

1,269,327.

Patented June 11, 1918.
4 SHEETS—SHEET 1.

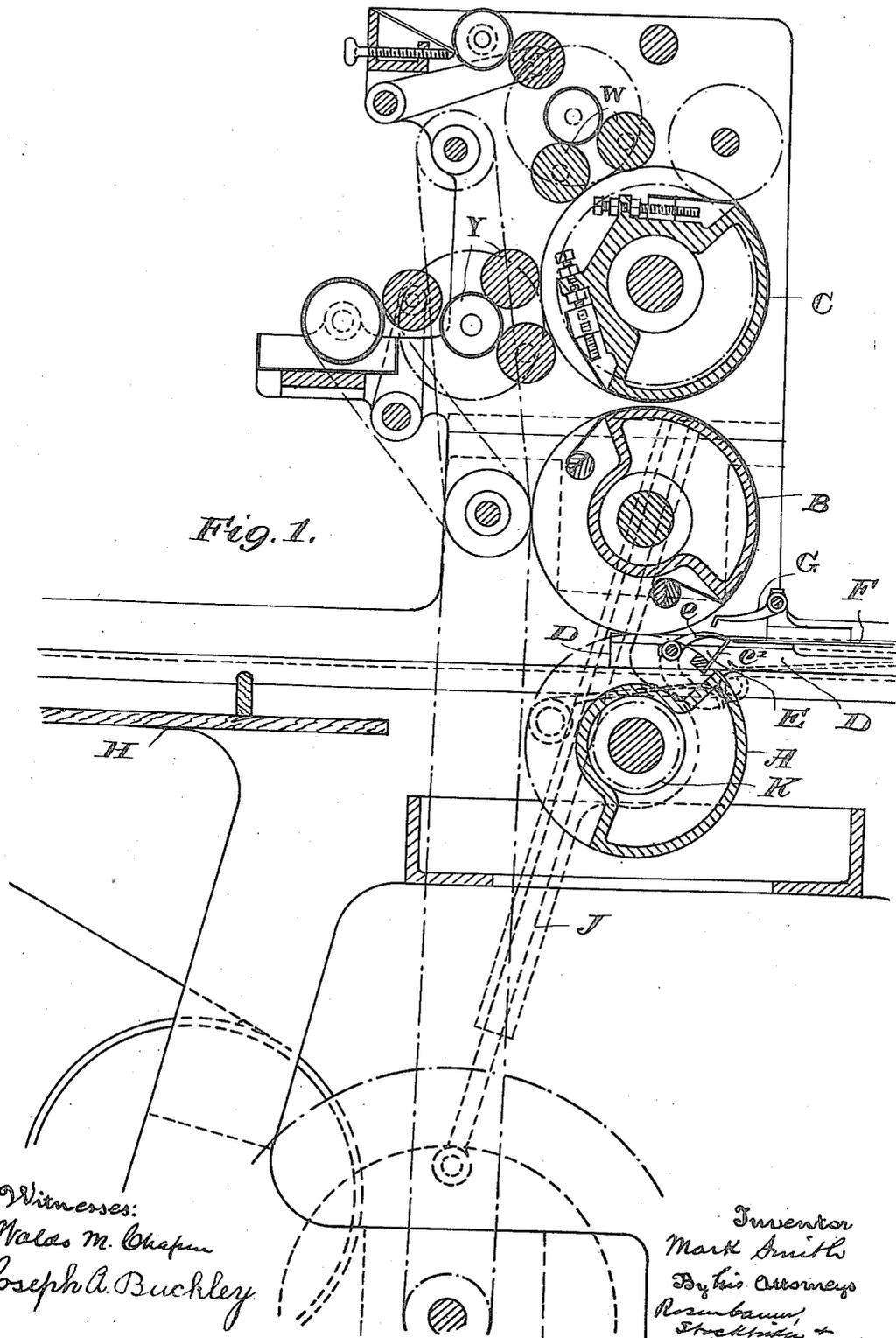


Fig. 1.

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PRINTING MACHINE.
APPLICATION FILED DEC. 22, 1914.

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4 SHEETS—SHEET 2.

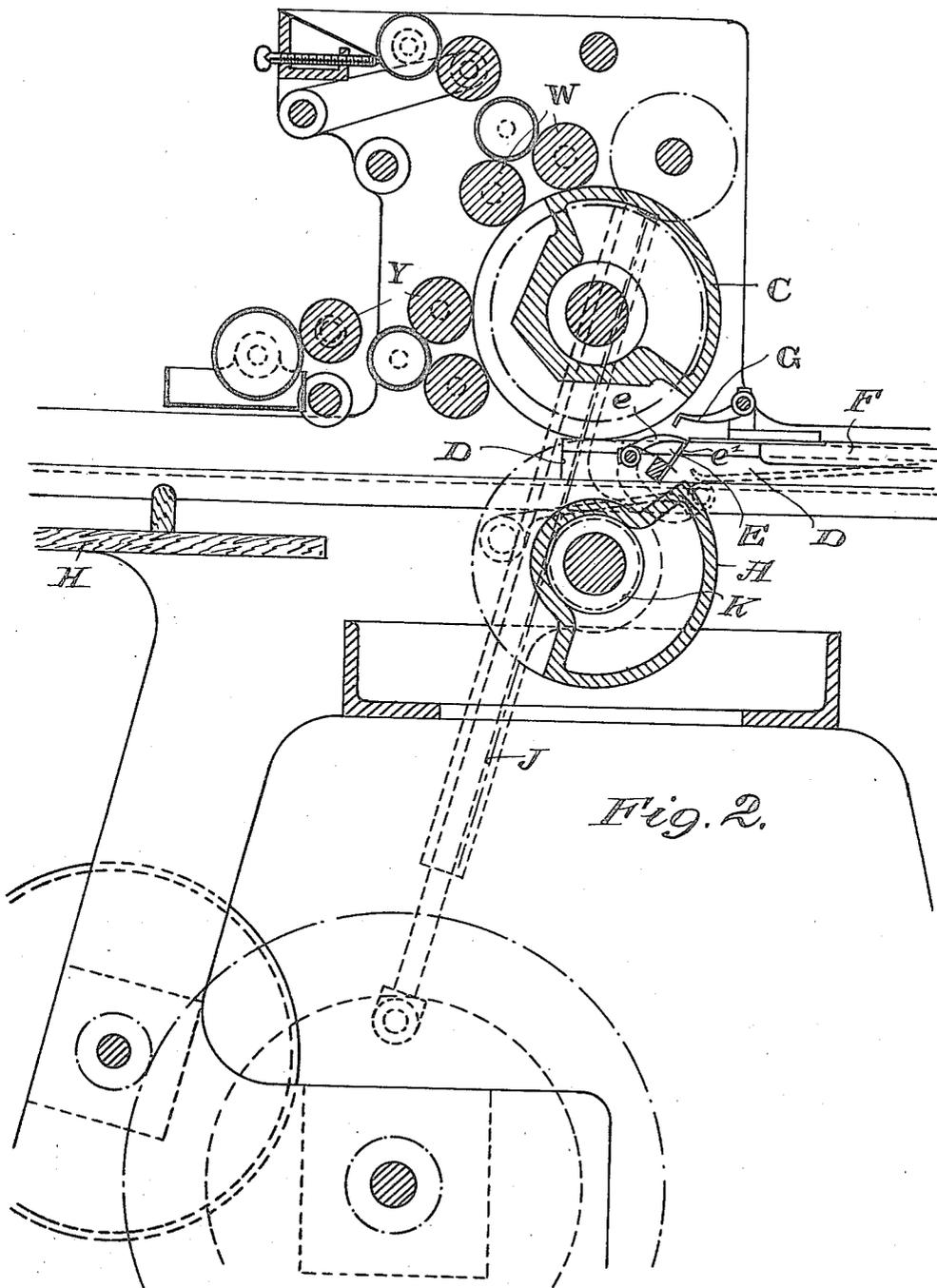


Fig. 2.

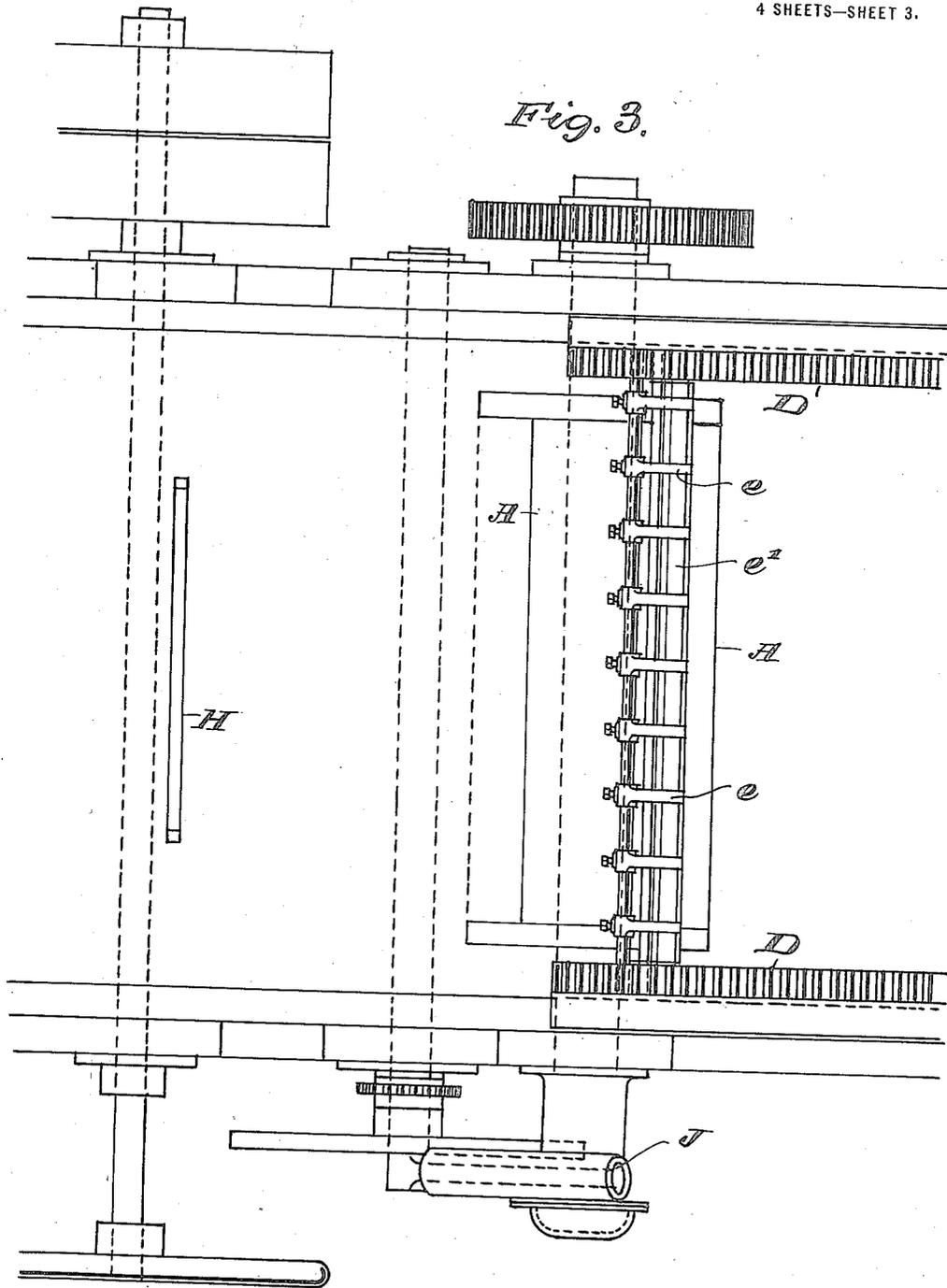
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4 SHEETS—SHEET 3.

Fig. 3.



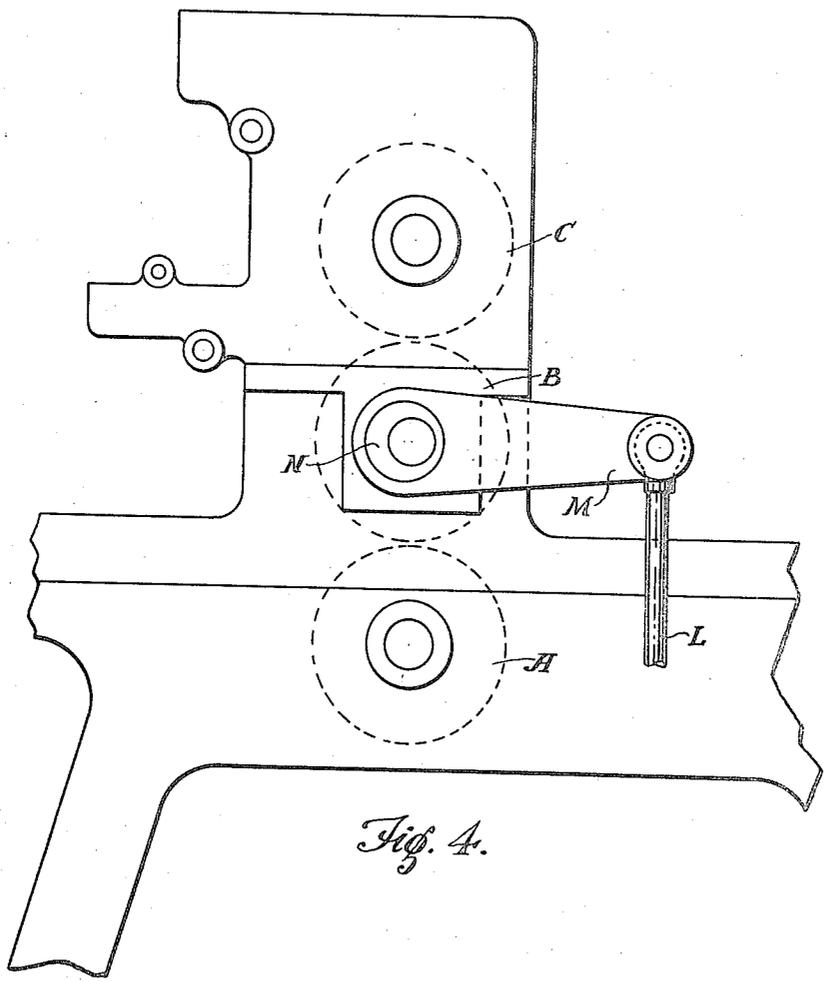
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UNITED STATES PATENT OFFICE.

MARK SMITH, OF REDDISH, NEAR STOCKPORT, ENGLAND, ASSIGNOR TO TAYLOR GARNETT EVANS & CO. LIMITED, OF REDDISH, NEAR STOCKPORT, ENGLAND.

PRINTING-MACHINE.

1,269,327.

Specification of Letters Patent. Patented June 11, 1918.

Application filed December 22, 1914. Serial No. 878,473.

To all whom it may concern:

Be it known that I, MARK SMITH, a subject of the King of Great Britain and Ireland, and a resident of Reddish, near Stockport, in the county of Lancaster, England, have invented new and useful Improvements in Printing-Machines, of which the following is a specification.

This invention relates to a printing machine for printing thick cards or sheets, or sheets of stiff material such as metal while they are in the flat condition.

In a printing machine constructed according to this invention the sheet to be printed is drawn in the flat condition under an oscillating printing cylinder by means of a reciprocating open frame, provided with the necessary grippers and remains in the flat condition during the printing, the sheet being supported by an impression cylinder. If such a frame consists only of members which are greater distances apart than the width of the sheet, the rear edge of the sheet will fall down as it leaves the impression cylinder and the grippers will ultimately release the front edge so that the printed sheet falls down through the open frame printed face upward.

The accompanying drawings illustrate the application of my improvement to printing machines.

Figure 1 represents in central vertical cross section an offset lithographic printing machine.

Fig. 2 similarly illustrates a machine in which a litho or form cylinder prints directly on the sheet or card.

Fig. 3 is a plan view of an impression cylinder and an open gripper frame, and Fig. 4 shows mechanism for allowing the cylinders to be put out of contact while still rotating together.

Similar letters of reference are used to indicate similar parts where they occur in the different figures.

Referring first to Fig. 1 A is an impression cylinder, B an offset or transfer cylinder, and C a litho or plate cylinder furnished with the usual inking rollers W and damping roller Y. The cylinders A, B, C, simultaneously oscillate to roll in contact or cooperation with each other where their surfaces permit. D is one side of an open frame. The sides of this frame are wider apart than the lengths of the cylinders and

the width of the card or sheet to be printed (see also Fig. 3) and are formed as racks to gear with spur wheels fastened to the shaft of the offset cylinder B. Thus as this cylinder oscillates the racks and the open frame reciprocate. Secured across and to the reciprocating frame is a gripper E composed of the two parts e and e' , one part e being movable and being operated to open from or close upon the part e' in any manner usual or suitable in printing machines. When the frame D and its grippers are in the right hand position of Fig. 1 the grippers are brought in front of a feed table F. A card or sheet is now fed upon and against the movable stop G and the grippers E close upon it. At the same time the stop G rises out of the path of the sheet. This state is shown in Fig. 1. As the frame moves to the left carrying the grippers and the card with it, and the offset roller B rotates with a clockwise movement of rotation, the card is drawn in between the offset cylinder B and the impression cylinder A and is printed while it retains its flat condition. When the card has been drawn completely through the nip of the impression and offset cylinders and is brought over the delivery table H it is released from its grippers so that it can fall down through the frame on to the table printed face upward. The traverse of the frame to the left is so great that the rollers A, B, C, make each about a rotation and one-eighth. The racks and the frame D then commence their return movement to resume their positions indicated in Fig. 1, the cylinders moving in the reverse direction to obtain another transfer from the litho cylinder to the offset cylinder for the latter to print upon another card when the frame D again moves to the left of Fig. 1.

The cylinders A, B and C are so spaced apart that the offset cylinder can not be in contact with both the others at the same time, and so also that it can be rotated out of contact with either. But they are so geared together that they always rotate together. Fig. 4 illustrates how this may be done. A, B and C are the cylinders which are geared together by spur wheels in the ordinary manner. L is a rod actuated from any convenient part of the mechanism of the machine, and M a lever connected at one end to and capable of being actuated by said rod. It is secured at its other end to a bush

N which can rotate in a side frame of the machine. One end of the shaft of the cylinder B is carried eccentrically in the bush N as shown, there being a corresponding arrangement of bush and lever at the other end of the shaft. The two levers are connected to operate together in any well known manner and when they are oscillated they rotate the bushes which eccentrically carry the shaft of the cylinder B and thus raise or lower the cylinder. When the lever M is horizontal, the cylinder B is out of contact with A and C. When it is depressed below the horizontal B is in contact with A but out of contact with C. When it is raised above the horizontal B is in contact with C but out of contact with A. The clearance when the lever M is horizontal is not more than one-sixteenth of an inch between two adjacent cylinders and consequently, although the cylinder B is movable, the gear wheels are always in mesh. During the printing stroke of the gripper frame D to the left, the offset cylinder is lowered to come in printing contact with the sheet, being printed and remains in its lowered position during the whole of the printing stroke of the frame. When the frame commences to return to the right the off set cylinder is raised and rotates in the opposite direction and is brought into contact with the plate cylinder C so that during this return rotation of the cylinder B it will receive an impression from the plate cylinder C. In this raised condition the cylinder B remains until it has about returned to the position of Fig. 1 when it is again lowered for the printing stroke and a next impression. There is thus a double inking of the plate cylinder C for each impression given to the offset cylinder. Devices for thus raising and lowering cylinders are well known in printing machines. The machine may also be provided with a device to be operated by the attendant to insure that the offset cylinder remains in its intermediate position and out of contact with either of the others should a sheet be missed and the gripper frame take its printing stroke without a sheet.

The appliances for releasing the printed sheet from the grippers may be any usual in printing machines.

The driving power may be applied through a reciprocating rack J gearing with a pinion K on the shaft of the impression cylinder A. The gripper frame is mounted in suitable guides so that it has a linear motion from right to left and vice versa in Fig. 1.

The various cylinders are preferably of such diameters that only about half of the peripheral surface of each is brought into use. The remainders of such surfaces may be cut away as shown in the drawings.

Fig. 2 illustrates a direct printing litho machine, the offset cylinder being dispensed with and the litho cylinder C printing direct upon the card which is drawn over the impression cylinder. The remaining parts of the machine are of the same construction and operation as those shown in Fig. 1, with the exception that the impression cylinder is the one which can be raised and lowered, in the usual way.

Claim:—

A printing machine adapted to print sheets or cards in flat form, comprising two oscillatory cylinders each of said cylinders having a cylindrical surface adapted to register with the corresponding surface of the other cylinder as the cards or sheets pass between said cylinders, and each of said cylinders being cut-away so as to provide a space between said cylinders when said cylindrical surfaces are out of contact with each other, a reciprocating frame, grippers mounted on said frame for gripping the sheet or card and drawing it between said cylinders, said frame having an opening therein of sufficient size to permit the printed sheet or card to fall through the frame upon being released from said cylinders, said grippers being adapted to pass between said cylinders through the space provided by cutting the portions of said cylinders, means for reciprocating the frame, and means for releasing the grippers.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

MARK SMITH.

Witnesses:

ERNAULD SIMPSON MOSELEY,
MALCOLM SMETHURST.