

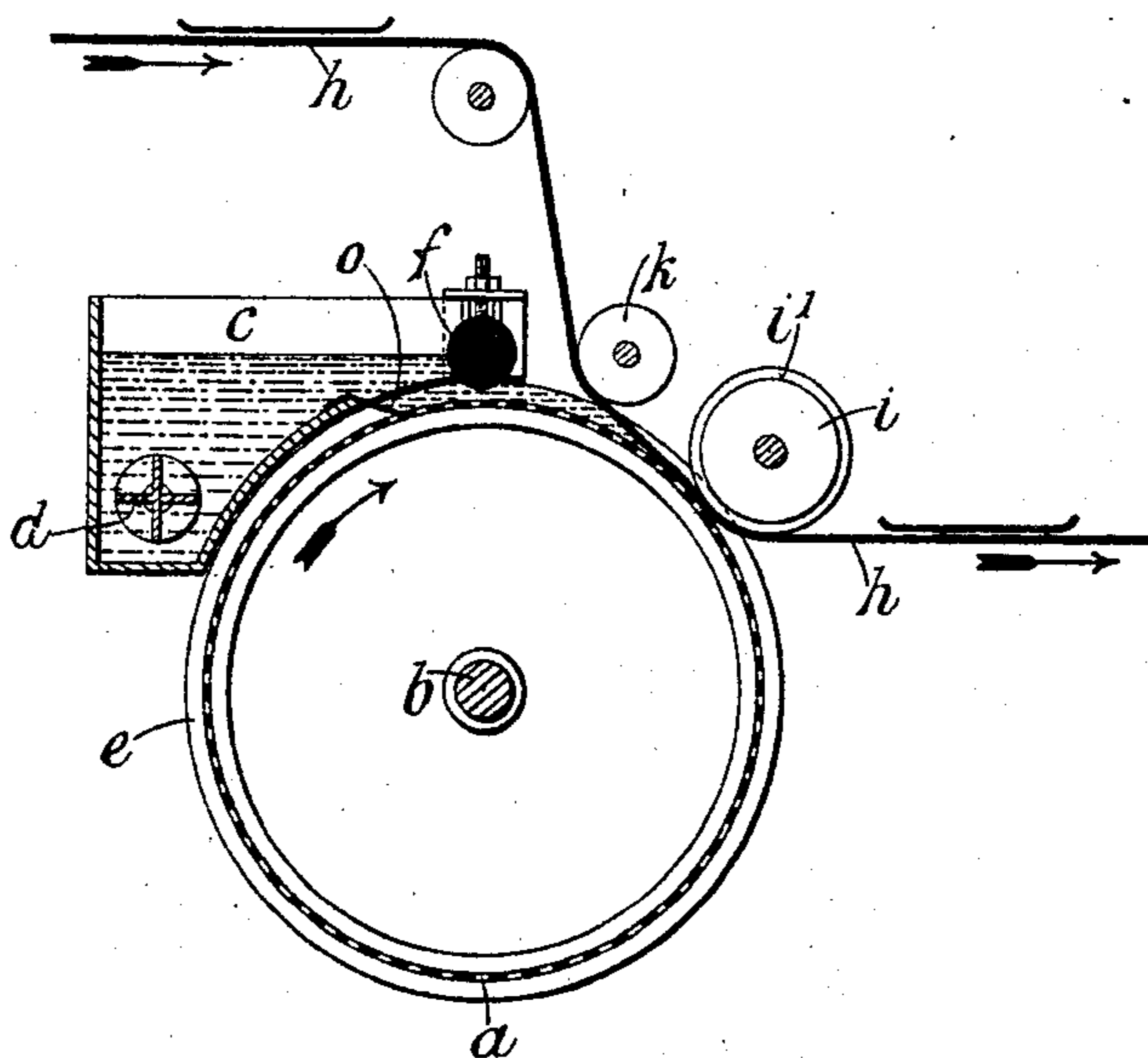
No. 682,544.

Patented Sept. 10, 1901.

C. K. GRAHAM.
PAPER MAKING MACHINE.

(Application filed June 21, 1901.)

(No Model.)



Witnesses

J. B. [Signature]
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Inventor

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by

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atty

UNITED STATES PATENT OFFICE.

CHARLES KNOTT GRAHAM, OF LONDON, ENGLAND.

PAPER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 682,544, dated September 10, 1901.

Application filed June 21, 1901. Serial No. 65,463. (No model.)

To all whom it may concern:

Be it known that I, CHARLES KNOTT GRAHAM, a subject of the King of Great Britain, residing at London, England, have invented certain new and useful Improved Machinery or Apparatus for Making Paper, Cardboard, or the Like, of which the following is a specification.

This invention relates to improvements in machinery for making paper, cardboard, and the like, said machinery being designed to collect the materials into a layer which may be of sufficient thickness to form a sheet directly or may be superposed on itself or on other layers to form a sheet of any desired thickness.

In paper-making as heretofore practiced the pulp is either taken up upon a drum or other collector until the desired thickness is obtained or it is delivered continuously onto a traveling band of felt or wire-cloth. To form a layer by the first method in the case where drums are used, the pulp after being duly mixed with water is introduced into a vat in which the said drums revolve, and the parts are arranged in such a manner that the water passes into the drums through the meshes of the wire-cloth or sieving forming their periphery, and in so doing the pulp is left on the surface of the said drums and is carried up thereby until it comes into contact with a continuous cloth, which is pressed against it by a roller. The pulp is removed by this cloth from the drums and carried forward by the said cloth to the collector. In forming a layer by the second method above referred to the pulp and water are poured onto a wire-cloth and air-pumps are used to suck the water through the wire-cloth and so cause the adhesion of the pulp to the surface of the wire, on which it is carried forward. The layer so formed is either collected in superposed layers or is treated in its original thickness to form a sheet. Now according to my said invention I allow the pulp to flow from a suitable receptacle directly onto the upper part of a drum, and I regulate the thickness of the deposited layer by means of an adjustable roller arranged parallel to the said drum, the layer of pulp being pressed and removed from the drum by means of an endless cloth or felt.

In the accompanying drawing, which is a longitudinal section of my improved apparatus, the pressing and guide rollers hereinafter described being shown in elevation, *a* is a drum mounted on a shaft *b*, turning in suitable bearings. The said drum is furnished at its periphery with suitable wire-cloth or sieving, and above the drum is arranged a trough *c*, provided with a stirrer or mixer *d* and from which the liquid pulp flows onto the surface of the drum. In order that the pulp may be prevented from overflowing at the sides of the drum, I arrange india-rubber rings *e* around the two ends of the drum. These rings may make direct contact with the lower edges of the side walls of the trough *c*, or thin strips of sheet india-rubber may be secured to the said walls, so as to bear against the inner sides of the rings *e* to prevent leakage. The flow of the pulp onto the drum *a* is regulated by means of a roller *f*, mounted in the trough *c*, parallel to the drum *a*, at a short distance above its most elevated part, the said roller being fitted with means for raising and lowering it. This roller is preferably mounted so that it can be turned by hand or otherwise at suitable intervals to bring a fresh portion of its periphery into contact with the pulp and to enable the adhering fibers and other matter to be removed from the part previously in contact with the pulp. As the drum *a* revolves the pulp is allowed to flow under the roller *f* from the trough *c*. In order to prevent the liquid from running backward under the trough at the place where the latter nearly touches the drum, a strip of thin or flexible india-rubber *o* or other suitable material is provided, which strip fits at the sides against the inner edges of the rings *e* and rests upon the drum *a* without impeding its movement, but effectually preventing the pulp and water from running under the bottom of the trough.

i is a press-roll mounted as far as is practicable away from the regulating-roller *f*. This press-roll has a cloth or felt *h* passing under it in such a manner as to be pressed tightly against the drum and has its ends reduced in diameter, as shown at *i'*, so as to fit against the inner sides and on the outer peripheries of the rings *e*. In front of the press-roll a guide-roll *k* is placed a short distance

above the drum, so that the cloth passes between this guide-roll and the drum and then under the press-roll *i*. By this means the water contained in the pulp is forced through the cloth or felt *h*, the pulp being afterward taken up by the said cloth and carried forward to the collector layer upon layer or in a continuous sheet, as may be desired. The driving power is preferably applied to the cloth or felt *h* through one or more of the rollers over which it passes, the drum *a* being driven by its frictional contact with the cloth.

Although I have referred to a drum *a*, a solid cylinder may be employed, having its periphery covered with wire-cloth or sieving to provide the necessary rough surface.

The advantages of my improved system are, first, only one mixer is required in the trough where the pulp is brought to the drum; second, the pulp may contain fiber of much longer staple, a greater variation in lengths of the individual fibers is permissible, and at the same time a much more even layer is obtained than is possible by the methods heretofore known; third, since the water passes through the cloth or felt the formation of the sheet at those parts of the drum where the wire-cloth or sieving thereon is supported, as is necessary, by internal rings in order to give it the necessary strength to stand the pressure of the press-roll is not in any way inferior to that on the other parts of the drum, which is not so with the methods first described; fourth, a much less quantity of water is required to be handled in the process; fifth, the layer of pulp can be thicker and its contents of solid matter greater than is possible by the drum processes heretofore known; sixth, the tank in which the drum usually revolves may be done away with, and the drum can be supported on ordinary standards or bearings in the open; seventh, no vacuum-pumps are required, and, finally, the plant for a given output takes up much less room than is required in existing systems.

What I claim is—

1. The combination, in a paper-making machine, of a cylinder having a rough periphery, a trough mounted adjacent to the said cylin-

der, a delivery-orifice in said trough for discharging the pulp onto the upper part of the said cylinder, and means for pressing the pulp and removing it from the cylinder, substantially as hereinbefore described.

2. The combination, in a paper-making machine, of a cylinder having a rough periphery, a trough mounted adjacent to the said cylinder, a delivery-orifice in said trough for discharging the pulp onto the upper part of the said cylinder, a regulating-roller for regulating the flow of pulp onto the cylinder, a press-roll and a permeable band traveling between said cylinder and said press-roll, substantially as, and for the purpose, hereinbefore described.

3. The combination, in a paper-making machine, of a drum, sieving forming the periphery of said drum, a trough mounted adjacent to the drum, a mixer in said trough, a delivery-orifice in said trough for discharging the pulp onto the upper part of said drum, elastic rings at the ends of said drum, a strip of flexible material arranged along the lower edge of said delivery-orifice and fitting between said elastic rings, and means for pressing the pulp and removing it from the drum, substantially as described.

4. The combination in a paper-making machine, of a drum, sieving forming the periphery of said drum, a trough mounted adjacent to the drum, a mixer in said trough, a delivery-orifice in said trough for discharging the pulp onto the upper part of said drum, elastic rings at the ends of said drum, a strip of flexible material arranged along the lower edge of said delivery-orifice, a regulating-roller for regulating the flow of pulp onto the drum, a press-roll, a band traveling between said drum and said press-roll, and guide-rollers for said band, substantially as described.

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

CHARLES KNOTT GRAHAM.

Witnesses:

JOHN T. KNOWLES,
HENRY W. LYNDEN.