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A. SCHIMMELFENNIG AND JULIUS ENDE, OF WASHINGTON, D. C.

IMPROVEMENT IN INK-ROLLERS.

Specification forming part of Letters Patent No. 20,512, dated June 8, 1858.

To all whom it may concern:

Be it known that we, ALEXANDER SCHIMMELFENNIG and JULIUS ENDE, of the city of Washington, in the District of Columbia, have invented a new and Improved Ink-Roller, of which the following is a specification.

The nature of our invention consists in manufacturing ink-rollers out of elastic gums, such as caoutchouc or gutta-percha, or compounds of the latter.

The ink-rollers used at present with the book and job printing presses, consisting of glue and molasses, are liable to melt when worked at from 80° to 90° Fahrenheit, and, on the other hand, they lose their elasticity and refuse to spread ink at a very low range of the thermometer. It is the former fact which causes great inconvenience to the managers of printing-presses. To prevent the rollers from giving way during a warm day a certain number of ink-rollers are constantly kept in ice-boxes, ready for use, and cold rollers are supplied as fast as the working ones give way. This, however, proves to be the case so often during the day as to cause a great loss of time and paper, besides the expense of keeping a number of rollers in ice-boxes. And notwithstanding all this expense and trouble it often happens that some deficient part will escape the attention of the foreman of the press and spread the sticky compound of the roller over the whole form, thus causing a thorough cleaning of the latter—an accident of some importance in the newspaper business. None of these inconveniences will be experienced with our ink-rollers, for the substance used in the manufacture of them will stand any temperature of the atmosphere. At the same time it saves ink, does finer work, and will last for an almost indefinite time.

To enable others skilled in the art to make and use our invention, we will proceed to describe its manufacture and operation.

Ink-rollers we manufacture as follows:

No. 1. A very soft and elastic roller being desired, we use the juice as it flows from the tree or is imported, or apply solvents in order to bring the cakes of gum as they come into the market into a plastic, flowing state. We then filter the substance and spread it over an even plane well adjusted in a horizontal position, (we prefer a plane of plate-glass,) taking care that the

layer of gum becomes equally thick and evaporates or dries equally. However, we do not allow it to dry entirely, but roll the layer of gum upon the required axis as soon as the particles become adhesive, and the whole forms one sheet. The roller may be used after having been allowed to become dry on its surface. In some instances, in order to prevent a further evaporation as much as possible, we cover the roller with a thin sheet of elastic gum which is perfectly dry or is vulcanized.

No. 2. A very soft roller which is of inferior elasticity we manufacture out of the cakes of caoutchouc as brought into the market, applying heat and pressure only, employing heated cylinders or "calenders," used in india-rubber manufactories to soften the caoutchouc, which has previously been cut into small pieces by any machine, bringing it into what is technically called a "plastic state," and pressing it into sheets of equal thickness. We then roll up the sheet upon the axis until the roller has acquired the desired diameter, and finally, when the surface of this roller proves too sticky, we provide it with a coat or cover of elastic gum, either in its natural state or vulcanized. Applying heat and pressure, we also make rollers out of the sticky compound by pressing the latter into a mold of two half-cylinders, as described hereinafter, though we prefer the former process.

No. 3. Having to manufacture a harder specimen of a roller, we simply roll upon an axis a sheet of caoutchouc which is of equal thickness, and fasten the end of the sheet to the surface of the roller by means of a fresh cut or otherwise. We give the whole sheet a coat of a solvent, or of dissolved caoutchouc, or the juice of the tree, or the sticky compound mentioned in No. 2, or we soften the sheet in a solvent, then roll the sheet upon the axis, and, if necessary, provide it with a cover of dry caoutchouc or of gutta-percha, as the case may be, and if the said sheet is very thick either the axis must be cut out where the sheet of gum is laid on, or the sheet must become thinner gradually toward the ends in order to avoid differences in the diameter of the roller.

No. 4. We also employ the vulcanizing process for certain specimens of rollers as patented by Charles and Nelson Goodyear, 1844 and 1851; E. E. Marcy, 1854, and Robert Hae-

ring, 1857. We use a mold of the required shape, highly polished inside, and introduce the axis at the time when filling the mold with the sticky compound, or, what is better, we use a substitute for the axis in the form of a screw made out of glass, metal, or wood, and cover it with glazed cotton or a similar substance prepared to prevent the caoutchouc from entering it. The roller having undergone the vulcanizing process, we take out the temporary axis and put in one of any required shape.

No. 5. We use the sheets of soft rubber as they come from the calenders mentioned in No. 2, powder them on the surface with sulphur, white of lead, or selenium, applying either the one or the other, and roll them upon the axis or substitute for it described in No. 4. Having made the mold out of two half-cylinders, we lay the roller into one of them, pressing the other upon it, and firmly connect the two parts before vulcanizing the article. We use the mixture of Haering's patent if a very hard roller is required.

No. 6. It being the object to manufacture a roller which is hard near the axis and soft near the surface, we proceed as in No. 5, with this exception, that we use more sulphur on that part of the sheet of caoutchouc which is rolled up first, and add pipe-clay in order to prevent the bursting of the mold.

No. 7. Finally, we have obtained a very soft roller, also with the vulcanizing process, by making the roller spongy or cellular near the surface, what might be done by powdering more sulphur (or any other substance which becomes gaseous at the temperature required for vulcanization) upon said sheet of caoutchouc on that part of it which will fill up the space near the surface of the roller. The vulcanizing process now changes the sulphur, to a great extent, and on the place applied to a gaseous body, and the gases not being allowed to escape, and not being absorbed by pipe-clay, as in the former case, remain in the roller in a compressed state, making the roller cellular and spongy, expanding as soon as they are allowed to do so.

The defects which will occasionally happen with ink-rollers made out of caoutchouc will be found generally in the irregularities of their surface, and are caused either by carelessness in the manufacture or by rough handling during use; but these defects can be overcome more easily with our improved ink-roller than with those used at present. If the surface shows holes, grooves, &c., they are filled up afterward with dissolved caoutchouc, allowing the latter to dry before filling in another portion. If the roller proves too small in its diameter, a sheet of caoutchouc of the required thickness is rolled upon it; or the roller may be put into a vessel containing a solvent, in order to absorb the liquid, which swells the substance of the roller. If the roller shows an irregular surface all over or is too thick, it might be turned off on a large knife extending

along the whole length of the roller, very hot and sharp.

As the Patent Office is an institution for the general distribution of knowledge in practical sciences, we take this occasion to mention a fact which has come under our notice, in the hope that it might prove of service in some way. It is known that glue or gelatine after having been dissolved a number of times will not harden. The elastic gums act in the same way, for caoutchouc, after having been dissolved a number of times for different experiments, finally would not dry and stuck to the glass plate so firmly that it proved impossible to raise it in a sheet, even after having allowed it to evaporate four weeks.

The firm support of the elastic gum—viz., the axis of the roller—can be made out of wood or of metal; and in some instances, and when a reduction of the weight of the roller is desired, it should be constructed in the shape of a hollow cylinder of the required diameter. In order to attach the elastic gum firmly to the surface of the axis, we simply either nail upon the latter the end first to be rolled up of the elastic sheet, (Nos. 1 and 2;) or we nail upon it a thin cover of dry or vulcanized caoutchouc or of cold gutta-percha before rolling up the more elastic sheet, (Nos. 1, 2, and 3;) or we roughen the axis on its surface; or we manufacture it in the shape of a screw, (No. 4;) or we provide it with irregular cavities, the walls of which diverge toward the central line of the axis; or we provide it with small perforations throughout. In the two latter cases, and when the vulcanizing process is not applied, the holes are filled up with the plastic gum, which is allowed to dry and to become more solid before the sheets of gum are rolled upon the axis. If, however, the axis is hollow and provided with perforations, another sheet of elastic gum may also be applied inside of the cylinder to secure more firmly the elastic part of the roller to its support. If the article is to be vulcanized, it is not necessary to wait until the gum which has been forced into holes has become dry.

Having shown that the manufacture of ink-rollers out of elastic gums can be variously modified, we do not restrict ourselves to the precise processes described in this specification.

What we claim as our invention, and desire to secure by Letters Patent, is—

To manufacture ink-rollers out of elastic gums—such as caoutchouc or gutta-percha, or of compounds of the latter—in the modes described in this specification, or in any similar modes.

Washington, District of Columbia, February 3, 1858.

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Witnesses:

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