

Nov. 26, 1935.

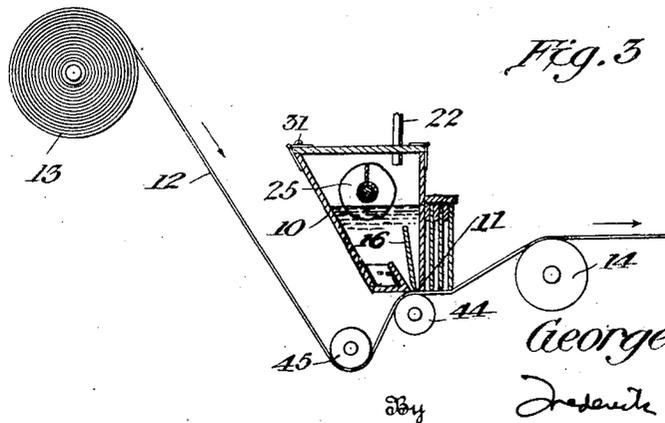
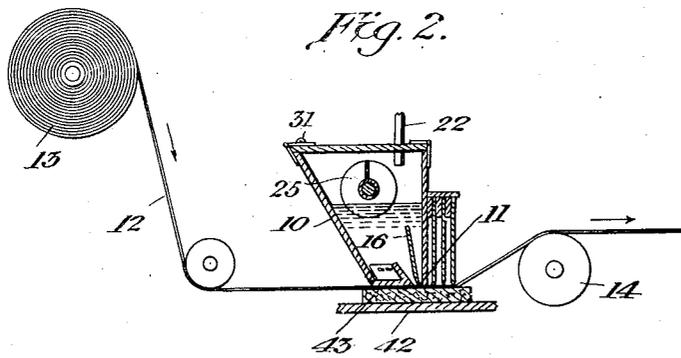
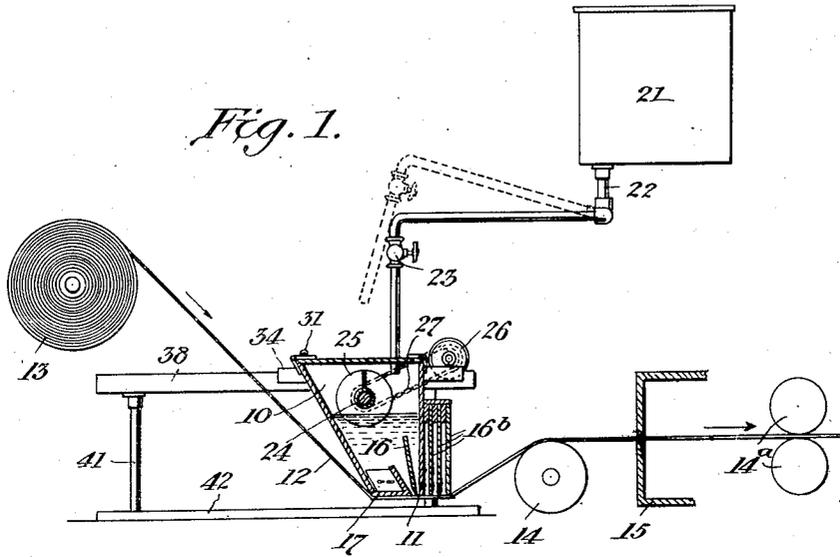
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2,022,322

COATED ABSORBENT MATERIALS AND APPARATUS FOR PRODUCING THE SAME

Filed June 29, 1932

4 Sheets—Sheet 1



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2,022,322

COATED ABSORBENT MATERIALS AND APPARATUS FOR PRODUCING THE SAME

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4 Sheets-Sheet 3

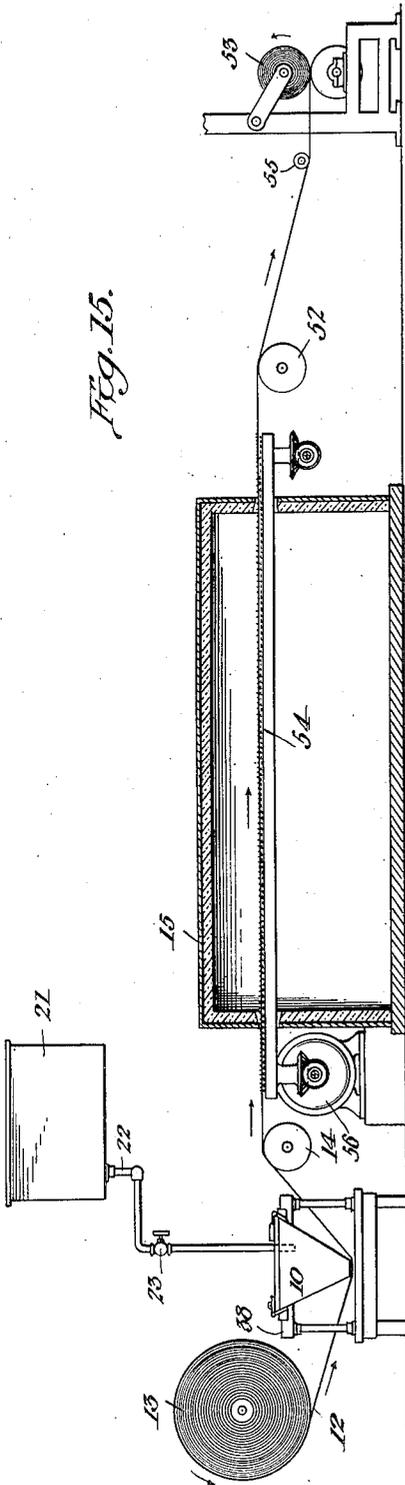


Fig. 15.

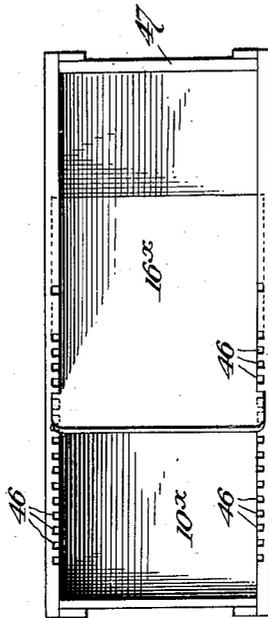


Fig. 8.

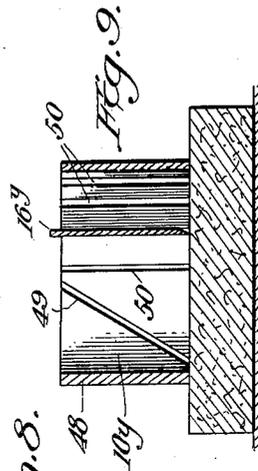


Fig. 9.

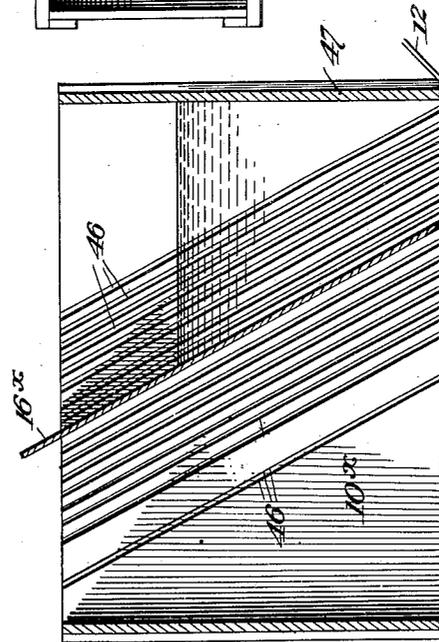


Fig. 7.

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COATED ABSORBENT MATERIALS AND APPARATUS FOR PRODUCING THE SAME

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4 Sheets-Sheet 4

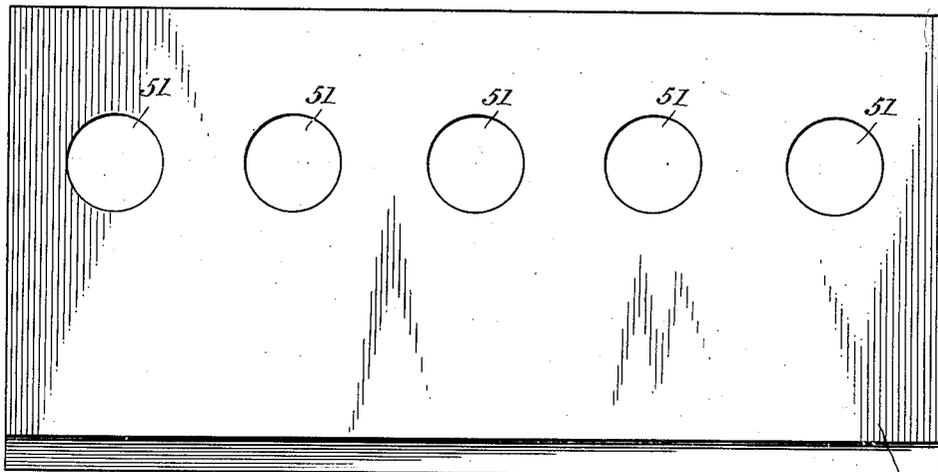


Fig. 10.

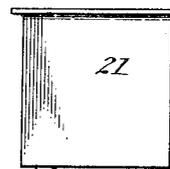
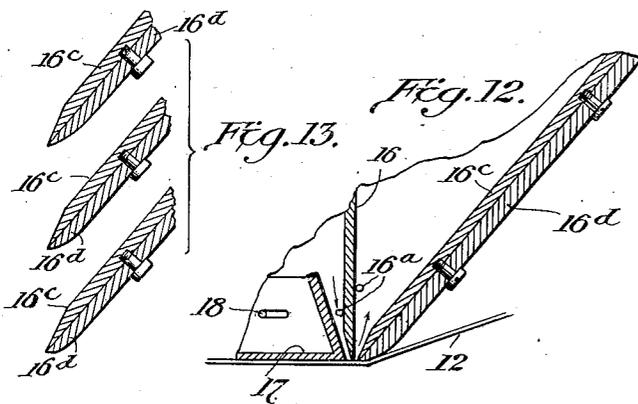


Fig. 11

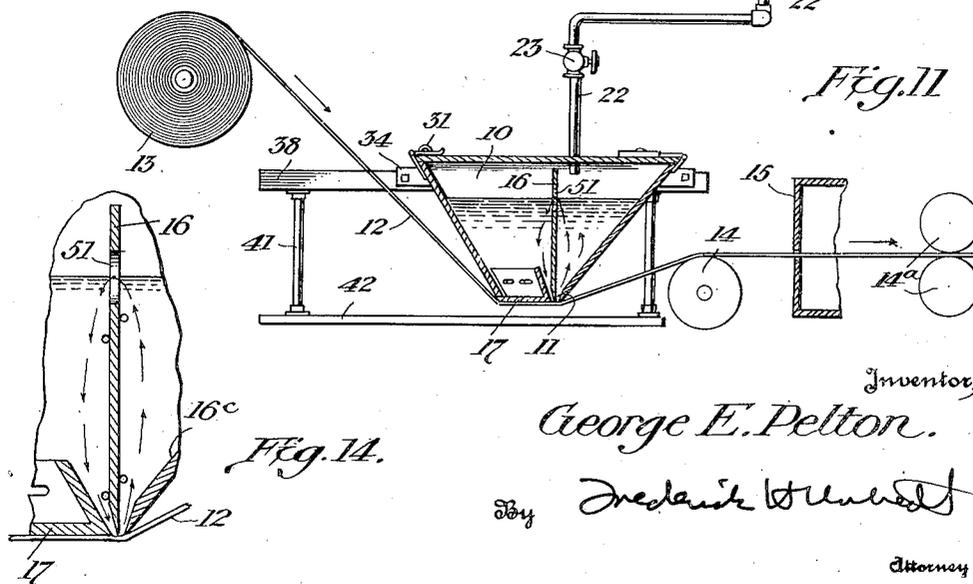


Fig. 12.

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# UNITED STATES PATENT OFFICE

2,022,322

## COATED ABSORBENT MATERIALS AND APPARATUS FOR PRODUCING THE SAME

George E. Pelton, Alexandria, Va.

Application June 29, 1932, Serial No. 620,045

19 Claims. (Cl. 91—17)

This invention relates to friction calendering highly absorbent base materials from which all oils, gums and foreign substances have been removed, and it relates generally to forming superficial overlying, superimposed films upon highly absorbent base materials. It relates to the formation on such base materials of a first film which is almost infinitely fine, and thin, and to successive coats superimposed upon said first coat until any desired character or thickness of film may be obtained. For ink transfer members made of highly absorbent materials which have been made absorbent by removing foreign gums, oils and other substances, the films formed on the surfaces of said absorbent materials may be pervious, if desired, in order that the ink may be fed through the film or coating so as to regulate and control its expenditure and so as to secure an increased quantity of writing from a given ink supply and at the same time so as to enhance the beauty of the impressions, as is fully described in copending applications, Serial Numbers 337,820 filed February 6, 1929 now Patent 1,957,611; 567,111 filed October 5, 1931.

This invention relates generally to the treatment of surfaces of absorbent, fibrous and fabric, paper and textile and any other absorbent base materials. It is a continuation in part of all common subject matter of the two copending applications mentioned, and of copending applications 189,180 filed May 5, 1927, now Patent 1,904,628 and 588,932 filed January 26, 1932. It is limited to base materials from which all original gum, oil or other foreign substance has been removed to an extent that makes it impossible for such foreign substances to appreciably impair the absorbency of the base materials, and it is limited to base materials which will permit coating material to adhere securely and permanently to the surface of the base without question, and to base materials which will be absorbent to edging materials such as ordinary adhesive materials. In making the base materials of the coated or friction calendered transfer members (uninked), it is absolutely essential that there be no oil in the base material and that the base material can be cut and the edges gummed or fastened with cellulose material, if desired. The base materials shall be so compactly formed and shall be so tight as to lend themselves readily to use for the hereinafter described purposes without material impairment of their absorbing capacities and without appreciable penetration of the body portions of the absorbent base materials; it being understood

that the two following steps are in very rapid succession: (a) application of the coating material, and (b) its drying and the evaporation of its solvent, and the thorough drying of the absorbent base material which has the surface coating. The present application is limited to forming surface coatings or films without materially penetrating the fibers or threads of paper or fabric materials and without materially decreasing their absorbency. I apply material to the surface of an absorbent ink-receiving base which contains no oils, gums or ink, or other substances, and by rapid application and by very rapid drying, a film or coating is formed on the surface of said absorbent ink-receiving base, or other base material which is absorbent (for other purposes), and I do this substantially without effect upon the absorbent properties of the body portion of the ink receiving base or other base material.

The method and apparatus disclosed in the present application are adapted for preparing the ink-receiving base members of my copending application No. 189,180, whether of paper, silk, cotton, artificial silk, ramie silk, rubber, or combinations of silk and cotton, or combinations of any of these fibres or threads.

The method and apparatus disclosed in the present application are adapted for preparing the textile and fibrous absorbent base materials and ink-receiving bases referred to and mentioned in my copending application No. 337,820, whether of paper, silk, spun silk, cotton, wild silk, ramie silk, or combinations of silk and cotton, spun silk and cotton, or any other combinations.

The method and apparatus disclosed in the present application are adapted for preparing the ink-receiving base members of silk or cotton or combinations of silk with either cotton or spun silk, and also the long fibre silk, and silk and cotton or spun silk combinations of the copending applications 567,111 and 588,932. Said method and apparatus of the present application are adapted for producing the various kinds of coated absorbent base materials mentioned and referred to in all four of said copending applications. This includes coated ink-receiving base members having a film on the side away from the type for feeding ink through said film in printed impressions; also coated ink-receiving base members having one surface carrying ink-retarding means impervious to ink, and it includes any kind of coating on a surface of an ink-receiving base. It also included any kind of a film or coating on one surface of any absorbent base material for

any purpose but said coated absorbent base material must have a body portion free from oil, gum or other foreign substances which might appreciably impair its absorbent capacity. All original oils must be removed from the base. The present application deals only with absorbent base materials that are compact and tight and highly absorbent throughout before any coating or film is formed on one surface of the same. If the base material is cotton and said cotton has just been taken off the loom and contains the original oils and the oils put into the warp threads during the weaving operation, the present application does not apply to said cotton material. Said cotton material has to be washed and cleansed and made highly absorbent before it can come under the terms of the present application in any possible way. If the base material is silk, it must have its natural gum removed. Wherever the term "ink receiving base" is employed, it is accepted to mean an uninked, highly absorbent paper or fabric or fibrous or textile material suitable for use later after being inked, as an ink transfer member. It may be a wide web or a narrow ribbon.

In my copending application Serial No. 189,180 is described an inking member carrying an ink-retarding film on one surface which increases the wear-resistance and durability of said member. The present invention is adapted for preparing said coated bases. Said bases of said application are coated with a cellulose ester material or a semi-liquid pyroxylin material. The coating adds to the wear resistance of the base portion and to the edge portions of said ink-receiving bases or that application, which are subjected to wear along the edge portions. The present method and apparatus are adapted for making the coated paper-ink-receiving base members of said copending application 189,180 of May 5, 1927, suitable for use, after inking, as manifold- ing means and carbon paper for typing machine use and for all other carbon paper uses.

The method and apparatus disclosed in the present application are adapted for preparing and producing the various kinds of coated ink-receiving base members of said copending application No. 567,111 wherein the woven fabric comprises an absorbent material in which one type of the woven threads after passing under a thread of the other type then passes over a plurality of adjacent threads of the other type, a weave I shall term "skip weave"; and said method and apparatus are for preparing the friction calendered base materials of said copending application, as well as other friction calendered, absorbent base materials for other uses.

One object of the present invention is to provide more efficient methods and apparatus for applying and drying said coating materials and said coated base members and also to provide an improved blade or scraper inside the discharge opening of the coating container or hopper, as shown in Fig. 11, and also improvements as to the rear scraper or scrapers and supplemental blades or scrapers and an improved method of maintaining perfect movement of the coating material at the contact line or space where the surface of the moving web contacts with coating material; also to provide an improved means of moving the web through the drying chamber as will be fully described and disclosed hereafter.

One other object of this invention is to provide smoother surfaces of absorbent materials by friction calendering to make one surface (or both

surfaces) very smooth or by weaving the threads more closely together and having the warp or the weft threads present a smoother surface than the opposite surface. To do this either the warp or the weft threads skip or pass over two or more adjacent threads of the other type on one side of the member whereby the skipping threads may be more closely drawn together and to provide more threads in a given space than in a plain weave such as has always been used for typewriter ribbon.

Another object of the present invention is to provide a film on the type side of an ink-receiving base to keep the type clean; also to provide a film to keep the base from getting baggy or saggy, and to maintain good shape under constant use in a typing machine.

Another object is to provide improved method and apparatus for forming a first film on one absorbent surface of a base material that shall be extremely thin and diaphanous; and to provide better ways and apparatus for drying said thin, diaphanous film, and also for applying better successive coatings and drying same more efficiently and by better methods than heretofore known.

Another object is to provide an improved coated paper or fibrous material for various uses as hereinafter fully disclosed.

In my copending application 337,820 I speak of preparing the coated webs and ribbons of copending application 267,089 now Patent 1,732,187, and such coated webs and ribbons included wool, linen, spun silk, cotton, wild silk, ramie silk, either rag or wood pulp papers, or other papers, or mixtures of the fibers of any of the above or of any fibers desired and the present application includes all absorbent fibers mentioned in any of my said applications above herein referred to.

Another object is to provide apparatus of an improved nature suitable for applying the first exceedingly thin coat and then without any change of the coating material in the container, but by quickly and easily fastening an additional blade to the rear wall of the container to be able to apply a thicker coating to the base material on top of the first thin coating and also to provide a series of new rear blades or supplemental scrapers of varying sizes which permit quick changing, as desired, and which give a much more elastic control and a much broader control of the successive coats applied.

One of the objects of the present invention is to provide a method and means for applying the first thin coat and the successive coats with practically no penetration of the body portion of the base material and without materially impairing the absorbing capacity of said body portion; also to provide a method and means of applying a second coat that shall be much thicker than the first; also for applying a third or fourth coats or additional coats that shall each be thicker than the preceding coat; also to provide more efficient and more precise and accurate apparatus and method. Other objects will be hereinafter disclosed and shown in drawings.

To enable others skilled in the art to fully comprehend the improvements above mentioned and other improvements, drawings have been annexed as a part of this disclosure of my invention.

Fig. 1 is a more or less diagrammatic sectional elevation of one form of apparatus embodying my coating apparatus and adapted to application of coatings to absorbent base materials of any form.

Fig. 2 and Fig. 3 are similar views showing two

different modifications of means for holding the moving base material against the discharge opening of the coating material hopper or container.

Fig. 4 is a plan view, on an enlarged scale, of the container shown in Fig. 1, and its supporting means.

Fig. 5 is a side elevation thereof, showing in full lines the parts in operative position, and showing in broken lines the container tilted to an inoperative position.

Fig. 6 is a longitudinal, vertical section, on an enlarged scale, of the container, on line 6-6, Fig. 4.

Figs. 7 and 8 are respectively a vertical, longitudinal section and a plan view of a modified form of container for the coating material.

Fig. 9 is a vertical, longitudinal section of still another form of container.

Fig. 10 is an elevation of a scraper blade.

Fig. 11 is an improved apparatus over that shown in Fig. 1. Fig. 11 is a sectional elevation of a new, improved apparatus embodying my improved coating apparatus and adapted to the application of coatings to absorbent base materials of any size or form.

Fig. 12 is a detailed sectional view of the hopper or container showing one use of the improved blade which lies in the discharge opening of said container; also the new rear wall transformed into a scraper blade which is readily removable and interchangeable; also showing a supplemental scraper blade attached to the rear wall.

Fig. 13 shows modified forms of the supplemental scraper blades.

Fig. 14 is a detailed view of hopper or container showing the circulation of the coating material underneath the blade and the passage of the coating material through the apertures in the upper portion of said blade.

Fig. 15 is a diagrammatic sectional elevation of the apparatus shown in Fig. 11 as used under my present invention, showing tenting apparatus and drying and evaporating chamber and winder.

Referring first to Figs. 1, 4 and 6 of the drawings, 10 represents a container or receptacle for the coating material and past which the fabric to be coated is moved for the application of the coating material to the surface thereof. This container is provided with a discharge opening 11, preferably extending from end to end of the bottom of the container and through which the coating material is adapted to contact with the surface of the web or base as it is moved across and past the discharge opening. The traveling base 12 is held against the edges of the discharge opening 11 so that the coating material will contact with and be applied to the surface of the web as the latter moves past the opening, but so that the base or web will prevent the escape of the coating material from the container except only as it is carried away by adhering to the surface of the base or web. In Fig. 1 the base or web is drawn from a supply roll 13, across and past the opening 11 of the container and over a guide roller 14, and the supply roller 13 and roller 14 are so disposed and the base is pulled forward rapidly under such tension as to cause the base to be kept taut over and in contact with the edges of the discharge opening 11. As shown in said Fig. 1, the base or web may be pulled by suitable driven pull rolls 14a disposed near the far or outer end of the drying and evaporating chamber or other drying means through which

the base is drawn rapidly for drying the coated

base and for evaporating of any solvent of the coating material. I may move the rolls for the first coating so as to cause the web or base to unwind from the supply roll 13, move past the discharge opening 11 and over the guide roller and tension roller 14 and into and thru the drying chamber as an uninterrupted, even, uniform movement at a speed of several hundred feet per minute, or if the base material has been woven very compactly and is silk, and especially if it is long fibre natural silk, free from joined threads or ties, or if it has been friction calendered, I may move the base at a speed of much less than several hundred feet per minute.

Sixteen (16) represents a scraper or blade for spreading the coating material evenly and as required for the various coats and said blade or scraper rests lightly against the moving surface of the web or base. For the first coat the material is spread on the surface of the web or base almost infinitely thin, so as to form a film of uniform thickness over the entire area of the base or web, which does not materially penetrate the body portion of the base or affect its absorbency appreciably. For this first coat I use the new improved blade 16 which has a series of holes in the upper portion as shown in Fig. 10 at 51, and the blade rests very lightly against the surface of the moving base or web, spreading the coating material over the entire area and the rear or supplemental scraper or scrapers removes the final surplus coating material. In order to get the full benefit of the new improved blade, I utilize the tank 21 and the discharge pipe 22 leading to the container 10 and provided with a suitable valve 23 for regulating the feed of the coating material to the container. By means of this latter equipment, I regulate the flow of the coating material from the tank 21 into the container 10 so as to maintain the level of the coating material in the container about half way up the series of holes (51). Since the blade in the discharge opening rests very lightly on the moving surface of the web or base, the coating material is constantly drawn by the moving base from the first compartment of the container to the rear compartment thereof next to the rear scraper 16b. The blade 16 does not press hard or tightly enough against the moving surface to prevent the constant, continuous flow of a small amount of coating material underneath the blade 16 and across the full length of its edge portion and underneath the said portion and by this means the coating material moves from the first compartment to the second or rear compartment causing the rear compartment to fill up and to flow back through holes 51. This gives a constant circulation and brings new coating material evenly and uniformly to the line of contact with the moving surface of the web or base, which is highly desirable, especially when using pyroxylin mixtures such as hereinafter described and such as mentioned in my copending applications and also when using cellulose ester material or any semi-liquid, viscous material. It insures full coverage with fresh material at all times during the coating operations.

The rear scraper 16c contacts tightly with the surface of the moving web or base and it rather than scraper 16 is depended upon to control the removal of the surplus coating material.

As explained above, the flow of coating material from tank 21 to the container 10 must be carefully and accurately regulated by means of the valve 23 so as to keep the level of the coating

material in the rear compartment slightly above the lower portion of holes 51. If the level rises above said holes and the level in the first compartment is below said holes, no harm will result. If, however, both compartments are filled above said holes, the circulation of the coating material will stop and harm will result. In this event, it is well to shut off the flow for a few seconds coming from tank 21 and then regulate the flow correctly for the rest of the work. This circulation is also of vital importance in order to avoid spots or fine lines on the web or base where there is no coating. There are some semi-liquid coating materials which easily "freeze" unless means are provided which absolutely keep fresh coating material flowing to the line of contact of the coating material with the web or base. Perfect circulation and movement must be had at all times.

I have also discovered a new method of using the rear and supplemental scrapers shown in Figs. 1, 2, 3, and 4 and have invented improved scrapers as follows: I take out the rear wall of the container and put in a new wall which also acts as a scraper. This new wall is interchangeable so that I may have a thin edge or any kind of edge desired for said rear wall scraper. In addition, I can join or fasten to said rear wall any one of a series of scrapers as indicated in Fig. 13. My improved scraper 16c makes obsolete the rear wall of Fig. 1. My improved scrapers 16c and 16d when fastened together make obsolete the supplemental scrapers of Fig. 1 shown as 16b. The metal of 16c is hardened steel. I prefer to use a thin edge blade 16c and except for unusual work I use it for the first very thin coat and then for the second and successive coats employ a blade 16d fastened to 16c as indicated in Fig. 12 and Fig. 13. The flat surfaces fit together perfectly. The blades shown in Fig. 13 as 16d show differences as to the edge portions of 16d blades. I may also use different edge portions of a series of blades 16c. Blade 16d of Fig. 12 may be much narrower than the height of the container 10 and much narrower than the rear wall of the container. I may use screws or any other suitable means for fastening the blades.

It is a big advantage, after applying the first exceedingly thin coat, to be able, without any change of the set-up, by simply fastening a 16d blade to the blade 16c of any desired size or thinness or thickness of edge portion, to apply a second coat or any successive coat that will be of any desired thickness required by the work the coated base or web is intended to perform. For the final coat I usually employ a rather blunt pair of blades 16c, 16d. Care must be taken to have the edges perfectly accurate and level.

Fig. 15 shows my new improved, high speed apparatus for application of the first coat to woven or very strong materials in the wide. It has the great advantage that the wide web or base is held under perfect control, smooth and firm and even during its entire travel, with not the slightest opportunity of the web or base becoming wrinkled or doubling over on the edges or getting out of perfect shape. This additional control is due to the tentering apparatus 54 which grabs the web or base as it comes off the tension and guide roll 14 and takes same into and through the drying and evaporating chamber 15. The base then is moved over the guide and tension roll 52 and under the idler roll 55 and the web or base is wound up into a finished roll by the winder 53. The tentering apparatus is driven at a speed of several hundred feet per minute by power

means and at any desired lesser speeds. I prefer to drive with an adjustable speed electric motor, shown at 56. The base or web is drawn and moved from the supply roll 13, past the coating container 10 and in contact with the blade 16 and the rear wall blade (and with a supplemental blade as well if desired) and over the guide and tension means 14 and through the drying and evaporating chamber 15 and over the guide and tension roll 52 and under the idler roll 55 and 10 is wound up by the winding means 53.

The blade 16 is supported within the container 10 with its lower, thin edge extending through the discharge opening so as to contact lightly with the traveling base or web. It may be held 15 in position in the container or receptacle or hopper by any suitable means, such, for instance, as studs or pins 16a projecting from the opposite end walls of the container, the studs or pins being disposed so as to embrace and firmly hold 20 the opposite side edges of the blade or scraper 16.

The discharge opening shown in Fig. 1 and Fig. 11 can be selectively widened in different ways to give wider contact of the coating material with 25 the moving base or web. In the construction shown in Fig. 6, the bottom plate 17 of the container, which plate forms one edge of the discharge opening 11, can be adjusted away from the opposite edge of the discharge opening for 30 widening the opening. The bottom plate 17 may be adjustably secured in place as by means of screws 18 screwed into the end walls of the container through elongated slots 19 in the upwardly projecting end flanges 20 of the bottom plate 17. 35 A stirring device may be employed in the container 10 in addition to the circulation system, but I prefer the circulation system alone. This stirring device is shown and described in the copending application 337,820 in Figs. 5 and 6 40 and is operated by the motor 26.

The container 10 is provided with a movable cover which has a hole or opening 32 equipped with a cover plate 33. Also the container is preferably mounted so it can be adjusted toward and 45 from the moving base and so it can be quickly and easily moved out of its operative position when this is necessary, as illustrated in Figs. 4-6; and for this purpose, the container is provided at opposite ends with cross bars 34 which are 50 pivoted as by screws 36 provided with wing nuts 37 on supporting bars 38, and at their opposite ends the cross bars are provided with studs 39 adapted to rest in open topped slots 40 in the supporting bars. The container can be swung 55 to and from its operative position on the pivots 36 by using the studs 39 as handles, and when the container is returned to its normal position, the studs will seat in the open slots and constitute stops for holding the container in its normal position. 60 By tightening the nuts 37, the container can be secured in the position to which it is moved. The supporting bars 38 are mounted on posts or uprights 41 rising from a base 42, the supporting bars being adjustable vertically on the posts 41 65 towards and from the base by nuts 41a screwed on the threaded upper ends of the posts and disposed above and below the lateral flanges of the angle supporting bars.

Fig. 2 shows a construction similar to that shown in Figs. 4 and 6, except that the web or base to be coated is held against the bottom of the container and against the edges of the scrapers by a pad 43 of felt or other material mounted on the base 42. 75

Fig. 3 shows another means for holding the web or base against the edges of the discharge opening 11 of the container and the edge of the blade 16. In this construction, this is accomplished by the roller 44.

The variation of width of the discharge opening may be as in Figs. 7-8 where the container 10x is provided in the inner faces of its end walls with opposite registering inclined grooves 46 which incline downwardly toward the wall 47 of the container. If blade 16x is in the first pair of grooves, its lower edge will lie close to the opposite edge of the discharge opening formed by wall 47 of the container and will form a narrow discharge slot or opening for the coating material, which, in this construction, is confined in an even width between the blade and the wall 47 of the container. The blade can be adjusted to different desired distances from the wall 47 to widen the discharge opening, as may be required, by placing the blade in one or another of the several pairs of grooves 46. Another arrangement is shown in Fig. 9, in which, as in Fig. 7, the scraper 16y is adapted to be supported in different positions in the container 10 and nearer to or farther away from one wall 48 of the container. For instance, the scraper can be held in the grooves 49, or, as shown in Fig. 9, the blade can be removed from these grooves and secured in one or another of the several pairs of vertical grooves 50 shown in the end walls of the container 10y in this construction. It should be noted that the coating material is always exactly even across the moving web or base. While varying the width of the discharge opening, one is maintaining absolute uniformity of width, exactness of width clear across the moving web.

In preparing the coated silk ink-receiving base members of application 189,180, as stated in said application, I prefer to use specially woven silk material, not less than .002 of an inch in thickness and not more than .006 of an inch thick, according to the use and the machine which employs said silk ink-receiving base for making impressions. If I friction-calender said silk ink-receiving base, I prefer to have same from .002½ of an inch thick to .01 of an inch. By friction-calendering and polishing and compacting either one or both surfaces I can reduce the thickness appreciably. The warp and filling are woven very compactly of yarn that is natural silk, of the best quality and preferably of very soft character. The closer the weave of warp and filling and the better the quality of the weaver's work, the better will be the results from the material. It is readily seen that a very minor imperfection in the weaver's result will blur a micro type or elite type impression when the coated silk base material is used as an ink transfer member in a machine. It is customary to use some sizing or starch or other stiffening material in silk cloth which is to be slit and the edges glued and the material used later for the manufacture of ink transfer members. This sizing or other material reduces just that much the absorbency and ink receiving capacity of the silk material. It is preferable to use no starch and no stiffening material of any kind. The natural gum in the threads of silk must, of course, be entirely removed or "boiled-off" and the material may be finished then in any suitable manner.

In my copending application 337,820 is disclosed a drawing (Fig. 1) showing a large roll of wide base material, for example absorbent paper such as may be used in making coated carbon paper

or manifolded sheets, and showing the coating apparatus, including a cellulose or coating material container or hopper, with suitable adjustable discharge opening for discharging the coating material upon one surface of the base material; also guide and tension means and a drying and evaporating chamber and at the outer or farther side of the chamber is shown a pair of pull rolls, driven at different speeds and capable of pulling the base material thru the coating apparatus, over the guide and tension means and thru the drying and evaporation chamber at a speed of several hundred feet per minute and at lesser speeds, all as one continuous, uninterrupted operation at uniform and even speed from the beginning of the run of the base material coming off the supply roll and going thru the process and out thru the pull rolls until all of the base material has been treated or coated and thoroughly dried, both processes being done almost instantaneously in rapid succession, and the first application at high speed and with a narrow contact opening, even as narrow as one-eighth of an inch for certain types of work. After the first extremely thin coating and drying, I may apply one or more coats at lesser speed and with a wider discharge opening in order to augment the thickness of the surface film or coating, all as fully described at greater length in said copending application No. 337,820. There may be one pervious coating for use on the side away from the type and towards the writing surface or there may be coatings such as described in copending application No. 189,180 which are for use on the type side which are unsuitable for screening ink through to a writing surface to form printed impressions although such coatings or films as described in copending application No. 189,180 and in application No. 567,111 may be such as will become discolored on the surface of the film or ink-retarding agent and some of the material of which the ink is composed may be retained to a slight extent within the coating or film but said film or coating is entirely unfit for use as a filter or screen on the writing surface side of said ink transfer member.

In my co-pending application 337,820 continuous webs, sheets, bands, ribbons or any other form of textile or other base material are described, whether suitable for use as inked transfer members or for any use where a surface coating is required on the surface of absorbent base materials and said copending application is not in any wise limited to ink transfer members or to base materials suitable for use later when inked. Said copending application No. 337,820 states that the method and means of applying extremely fine thin, first coats and thicker successive coats, all uniform as to the entire area of the base material and the finished result being free from blemishes such as streaks, uncoated spots, or minute defects, is for use for any absorbent materials of any kind for any purpose whatsoever and the base materials may be paper, wool, linen, artificial silk, silk, spun silk, cotton, or combinations of any of the fibres or threads of any of these, or combinations of any of said fibres or threads with any other fibers or threads, including fibers or threads of wild silk or ramie silk. I may use a pyroxylin coating which is composed of one half of pyroxylin solution and one half pyroxylin cement; the pyroxylin solution being composed of four parts of pyroxylin to five parts of castor-oil or other suitable softener, to which is added a low-boiling point solvent which is ethyl acetate

diluted with a quick-drying liquid such as alcohol, gasoline or acetone. Pyroxylin cement is the same as pyroxylin with the softener omitted and gum added. The addition of gum or resins seems to give greater flexibility and adhesion. This mixture is particularly for use in forming a film through which ink may be screened to a writing surface. For the coatings or films used on the surface of the base material of the transfer member which is turned towards the type and receives the blows or pressure or impact of the type, I prefer to use pyroxylin cement, two thirds; pyroxylin solution, one third; and in the pyroxylin solution I add only two parts of castor oil instead of five parts. Said copending application No. 337,820 states that to secure a first coating that has practically no penetration of the base material, it is essential and of much importance to have the discharge opening of the coating container very narrow, even as narrow as  $\frac{1}{8}$  inch, and by driven pull rolls move the base material very rapidly across and past said discharge opening with the cellulose material in contact with the surface of the base for said very slight width of said opening and then almost instantaneously evaporate the solvent of the cellulose coating material and dry said coated base thereby forming on the surface of the base an exceedingly thin film that does not impair the absorbency of the body portion of the base appreciably or materially. Then the process may be repeated one or more times, drying thoroughly after each application of coating material and being careful to evaporate the solvent completely, and thereby producing a film of any desired character or thickness and yet without materially impairing the absorbing character or capacity of the said base material. This process is for all absorbent materials for any desired use, with or without ink.

The copending application describes an adjustable discharge opening for giving contact of the surface of the moving base material with a wider body of coating material for the successive coats if that is desired. The present application shows an additional means and an improved means of quickly augmenting and building up the first and the successive coats into a film of any character and thickness desired; and it provides for adjustable supplemental scrapers and removes the rear wall of the container and substitutes therefor a hardened steel wall that has a scraper blade suitable for use in applying the first extremely thin coat, and as already described herein, I can quickly fasten a supplemental blade to the rear wall blade and this supplemental blade that I fasten on may be a thin blade or a blade of any desired thickness of edge. Since this rear wall blade has a flat surface on the outer portion of the container and since my new improved supplemental blades are made with one flat surface and exact fit against the rear wall blade, I now have a supplemental blade that when joined to the rear wall blade is in reality one blade although formed of two blades and this unique two ply blade can be quickly exchanged for any size of the bottom edge desired. It is, therefore, possible with my new improved arrangement of my blades and by having a series of blades from a very thin edge blade to a blade with a thick rounded edge of any desired size, to have a direct control over the amount of coating material left on the surface of the base material for the first coat or any succeeding coat. I mention the first coat because it is now possible to use a two-ply

blade even for the first coat, if desired, and if the base material is highly congested, for example made on the skip weave principle. This improved rear wall two ply blade and also the single rear wall blade is a decided advantage over the apparatus shown in application 337,820, in Figs. 1, 2, 3 and 4. It gives an elasticity of control in addition to the adjustable discharge opening of said application and adds greatly to the efficiency of the apparatus shown in said Figs. 1, 2, 3, and 4.

Spun silk threads are more like cotton threads as to their composition and make-up than like long-fibre threads of natural silk. As stated in my other applications, spun silk is highly absorbent and especially valuable in coating work for all manner of purposes. As ink-receiving bases, they take a surface film and easily permit a very large supply of ink to be carried. They are much more absorbent than cotton fibres or long-fibre silk. Spun silk fibres I have found by experimentation make a distinctive, new paper material of large value and importance that is lighter for its thickness than any paper I have tested. I friction calender this spun silk paper and I coat it on either the calendered surface or the other surface. It may be used as an ink-receiving member, for writing paper, for ledger paper and for keeping permanent records of importance. The present invention is adapted to coating all kinds of absorbent rag papers, wood-pulp papers and other papers, linen papers, silk papers, and said invention makes it possible to produce silk paper coated with pyroxylin which has unusual fineness and quality and strength; also other fibrous absorbent unwoven materials; also heavy paper material and card material, suitable for index cards and cards that are handled constantly by clerks in offices and in libraries, etc. By means of the present invention, coatings are applied which add greatly to the cleanliness of such paper materials and to their durability and wearing qualities. By reason of the coatings of this invention cards may be made practically non-absorbent of dirt and yet with surfaces suitable for printing impressions as the ink is able to sink into a pervious cellulose ester or pyroxylin coating. I apply the coatings of my application 189,180 to any paper material. For certain uses I coat on one side, for other uses on both sides. I may friction calender the paper material before coating a surface.

Long-fibre silk may be made up of fibres six or eight hundred feet in length. Reference is made to the ink-receiving base members of copending application 567,111. By the present invention I coat the long-fibre silk ink-receiving bases of that application. By reason of the toughness of the long-fibre, closely-woven, natural silk, and by reason of the fact that the fibers contain no lint whatever, such a fabric has certain characteristics which set it apart from ordinary fabrics. As stated therein, one of the objects of the high thread count long fibre silk is to overcome the dotted effect produced by low thread count silk typewriter ribbons such as my patent Silk ribbon of April 14, 1914, No. 1,092,856. By increasing the thread count to a point where the threads are so compact and so close together that dotted lines will not and cannot result, I secure impressions closely resembling printing. As stated in said copending application, where the long fibre silk threads are so interwoven that the warp threads skip more than one weft thread or filler thread or where the filler threads skip

more than one warp thread and using the same thread count or a higher thread count still, an even greater durability results. The advantages of this skip weave can be largely enhanced by friction calendering either or both surfaces of the fabric, as stated in my said copending application and as described at great length in my Patent No. 1,830,559. Said patent covers friction calendering as applied to highly absorbent ink members fully inked. I find that for other purposes and uses highly calendered absorbent base materials have increased efficiency and usefulness where the calendering is done by friction as stated in my copending application. In my copending application No. 588,932 this statement is made, "By the use of ink feed mechanisms, such as described, it is possible to employ a very fine writing ribbon which may be very closely woven and as low as .002 of an inch in thickness, since the writing ribbon itself, in this case, is, of course, not depended upon to act as a reservoir for a supply of ink as in the case of typewriter ribbons now in use." A thin ribbon of this kind if made entirely of long fibre silk and friction calendered, as described in my application of October 5, 1931 (567,111) is extremely tough and will withstand the pounding of the type for a long period of time and also has the advantage of producing very fine-cut, sharp, neat impressions. For the very longest service and the finest writing, I prefer to use a ribbon, with either woven edges or cut edges, if the cut edges are fastened securely, of long fibre silk woven as described in my copending application of October 5, 1931, No. 567,111. I use a silk material that is approximately .004" thick when the silk has been boiled off and the natural gum removed from the threads and the material singed in the usual manner and then I friction calender the material down to approximately .002 of an inch in thickness. The foregoing, as stated in said application No. 588,932, discloses the great wear-resistance of said long-fibre silk for use as an inking ribbon in a machine wherein ink is being fed to the ribbon continuously and where the ribbon can continue to serve until it wears out inasmuch as the ink supply is sufficient to last much longer than the fabric. I have found that for other uses such friction calendered closely woven silk material, made of long fibre silk, and used either coated under my copending application 337,820, or used with the high thread count of my copending application 567,111 or used without the coating but friction calendered, has large value in making wearing apparel, umbrellas, parasols and for other purposes where great strength combined with thinness are important. For making the coated ribbons of long fibre silk whether friction calendered or not, to meet the requirements of the ink transfer ribbon members and ink transfer members generally, described in the specification and covered in the claims, as well, I will not use all of the apparatus of my copending application No. 337,820 and will use the new improved blade of the present application but that is not absolutely essential to secure the desired result. The improved blade makes the apparatus more simple and less expensive and gives a thorough circulation of the coating material at the opening and at the very part of the opening where the spreader blade contacts lightly with the surface of the base material, thus insuring an even coating produced by fresh material that is in move-

ment and cannot freeze and form streaks or spots on the surface of the base.

As disclosed in my copending application 567,111, in calendering in the ordinary manner, the web or base is run through two heavy metal rolls under great pressure. This weakens the fibres and in the case of narrow ink-receiving base members such as typewriter ribbons of 33/64" or 1/2" width, as commonly made and sold by the brokers and middlemen to the inking ribbon factories, the pressure calendering usually breaks the gummed edges and often cuts into the edge portions as clean as with a sharp knife. My friction calendered ink-receiving base members are uncut and unweakened and are a big improvement in every way over all others now for sale: I may coat the friction calendered surface with a pyroxylin mixture or a cellulose ester coating as disclosed in application 189,180 for use as an ink-receiving base in preparing the coated paper and fibrous and fabric members of that application, or I may prepare any absorbent base material by such friction calendering and coating. For the final coating on top of the cellulose ester or pyroxylin or other coating material, I may use a glue or gum-like coating. This may be used in accordance with copending application 337,820 in preparing the coated ink-receiving members of that application.

My improved methods and apparatus for coating all kinds of absorbent base materials produce extremely soft, flexible materials. I am careful to have the base materials as absorbent as possible and of good quality and as compactly put together as may be obtained. The friction calendering reduces thickness without weakening the fibres or threads of the paper or fabric or other base material and the thin coatings which are on the surface do not stiffen the base, certainly not to a serious extent. Such extremely thin friction calendered, coated material, so soft and flexible is of real value for many articles. I mention a few: parasols, shirting and other wearing apparel, sheets, pillow cases, white duck material for men's summer suits, linen suit material for boys and men. Improved as to strength and made less absorbent and more wear-resisting on one surface (the outer surface) with an absorbent body portion and the inner surface highly absorbent, such materials are more lasting. In friction calendering the base material, one or both surfaces, I pass said base material, whether paper or other fibrous material, or long fibre silk, cotton, or other fabric material, or spun silk, or skip weave material made of silk in the warp and either cotton or spun silk in the weft, or filling, through friction calendering rolls, with the pressure roll of metal rotating at a much higher speed than the anvil roll which has no metal surface. It is desirable that the anvil roll operates slowly and that it is a larger roll than the pressure metal roll. As the anvil roll moves slowly, the pressure roll's smooth steel surface operates upon the surface of the base material which is being friction calendered, and the pressure roll is revolved rapidly as a friction roll and it compacts, polishes, and smooths the face of the base material. If it is desired to calender both surfaces, the base material is reversed and passed through the calendering rolls a second time. The surfaces have to be friction calendered one at a time. I may calender before coating or after coating according to the required use of the finished base material. If ink is to go into the base material, I preferably friction calender before coating as I

have found that it is possible to apply the first coating with less care if the surface has previously been friction calendered. I believe that friction calendering a cellulose ester coating to some extent weakens it and makes it of less value as a coating for an inking ribbon. However, I always apply my coating material to an uninked base and the present application does not deal with inking in the sense that it covers actual inking operations. It is, therefore, understood that wherever herein I speak of inking operations it is as something to be done later at an inked ribbon factory or a factory where paper is inked and made into manifo'ding or carbon paper sheets. For certain base materials, I prefer to apply a pyroxylin or cellulose nitrate coating and then by passing same through a drying zone at a temperature of 350 to 360° F. decompose the coating or film so that it largely disappears and then apply the first coat as herein described with a narrow discharge opening and at high speed, the coating and drying being done as two operations in rapid succession, and in the drying operation I evaporate the solvent of the pyroxylin or cellulose ester or other coating material so rapidly as to avoid practically all penetration of the body portion of the base material and so as to avoid any material impairment of the absorbing capacity of the base material.

In preparing the base materials for friction calendering all natural gums and all foreign substances, original oils and all dirt and accumulations of oil which may get into the base materials at the paper mills or cotton or silk mills or other manufacturing establishments where the base materials are first manufactured in their coarse state are completely removed from same and I limit my coating work, as well as friction calendering work, to base materials which contain no foreign substances of any kind but are absorbent. In preparing the cotton base material after it comes from the cotton mill where it was woven, it is customary to use bleaching chemicals and other chemicals to increase the absorbency. In order to avoid breakages of warp threads in weaving the high thread count, very fine cotton base materials for use in producing the coated base materials for ink transfer members of my inventions, it is customary to soften the warp threads by the use of oil. From actual experience I found that unless all original oils, gums, accumulations of foreign substances in the cotton fabrics, were removed, it was impossible, if I friction calendered the surface which I later coated with cellulose ester material, to have the cellulose coating adhere well. It was, of course, due to the oil and other foreign substances that good adherence was not had. I also found that when the finished wide fabric was slit into typewriter ribbons, the edges would not absorb and take the edging material properly. I found that the coating material could be applied at slow speed and due to the oil and other foreign material already in the cotton base, the cellulose coating material would not penetrate appreciably, nor would it adhere properly, however. It easily peeled right off the oily surface. Upon applying the usual typewriter ribbon ink to this kind of cotton fabric, I found the fabric was not absorbent and would not absorb more than a third of the ink (and some of it did not absorb more than a tenth of the ink) that such cotton fabric regularly absorbs after being chemically treated and washed so as to make the same highly absorbent and after removing the original oils and

gums and other foreign material in said cotton fabric at the time it reaches the finishing plant. All typewriter ribbon cloth made of cotton for long years has always been sent to a finishing plant where it is treated chemically, singed and smoothed, so as to make it highly ink absorbent and suitable for use as an ink reservoir and as an ink transfer member for making impressions. The fact that the cloth can take a cellulose ester coating on the friction calendered surface at lower speeds and with a somewhat wider discharge opening of the coating container, giving a wider contact of the surface of the fabric with the body of cellulose in the container, does not have any value because the result will not permit use of the material due to poor adherence of the cellulose film or surface coating, due to the lack of proper absorbency of the cloth. The threads are already at least partially filled with oil and gum and other foreign substances which make it impossible for the cellulose ester coating material to do harm by appreciably penetrating the fabric but they also make proper adherence entirely impossible and make the fabric unsuitable for use as an absorbent base material either for ink transfer members or other purposes so that such non-absorbent fabrics do not come under the class of base materials with which my inventions deal. I am limited to absorbent base materials upon which a film can be placed which will adhere and which after being coated or treated to effect a sound surface film having good adherence with the base material, leaves the body portion of the base fully absorbent, or without its absorbency appreciably impaired in any way. Cellulose ester coating material cannot be successfully applied to non-absorbent cloth and be used in my work. For many years there has been a very large sale in this country of uninked absorbent ink-receiving base materials of papers of various grades from the cheapest to the fine imported Crompton tissues for use in making manifolding sheets and carbon paper. In addition to coating these absorbent base materials, as mentioned in my copending application No. 189,180 and in other applications copending, I also coat paper material for any purpose and may use the pyroxylin formula hereinabove set forth or a cellulose ester coating material as mentioned in said copending application of May 5, 1927, and I may use a final coating of gum or glue. For tissue papers or very thin papers, I prefer to use the same type of guide means and means for keeping the paper smooth and flat as is used in connection with a carbon paper inking machine. I coat the paper in the wide and it has considerable tensile strength. I use the type of coating apparatus shown in Fig. 11 and the drying and evaporation chamber. I find that a gas oven approximately 30 feet in length, five feet in width and six feet in height gives satisfactory results when coating paper with a cellulose ester so as to form a first almost infinitely thin coat that does not materially impair the absorbing capacity of the body portion of the paper. If one uses an oven of this length capable of temperatures up to 450° Fahrenheit, it is of large value for use in coating continuous webs of fabric material as well, and especially where the decomposing of the first substantial coating is done as above described herein. This decomposing operation requires sufficient heat to cause the coating to almost completely disappear and the coating is then applied in the usual way on top of the surface which carries a decomposed coating

material, or the residue of said material, inas-  
 much as the gases in the coating material which  
 was decomposed, have been generated and a  
 substantial chemical change of considerable value  
 5 has been effected. For book papers and letter  
 paper and papers that are to be handled fre-  
 quently for many years and for records of grave  
 importance that are expected to last many years,  
 I prefer to use a pyroxylin coating material. I  
 10 coat in the usual way above described. Great  
 care must be taken with the gas oven and high  
 speeds are essential. For the finest and best  
 results from paper, I prefer to use a paper which  
 is largely composed of spun silk fibres. I find  
 15 that such a paper coated with cellulose ester ma-  
 terial has many uses. It is very absorbent, is  
 strong and durable and exceedingly light. In  
 fact, for its thickness it seems to be the lightest  
 of papers. I also find that a cellulose ester coat-  
 20 ing on one surface of unwoven material, in ad-  
 dition to papers, has value. I refer now to the  
 silk and cotton thread or fibre material made up  
 entirely of warp fibres or threads. The cellulose  
 ester coating is applied in the usual manner and  
 25 without materially impairing the absorbency of  
 the base, and one or more coats may be applied as  
 desired. I may use a final coat of gum or glue.  
 The material may be cut into any desired width.  
 Very narrow strips or ribbons may be used for  
 30 tying boxes of flowers or candy. The cellulose  
 film or coating adds strength.

After coating webs or ribbons which have woven  
 edges, of course it may not be necessary to slit  
 same. The present invention is intended to cover  
 35 any form or size of coated absorbent base material  
 whether woven edge or slit edge, fastened or un-  
 fastened edges. The unwoven materials such as  
 papers and the florists' material above mentioned  
 may be slit to any desired width after coating.

I have found that coated silk, spun silk, high  
 40 thread count cotton fabrics are of large value for  
 such wearing apparel as shirtings, washable  
 dresses, summer suits, wash suits and rompers  
 for children. The cellulose ester coating on such  
 45 absorbent materials is done in the same manner  
 as hereinabove described, leaving the body por-  
 tion of the base material absorbent and free from  
 any material which might materially impair its  
 absorbing capacity. By using the clear cellulose  
 50 ester coating material, without dye or color or  
 pigment, it is possible to apply extremely thin  
 first coatings followed by thicker coatings which  
 are transparent and which add to the wear re-  
 sistance and durability of such wearing apparel  
 55 and other articles as mentioned herein without  
 detracting in any degree from their appearance.  
 I may friction calendar one or both surfaces and  
 may coat upon the friction calendar surface  
 or not as seems best. I find that for shirting ma-  
 60 terial and for other materials, that by friction  
 calendar a high thread count, highly absorbent  
 cotton material and then applying a cellulose  
 ester coating of considerable strength, that the  
 65 resultant material has a sheen much like silk  
 which adds to its commercial value and to its de-  
 sirability. I prefer to coat all such materials in  
 extremely long lengths. I have found that the  
 silk material described in my copending applica-  
 70 tion of May 5, 1927, can be handled better and  
 more economically and efficiently in the width  
 and length mentioned in said application, viz:  
 lengths of 1000 yds. and not less than forty-two  
 inches in width. I prefer to sew and paste the  
 75 ends together and form a large supply roll before  
 beginning the coating operation. If the material

to be coated is very expensive, I fasten leader  
 tapes or leader cloth to each end, sufficiently  
 long to reach from the supply roll thru the coat-  
 ing and drying apparatus and through the driven  
 pull rolls and also to a winding machine which  
 5 is located not more than six yards from the pull  
 rolls. The rolls are located not more than ten  
 ft. from the far end of the drying chamber. It  
 is preferable to have the leader cloth or tape ten  
 yards longer than the actual distance between 10  
 the supply roll and the winding machine so that  
 the first yard or two of the expensive base ma-  
 terial will positively not be wasted. The same  
 length is preferable for the other end of the base  
 material so that when the entire roll of base ma- 15  
 terial has been coated, as it passes from the sup-  
 ply roll to the coating apparatus and through the  
 drying chamber and through the pull rolls to the  
 winding machine, there will be no loose end of  
 the expensive base material, but there will be 20  
 sufficient leader cloth to keep the expensive base  
 material tight and smooth and taut until it is  
 thru the entire operation and wound upon the roll.  
 These leader cloths may be used thousands of  
 times and may be made of loosely knit webs. 25

For coating woven materials I find it advan-  
 tageous to use the tentering outfit to control the  
 base material in its travel from the coating ap-  
 paratus proper into and through the drying  
 30 chamber. Such machine should be built strong-  
 er than usual for high speed work. As much as  
 two years or more ago I began using tentering  
 machines in coating wide absorbent cloth in ex-  
 perimental work in connection with my inven-  
 tions and they positively are highly valuable when 35  
 connected up with my apparatus shown in Fig. 11  
 herein. They must be carefully set so as not to  
 stretch the cloth out too wide, as it is highly de-  
 sirable to keep the cloth as compact and tight as  
 possible. The application of the coating and the 40  
 rapid (almost instantaneous) drying of said coat-  
 ing material on the surface of the absorbent ma-  
 terial tends to cause the base material to shrink  
 and contract, which is desirable, and the tenter-  
 ing outfit must not be used in such a manner as 45  
 to widen out this cloth or base material. Such  
 contraction of the base material increases the  
 number of absorbent fibres per square inch which  
 for use as ink transfer members is of considerable  
 importance and value. 50

The description of my invention is intended to  
 cover and include in a broad way uninked, dry,  
 absorbent materials such as absorbent paper and  
 florists' materials described herein and other sim-  
 55 ilar materials, coated with any kind of coating  
 material so long as the coating or film does not  
 impair the absorbency of the base material. This  
 applies as well to woven absorbent materials.  
 Suitable variations in proportions and methods  
 of applying the coatings and also variations in 60  
 speeds and temperature may be made without  
 departing from the spirit of my invention. Suit-  
 able variations may be made in the apparatus de-  
 scribed herein and disclosed in the drawings with-  
 out departing from the spirit of my invention. 65  
 Steam ovens are safer for ordinary work. I do  
 not limit myself to ovens but any suitable drying  
 mechanism or evaporating mechanism or struc-  
 ture or zone may be used. I, therefore, do not  
 limit myself to particular processes, appa- 70  
 ratus or materials, so long as the foregoing results  
 are secured and the body portion of absorbent  
 materials left unappreciably impaired.

I claim:

1. A coating apparatus including a coating con- 75

tainer having a discharge opening through which coating material may be discharged upon the surface of a base material or web, a blade or scraper means located within said discharge opening, and spaced from the side walls of said discharge opening with an edge portion contacting at least to some extent with the surface of said base material or web.

2. A coating apparatus according to claim 1, wherein at the rear wall of the coating container are one or more supplemental blades or scrapers of any desired size of bevel and edge, said scrapers or blades being readily interchangeable and being in direct contact along their edges with the surface of said base material or web for insuring a complete and even coverage of the web by the coating material.

3. A coating apparatus according to claim 1, in which the blade or scraper is provided with one or more openings in the upper half portion of same for permitting coating material to circulate therethrough from the rear compartment to the front compartment of a container in which coating material is used.

4. A coating apparatus according to claim 1 wherein the rear wall of the container serves as a blade or scraper means in addition to the blade within the discharge opening and has a fairly thin edge, is true and level along said edge for insuring a uniform and even removal of the surplus coating material, said blade or scraper being interchangeable for blades having any kind of edge portion desired.

5. A coating apparatus according to claim 1, wherein the rear wall of the coating container is a scraper, and wherein one or more scrapers are attached to said rear wall scraper for insuring an even, uniform coating on a travelling web or base.

6. A coating apparatus according to claim 1, in which the said apparatus includes means for keeping the supply of coating material in the coating container or hopper at a fixed level or depth, and means for varying the width of said discharge opening for varying the period of contact of the coating material with the surface of the moving web or base.

7. A coating apparatus according to claim 1, in which there are means for movably supporting a receptacle or container or hopper to move toward and from the position in which it contacts with a moving web or base and means for varying the width of the discharge opening of said container and for increasing or decreasing the size of the compartments of said container.

8. A coating apparatus including a coating container having a discharge opening through which coating material may be discharged upon the surface of a base material or web, a blade or scraper means located within said discharge opening and spaced from the side walls of said discharge opening, with an edge portion contacting at least to some extent with the surface of said base material or web, said blade or scraper being provided with one or more openings in the upper half portion of same for permitting coating material to circulate therethrough from the rear compartment to the front compartment of a container in which coating material is used, the coating material in said container being kept moving and circulating without the use of driven means for stirring or mixing the coating material, and said apparatus including equipment for maintaining the desired level of coating material in said container during the operation of coating.

9. An apparatus for coating absorbent materials according to claim 1, including means for pivotally supporting a container or receptacle to swing toward and from a position in which it contacts with the web or base and means for maintaining the body of coating material in said container at an absolutely even width across said moving web or base and means for varying said width of contact of said coating material with said moving web or base and means for varying the width of the said discharge opening and means for maintaining a constant supply of coating material in the said container, and for maintaining same at any desired level in the said container, during the coating operation.

10. An apparatus for coating absorbent materials according to claim 1, including a two-ply blade or scraper means as herein described, for removing the surplus coating material.

11. An apparatus for coating absorbent materials according to claim 1, including a two-ply scraper means as herein described, one or both parts of said two-ply scraper means being interchangeable for scraper means of other sizes of edge portions.

12. An apparatus for coating absorbent materials according to claim 1, including centering apparatus as herein described for keeping the moving web or base perfectly tight, smooth, taut and free from folds or wrinkles of any kind.

13. An apparatus for coating absorbent materials according to claim 1, including means for moving said container out of its operative position from the web and means for quickly returning it to its operative position against the web; and a rear wall of said container which is itself a scraper means made up of one blade or scraper or more than one, or made up of a two-ply scraper means for removing the surplus coating material; and the discharge opening of said container being adjustable so the opening may be widened or varied as desired, but said opening in any position always being of uniform width clear across the web or base and from end to end of said discharge opening.

14. A coating apparatus including a coating container having a discharge opening through which coating material may be discharged upon the surface of a base material or web, a blade or scraper means located within said discharge opening and spaced from the walls of said discharge opening, with an edge portion contacting at least to some extent with the surface of said base material or web, means to support a roll of said material or web, means to unwind same and to pass said material or web across said discharge opening; guide means, tension means, centering means, and drying means to dry said coated material, so said material is at all times maintained in a smooth, taut, tight condition during the coating and drying processes; means to wind said material after it has been dried, and means to vary the speed as desired at which said material or web is unwound, passes the said discharge opening, passes through said drying means and is wound.

15. A coating apparatus according to claim 1 wherein the said apparatus includes means for keeping the supply of coating material in the container or hopper at a fixed level or depth, and means for varying the width of said discharge opening for varying the period of contact of the coating material with the surface of the moving web or base material.

16. A coating apparatus according to claim 1 71

wherein there are means for movably supporting a receptacle or container or hopper to move toward and from the position in which it contacts with a moving web or base material and means for varying the width of the discharge opening of said container and for increasing or decreasing the size of the compartments of said container.

17. A coating apparatus including a coating container having a discharge opening through which coating material may be discharged upon the surface of a web or base material; a blade or scraper means located within said discharge opening and spaced from the walls thereof, with an edge portion contacting at least to some extent with the surface of said web or base material; said scraper means having one or more openings in the upper portion thereof to permit coating material to circulate therethrough from the rear compartment to the front compartment of the container, and means to keep said coating material moving and circulating.

18. A coating apparatus for coating absorbent materials including a coating container or hop-

per and including circulating means for mixing and circulating the coating material situated within said coating container or hopper, said means including a partition in the hopper forming two compartments therein, said partition being provided with holes or apertures to permit coating material to pass from one compartment to the other.

19. An apparatus for coating absorbent materials including a coating container or hopper and including circulating means for mixing and circulating the coating material situated within said coating container or hopper, said means including a partition in the hopper forming two compartments therein, said partition being provided with holes or apertures to permit coating material to pass from one compartment to the other, and said apparatus including equipment for maintaining the desired level of the coating material in said container during the operation of coating.

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