

No. 628,570.

Patented July 11, 1899.

G. S. WITHAM.

APPARATUS FOR IMPARTING WATER FINISH TO PAPER.

(Application filed Apr. 3, 1899.)

(No Model.)

Fig. 1.

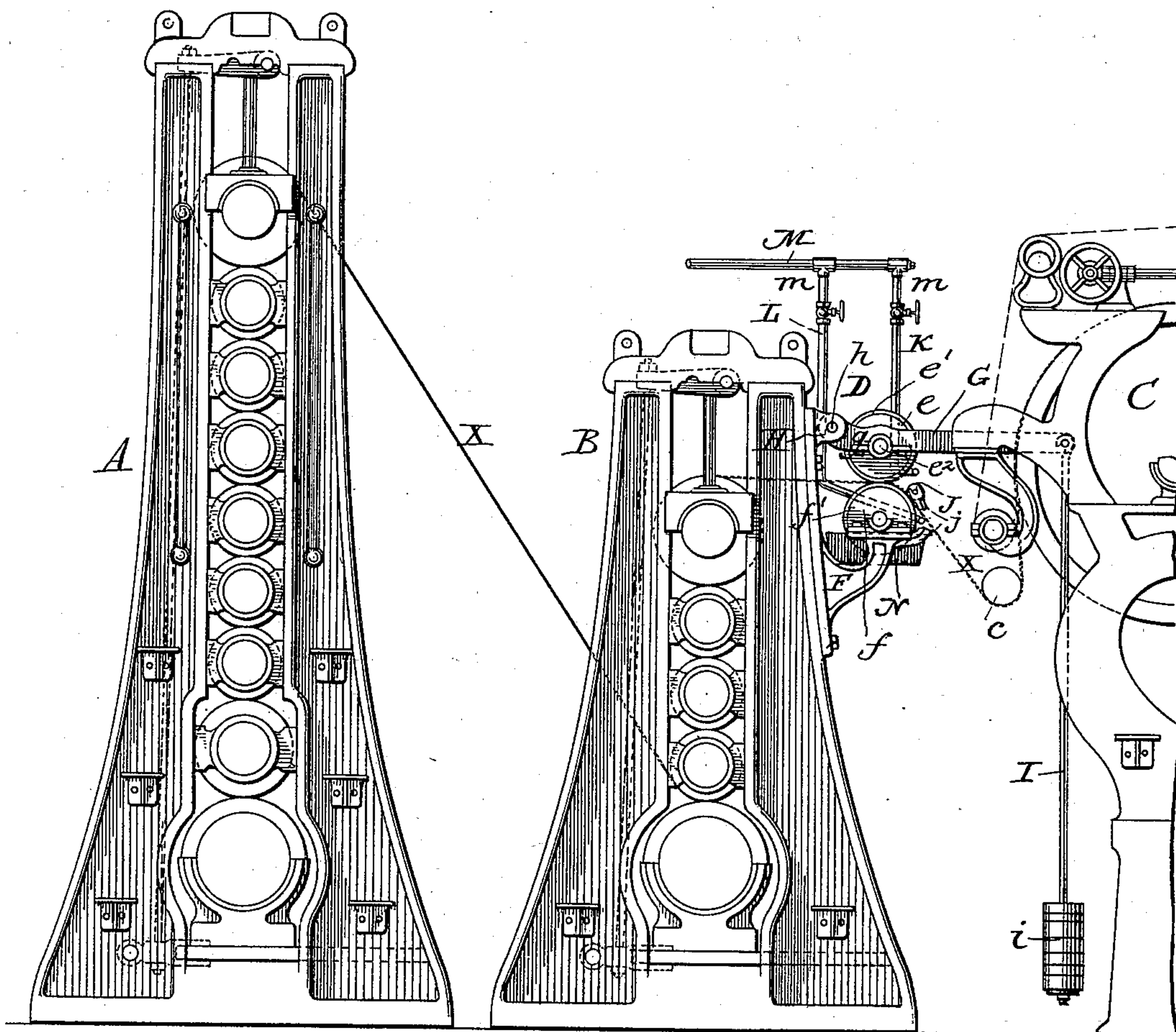
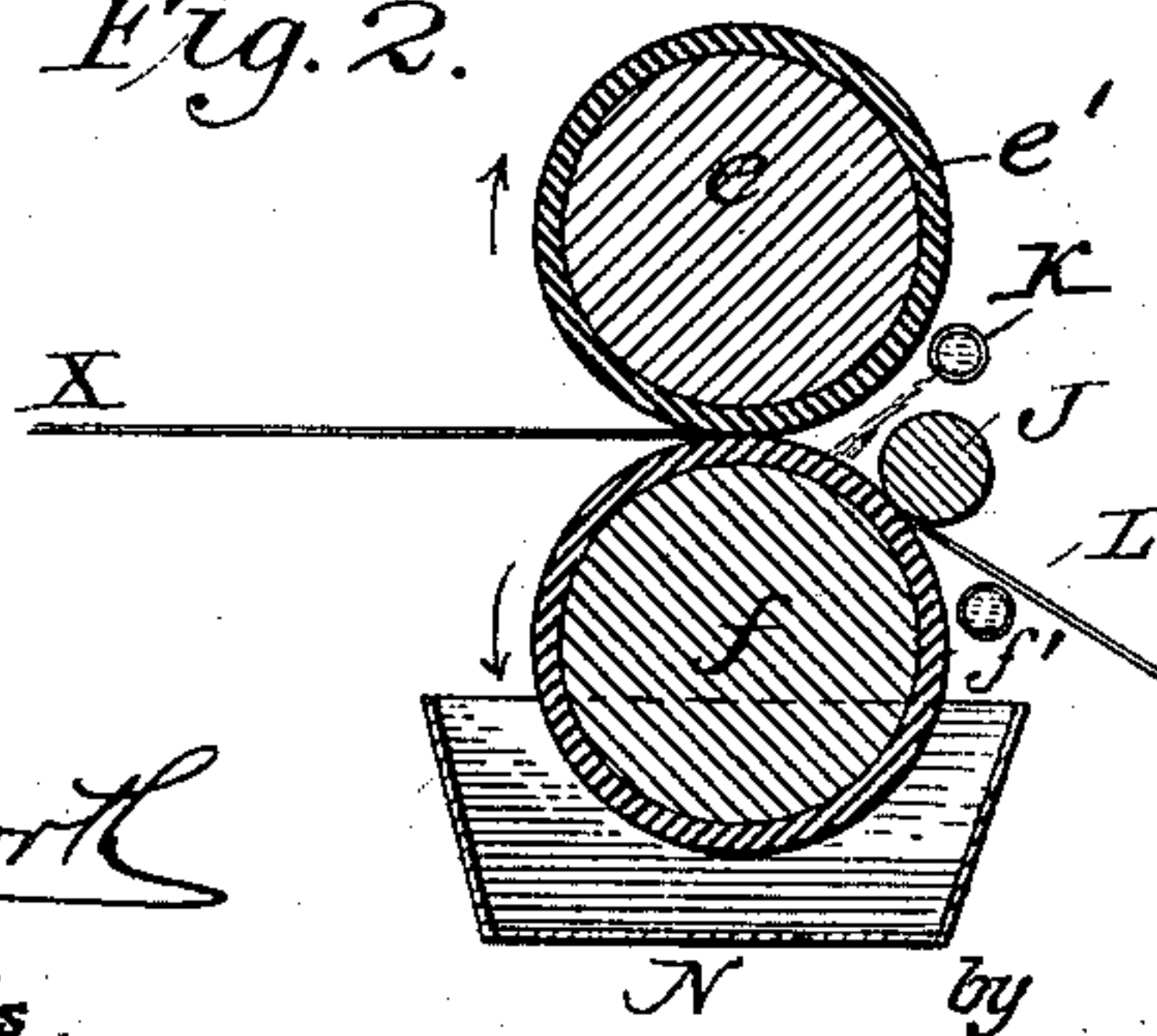


Fig. 2.



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GEORGE S. WITHAM, OF OCONTO FALLS, WISCONSIN, ASSIGNOR OF ONE-HALF TO EDWARD A. EDMONDS, OF SAME PLACE.

APPARATUS FOR IMPARTING WATER-FINISH TO PAPER.

SPECIFICATION forming part of Letters Patent No. 628,570, dated July 11, 1899.

Application filed April 3, 1899. Serial No. 711,592. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. WITHAM, a citizen of the United States, residing at Oconto Falls, in the county of Oconto and State of Wisconsin, have invented certain new and useful Improvements in Apparatus for Imparting a Water-Finish to Paper, of which the following is a specification.

In apparatus for this purpose the paper web is led from the drier to calender-rolls, and water is applied to the paper before it has completed its passage through the calender-rolls. Generally the water is applied in the form of a spray or by steam after the paper has passed through some of the rolls. This is the kind of apparatus at present most largely used, but it is open to many objections. In the first place, after the paper has passed through one or more calender-rolls its surface becomes more or less hard and glossy and does not properly absorb a sufficient amount of water, and, secondly, when water is applied directly to the calender-rolls the latter become more or less rusted, making frequent repairs necessary, as creases form in the surface of the rolls, which correspondingly impair the surface of the paper. All calender-rolls are made of heavy solid chilled iron and are very accurately ground and polished, so that the thinnest sheets of paper passing through them may receive equal pressure throughout, and inasmuch as the paper which comes from the drier is hot and continually running on the calender-rolls the latter become heated, causing them to expand, especially in the central portions and where the metal is thickest. So much trouble has been experienced in this respect that cold-air blasts and the like have been resorted to to remedy it. In such apparatus it is also difficult, if not impossible, to control the amount of moisture in the edges of the sheets. Moreover, when a web of paper is run part way through the calenders before receiving moisture the fibers are crushed and injured because they are brittle, and where steam is employed for supplying moisture it is apt to heat the paper to such an extent as to unduly heat the calender-rolls and to expand them unevenly, thus

causing the paper to be calendered to a greater degree in some places than in others, and the steam is apt to injure the sizing in the paper and unlay the fibers, which are caused to curl and twist and give the surface of the web a fuzzy appearance, which cannot be remedied by the calenders.

The object of my invention is to overcome these objections in machines now commonly employed.

In carrying out my invention I interpose between the drier and the calenders an improved device for applying water to the web of paper just before it enters the first calender-rolls. The apparatus is so constructed as to apply evenly the proper amount of moisture to both sides of the paper while it is porous and in the best condition to receive moisture. The arrangement is such, also, as to prevent an undue amount of water or moisture from being carried by the paper into the calenders.

In the accompanying drawings, Figure 1 shows a side elevation of calenders of ordinary construction and a part of the drying apparatus. It also shows my improved water-applying devices interposed between the drier and the calenders. Fig. 2 is a detail view, on an enlarged scale and in transverse section, through a part of my improved water-applying devices.

The calendering apparatus A B may be of any suitable improved construction, as may also the drying apparatus C. The web of paper X is led from the drying apparatus C under a guide-roller *c*, through my improved water-applying devices D, then through the calender apparatus B, and then through the calender apparatus A.

In my improved apparatus there are two rolls *e* and *f*, which are provided with rubber coverings *e'* *f'*. The lower roll is preferably mounted in bearings on a bracket F, attached to the frame of the calendering apparatus B. The upper roll *e* rests on the lower roll *f* and is held down in contact therewith by levers G, pivoted at *h* to brackets H, secured to the frame of the apparatus B. The levers G are provided with open bearings *g*, which extend

over the stud-journals e^2 of the roll e . The outer ends of the levers are connected with a downwardly-extending rod I , weighted at i .

J indicates a small roller which is preferably made of metal and mounted in open bearings in a bracket j , projecting from the bracket F . This roller bears on the surface of the roll f and acts as a dam for the water. Water is supplied to both sides of the paper web X by means of spray-pipes $K L$, which are connected with pipes $M m$, provided with suitable controlling devices. Below the lower roll f is a drip-pan N .

The dam-roll J prevents the water from running down the web X and also holds the web in contact with the lower roll. The pan N may be connected with a trough or drain to carry off surplus water.

The rolls e and f are preferably made rather heavy, so as to press upon the paper web as it passes through them. The pressure of the upper roll may be regulated by the weights i or by a system of levers or the like in well-known ways. The web of paper X receives moisture while it is still warm, but uncalendered, and in the best condition to absorb water. This passes directly to the calenders while still moist and in the best condition to pass through the calender-rolls. Moisture is applied to both sides, and thus both sides of the paper are finished in the same manner by the calenders and there is no liability of the paper curling, as would be the case if moisture were applied to only one side.

In my apparatus the paper web may be run at high speed, the drier is located close to the first calendering apparatus, and my water-applying devices are close to the calenders.

The arrangement is compact, and if the paper web breaks it can be properly adjusted without difficulty.

Another advantage of my apparatus is that the moisture at the edges of the paper is uniform with that in other portions thereof. By means of the use of rubber rolls a beautiful mottled paper may be obtained.

I claim as my invention—

1. The combination of calendering apparatus, drying apparatus, rubber-covered rolls interposed between the drying apparatus and the calendering apparatus, and through which the web of paper passes, and means for applying water to the web of paper while passing through the rolls.

2. The combination of calendering apparatus, drying apparatus, rubber-covered rolls through which the web of paper passes on its way from the drier to the first calender, means for applying pressure between the rolls, and a dam for preventing surplus water from flowing down the paper web.

3. The combination of calendering apparatus, drying apparatus, rubber-covered rolls through which the web of paper passes on its way from the drying apparatus to the calendering apparatus, spray-pipes for applying water to opposite sides of the paper web, and a dam-roll for preventing surplus water from flowing down the paper web.

In testimony whereof I have hereunto subscribed my name.

G. S. WITHAM.

Witnesses:

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