATENTED JUNE 16, 1903.

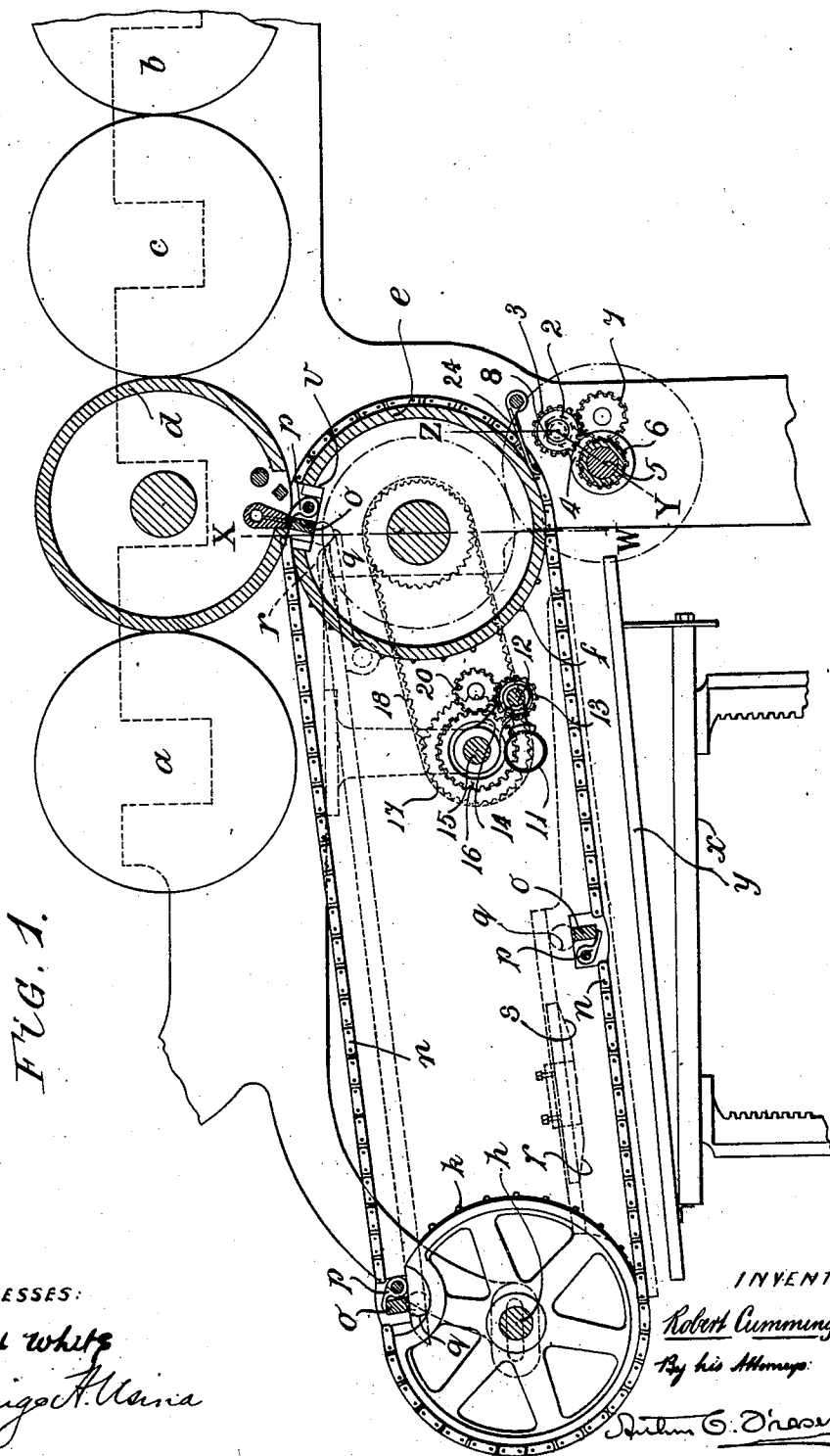
R. C. ANNAND.

DELIVERY MECHANISM FOR PRINTING MACHINES.

APPLICATION FILED DEC. 3, 1902.

NO MODEL

4 SHEETS—SHEET 1.



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4 SHEETS—SHEET 2.

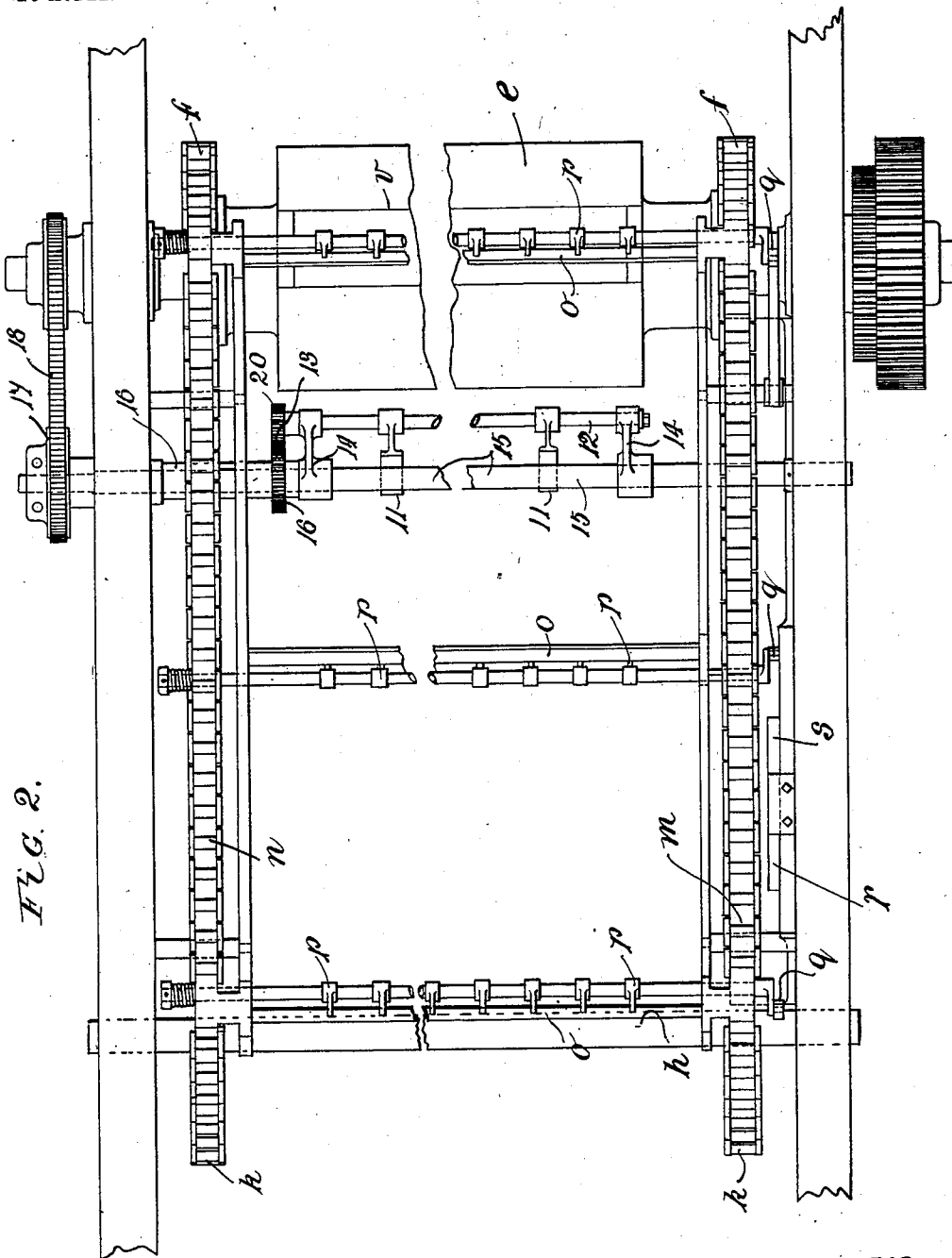


FIG. 2.

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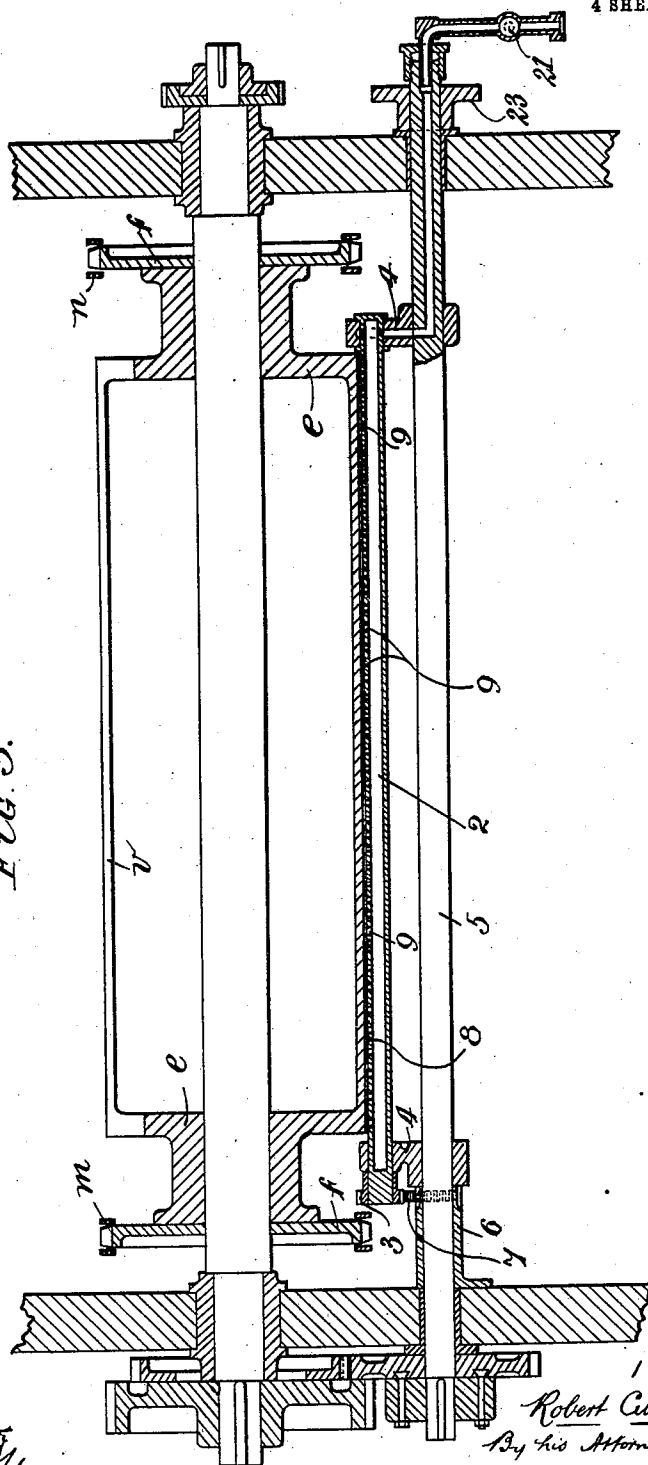
DELIVERY MECHANISM FOR PRINTING MACHINES.

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NO MODEL.

4 SHEETS—SHEET 3.

FIG. 3.



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DELIVERY MECHANISM FOR PRINTING MACHINES.

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4 SHEETS—SHEET 4.

Fig. 6.

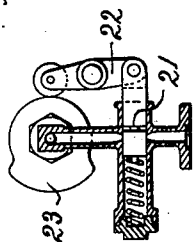


Fig. 7.

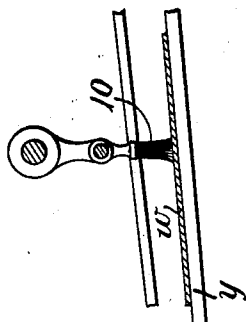


Fig. 4.

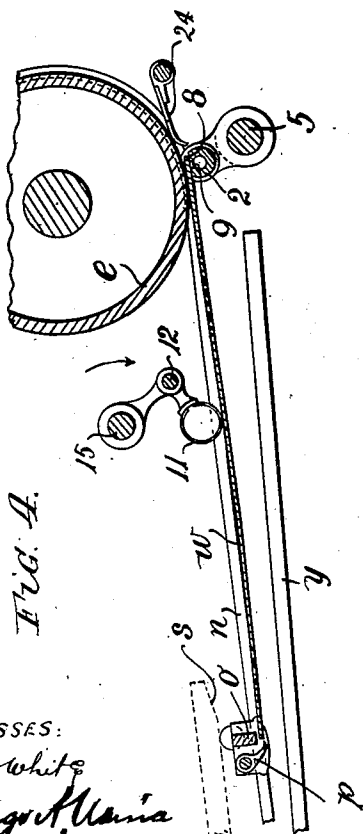
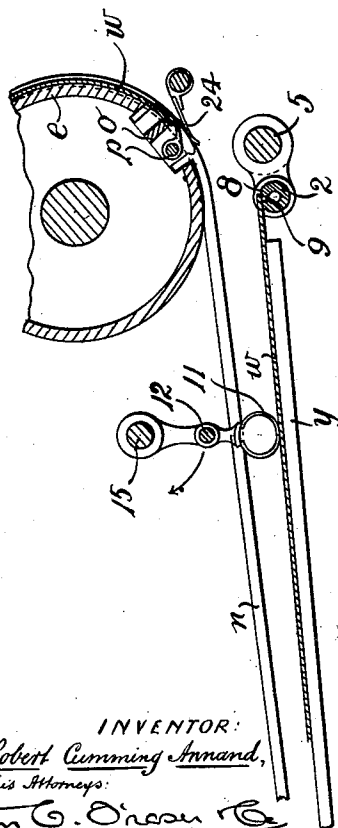


Fig. 5.



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UNITED STATES PATENT OFFICE.

ROBERT CUMMING ANNAND, OF SOUTH SHIELDS, ENGLAND.

DELIVERY MECHANISM FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 730,857, dated June 16, 1903.

Application filed December 3, 1902. Serial No. 133,661. (No model.)

To all whom it may concern:

Be it known that I, ROBERT CUMMING ANNAND, engineer, of Cornwallis street, South Shields, in the county of Durham, England, have invented certain new and useful Improvements in the Delivery Mechanism of Printing-Machines, of which the following is a specification.

This invention relates to the delivery mechanism of printing-machines, and has for its object to provide a delivery mechanism for web-printing machines which will deliver the sheets singly as they are produced by the machine and lay them flat on the delivery-board at a high speed without the use of tapes.

The invention is intended to be applied chiefly to machines producing high-class work with illustrations, which require such a body of ink in their production that the sheets cannot be carried by tapes or folded as they are produced by the machine without smearing or marking the work.

My invention is shown applied in a machine comprising the combination, with a gripping device which seizes and carries a sheet of printed paper by its forward end, of an auxiliary gripping or retarding device which seizes the following or tail end thereof, gradually reducing the speed of the sheet until it is brought to rest over a receiving-table, a rotary pressing device which is brought down on the sheet pressing out the air between the last two sheets and laying each in turn flat and evenly on the pile of sheets on the table. The said table may be set at any desired angle and may be lowered automatically or by hand as the sheets are deposited.

I will describe how the invention can be applied to a web-printing machine in which the sheets are cut from the web before they are printed. When this has been done, it will be readily understood by those conversant with the art how the invention could be applied to other forms of rotary web-printing machines in common use.

Referring now to the drawings, Figure 1 is a side elevation of a part of a web-printing machine, showing my invention. Fig. 2 is a plan thereof. Fig. 3 is a sectional view

through W X and Y Z. Figs. 4 and 5 show the sheet in different positions. Fig. 6 is the vacuum-valve. Fig. 7 is a modified form of rotary flier in which a brush is used instead of the bow-springs shown in Figs. 1 and 2, 4 and 5.

a and *b* are stereocylinders.

c and *d* are impression-cylinders. Immediately below the impression-cylinder *d* is disposed a delivery-cylinder *e*, preferably of the same size as the impression-cylinder *d*. This cylinder is carried in bearings in the framework of the machine and is driven by gearing at the same surface speed as the impression-cylinder *d*. At each end of the delivery-cylinder and inside the framework of the machine is mounted a sprocket-wheel *f*. At a suitable distance and in about the same plane is disposed an axle *h*, carried by bearings in the framework, having a sprocket-wheel *k* at each end thereof which are each in line with one of the two sprocket-wheels *f*. Stretched between these two sets of sprocket-wheels are two endless sprocket-chains *m* and *n*. These chains carry a series of gripper-bars *o* and grippers *p*, extending right across the machine. These gripper mechanisms may be termed the "leading" grippers.

q q are rollers connected with the gripping device and adapted to coact with the cams *r* and *s* for the purpose of opening and closing the grippers *p* onto the gripper-bars *o*. The delivery-cylinder *e* is so constructed with a longitudinal slot *v* in it that as each gripper-bar *o* and set of grippers *p* come around they drop into the longitudinal slot and form therewith for the time being a cylinder with gripper mechanism at one part of its surface. The cylinder and gripper mechanism are so timed that they will transfer the newly-printed sheet *w* from the last impression-cylinder to one set of the grippers on the sprocket-chain. Below the sprocket-chain is disposed a delivery-table *x*, which is preferably provided with a hinged top or board *y* and adapted to be set at any convenient angle.

Immediately below the delivery-cylinder *e* is a gripping device adapted to revolve at a less peripheral speed than that of the deliv-

ery-cylinder. One form of gripping device, which may be termed an "auxiliary" or "following" gripper, comprises a hollow shaft or tube 2, carrying a toothed wheel 3. Said hollow shaft is adapted to revolve in bearings disposed on brackets or arms 4, which are secured to another shaft 5. This shaft 5 passes through a toothed sleeve 6, fixed to the frame of the press, and is driven through suitable gearing from the delivery-cylinder *e* and is adapted to be adjusted so as to vary the distance of the following gripping device from the point where the gripping device on the sprocket-chain comes into operation in order to suit the length of sheet in use. Between the toothed wheel 3 on the hollow shaft 2 and the toothed sleeve 6 there is a toothed pinion 7, gearing with the said wheel 3 and sleeve 6. The hollow shaft 2 has a flat side or surface 8, in which there are a number of small holes 9, leading to the inside of the tube, which communicates through the axle with a vacuum-chamber. This tube 2 is so geared with the axle 5, about which it revolves, that the flat part 8 is always in a horizontal position with the air-holes perpendicular. This device is so timed that as the tube approaches the delivery-cylinder a valve is opened communicating with the vacuum-chamber, creating a vacuum in said tube and causing it to seize and hold the tail of the sheet *w*.

Disposed above the delivery-table is a rotary flier or pressing device adapted to descend on the middle of the sheet and press it onto the delivery-table and to rise again, the operation being timed to operate as a sheet is brought on the table by the leading grippers. One form of flier consists of long-haired brushes 10 or light bow-springs 11, mounted on a shaft 12 and adapted to be slid thereon, so as to press on the margins of the sheets, said shaft carrying a toothed wheel 13. The shaft takes its bearings in arms or brackets 14, mounted upon another shaft 15, which passes through a toothed sleeve 16, fixed to the frame of the press. This shaft carries a sprocket-wheel 17 and is adapted to be driven by an adjustable chain 18, passing around a sprocket-wheel disposed on the take-off or delivery cylinder. Between the toothed sleeve 16 and the toothed wheel 13 on the flier-shaft 12 is a toothed pinion 20, adapted to gear therewith. The action of the apparatus is such that while the flier revolves the tips of the brushes or the bows of the springs are made to work up and down in a vertical line. The vacuum in the tube 2 is controlled by a spring-pressed plunger-valve 21, connected to a lever 22 and operated by a cam 23.

In operation when the gripper or set of grippers *p* on the sprocket-chains *m n* has been closed onto the sheet *w* by cams *r*, suitably disposed, the sheet is carried thereby around the delivery-cylinder *e* until the grip-

per mechanism carried by the said sprocket-chain leaves the delivery-cylinder *e*. The sheet is then carried over the delivery-table *x* in a horizontal manner until the grippers *p p*, which may be called "leading" grippers, are opened by a cam device *s*, suitably disposed, whereby the sheet is released. The position of the cams *s* is adjustable to suit the length of sheet being printed. The sheet is kept pressed against the delivery-cylinder *e* by springs 24, adapted to come in contact with the margins of the sheet. At the moment that the sheet is released by the said leading grippers *p p* the following edge or tail is seized by the tail-gripping device, disposed below the delivery-cylinder. As soon as the tail of the sheet has been thus caught the speed at which the sheet is advancing over the delivery-table is reduced, while at the same time the tail of the sheet is carried downward onto the delivery-table *x*. When the sheet is brought down onto the table, the vacuum in the tube 2 is destroyed and the tail of the sheet is released, the position of the tube being such that the sheet is brought to a dead stop. At the same time the rotary flier descends onto the middle of the sheet and presses it down onto the pile of sheets already delivered. The delivery-board is so constructed that as the pile of sheets increases it is gradually lowered either automatically or by hand to make room for additional sheets.

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

1. In delivery mechanism for printing-machines the improved auxiliary gripping and pressing devices comprising the combination of a rotating shaft, arms on said shaft, a perforated tube mounted on said arms and moving around the shaft with its perforated face always horizontal, connections between the perforated tube and shaft for imparting the required movement to said perforated tube, means for connecting the perforated tube to an air-exhausting apparatus whereby the air in the perforated tube may be exhausted so as to grip and hold the sheets of paper, substantially as set forth.

2. In delivery mechanism for printing-machines the improved auxiliary gripping and pressing devices comprising the combination of a rotating shaft, arms on said shaft, a perforated tube mounted on said arms and moving around the shaft with its perforated face always horizontal, connections between the perforated tube and shaft for imparting the required movement to said perforated tube, means for connecting the perforated tube to an air-exhausting apparatus whereby the air in the perforated tube may be exhausted so as to grip and hold the sheets of paper, a delivery-table onto which the gripper delivers the sheets of paper, a shaft located over said table, arms on said shaft, a rotating spindle mounted on said arms, a resilient pressing

device mounted on said spindle, means for
actuating said resilient pressing device from
the shaft above the table so that the pressing
device moves to and from the table as the
5 shaft rotates and as the sheets are delivered
thereonto by the gripper, substantially as set
forth.

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

ROBERT CUMMING ANNAND.

Witnesses:

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W. M. HARRIS.