S. R. WAGG.

METHOD OF TREATING PAPER.

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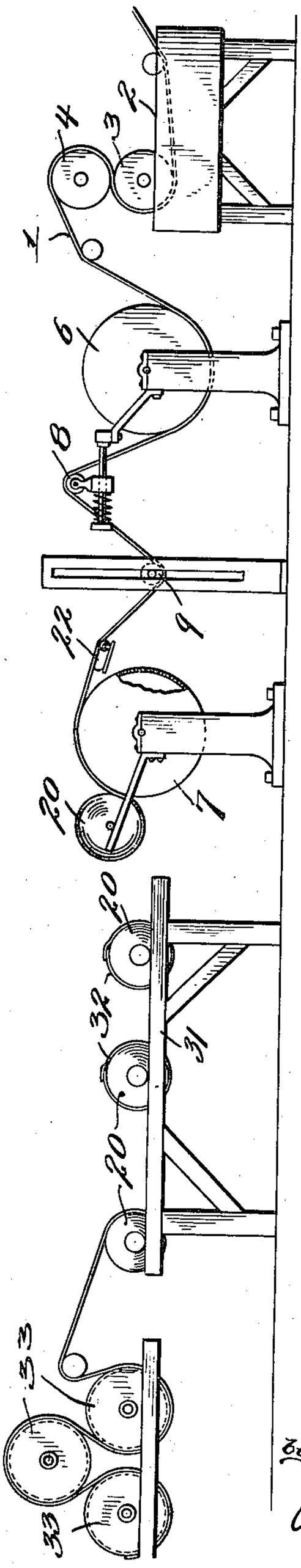
1,128,200.

Patented Feb. 9, 1915.



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METHOD OF TREATING PAPER.

1,128,200. Specification of Letters Patent. Patented Feb. 9, 1915.

Application filed November 20, 1913. Serial No. 802,149.

To all whom it may concern:

Be it known that I, SOLOMON R. WAGG, a citizen of the United States, residing at Appleton, in the county of Outagamie and State of Wisconsin, have invented new and useful Improvements in Methods of Treating Paper, of which the following is a specification.

The present invention has reference to the treatment of paper, and more especially of paper in the form of continuous strips or webs, the invention comprehending generally, an improved method of treatment, whereby the tensile strength and ink-resisting property of the paper are greatly increased, and a quality of paper obtained which is equal to that obtained by the well-known "loft-drying" process, but without the expense and delay of that process.

The same objects are obtainable by the process or method shown and described in my Patent No. 1,117,113, granted November 10, 1914, but at a much higher cost than by this method. Accordingly, the present application is to be considered as covering certain improvements in the earlier method, inasmuch as it enables the use of less expensive sizing.

The new and improved treatment, like the earlier, may be carried out with or by the aid of any suitable apparatus, an embodiment of that preferred being shown diagrammatically in the accompanying drawing.

In said drawing, 1 indicates, generally, the strip or web of paper undergoing treatment, and 2 the bath of size, preferably starch through which the same is passed as the initial step of such treatment. The web or strip, which has previously been subjected to the usual, preliminary engine sizing, with or without mordants, may be led to the starch size bath either directly from the machine, or after it has first been dried and reeled up.

On leaving the starch bath, the web is passed between the rolls 3 and 4, which serve to squeeze out the excess size therefrom, and from these rolls it is led, while still wet, beneath and around a smoothed cylinder 6 of polished copper which serves to initially smooth the web and to prepare it for subsequent wet winding. From this cylinder the web passes, successively, to the take-up, smoothing and winding devices or mechanisms. These devices are, preferably, of the types shown and described in my companion application, Serial Number 802,148, filed of even date herewith, and the one first mentioned embodies a spring-pressed roll 8 and a rising-and-falling dance roll 9, which are so mounted and arranged as to exert a complemental or coöperative action upon the web, the former roll moving forward and backward toward and from the frame wherein the other roll is mounted. Thus the two rolls work oppositely, and, in their action, insure a continuous and regular feed movement of the web by preventing breakage, relieving shocks and absorbing slack.

The web, as shown, passes over roll 8 and under roll 9, and thence to the smoothing device 22. Reference may be had to my said companion application for a complete description of this device, and it is, accordingly considered sufficient for present purposes to state that it consists of a pair of rolls arranged at a forwardly-directed angle to each other, such arrangement causing a stretching and spreading of the web transversely, with the result that all straight wrinkles and puckers will be smoothed out therefrom.

The action of the smoothing device is supplemented by the winding mechanism, the drum 7 of which is so constructed as to provide for the elimination of fine puckers and wrinkles due to the presence of air or air bubbles under the web, to which end its peripheral wall is suitably perforated, so as to break up the bubbles and dissipate the air during the travel of the web over the drum. The web then passes to the reel 20 whereon it is wound while still wet.

When the winding operation has been completed, the roll of paper is removed in its wet state from its support, and placed upon a frame 31, where it is allowed to remain for a period of time varying from one to twelve hours, during which time it is kept wet by being covered with wet cloths 32. The rest to which the roll of paper is thus subjected, permits a very extended and gradual permeation of the roll by the starch size, and in consequence the tensile strength and ink-resisting property of the paper are increased, while, at the same time, the engine size is enabled to set and a union, so to speak, is produced between the sizes and also the mordants when the latter are used. After

resting in the manner just described, the then thoroughly saturated paper is unreeled and the treatment is either partially or wholly repeated, according to the weight of the paper and other qualities it is desired that it should possess. For example, in making relatively light papers, the saturated paper is unreeled from the roll and then subjected to a second sizing treatment, whereupon the paper is passed over a series of hollow rolls 33 for its final drying, the rolls being supplied with steam from some suitable source.

In making relatively heavy or very hard sized paper, the paper after the second sizing treatment is preferably wound while wet into a roll and thereby submitted to a second prolonged rest period, whereupon it may be unwound from the roll and dried by passing it over the rolls 33, as before. It is to be observed, therefore, that this final drying step does not take place until after the completion of the afore-mentioned period or periods of rest. In consequence, all danger of injury due to rapid and premature drying, and, generally, to the presence of high heat, is avoided, since such rest has been found from actual practice to render the paper proof against injury of this character. For this reason it has been found perfectly practicable to utilize steam heat, with its relatively very low cost, for drying purposes, in place of the extremely expensive air-drying which has hitherto been deemed compulsory owing to the danger of injury from the high temperatures of steam-heat.

The present invention enables high quality papers to be manufactured with the use of starch sizing, the advantages in its favor, from an economic standpoint, over gelatin and other sizes being too obvious to require extended discussion. On the other hand, however, paper treated in the ordinary manner with starch size has been found practically worthless, since it offers unsatisfactory resistance to ink, but when allowed to rest in a wet state, while wound up, in accordance with the present method, this objection is completely obviated, as the ink-resistance is increased to such an extent that soaking, spreading and creeping of the ink are entirely prevented.

I claim:—

The herein-described process of treating paper web, which comprises producing a sized web, winding the wet sized web into a roll and allowing such a roll to rest for a prolonged period, then subjecting the web while wet to another sizing action, and finally drying the wet sized web.

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

SOLOMON R. WAGG.

Witnesses:
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