Dec. 25, 1934. J. H. SWAN, 3D 1,985,698

PAPER MANUFACTURE

Original Filed Aug. 30, 1929 2 Sheets-Sheet 1

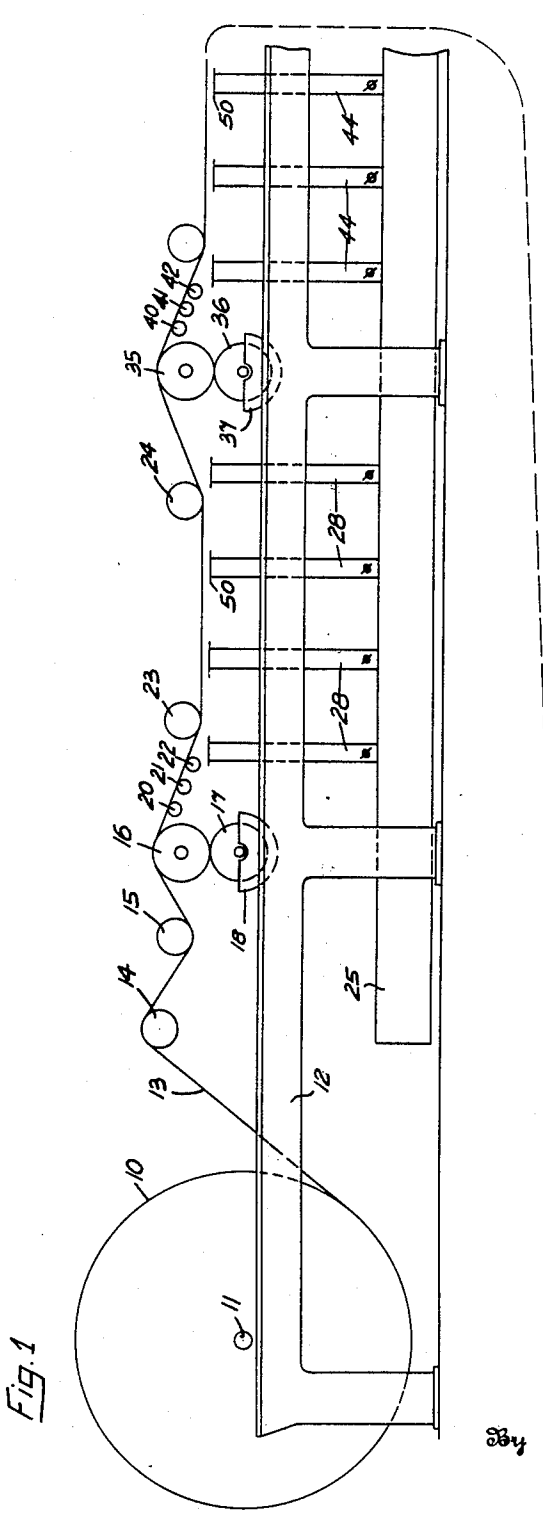

Fig. 1

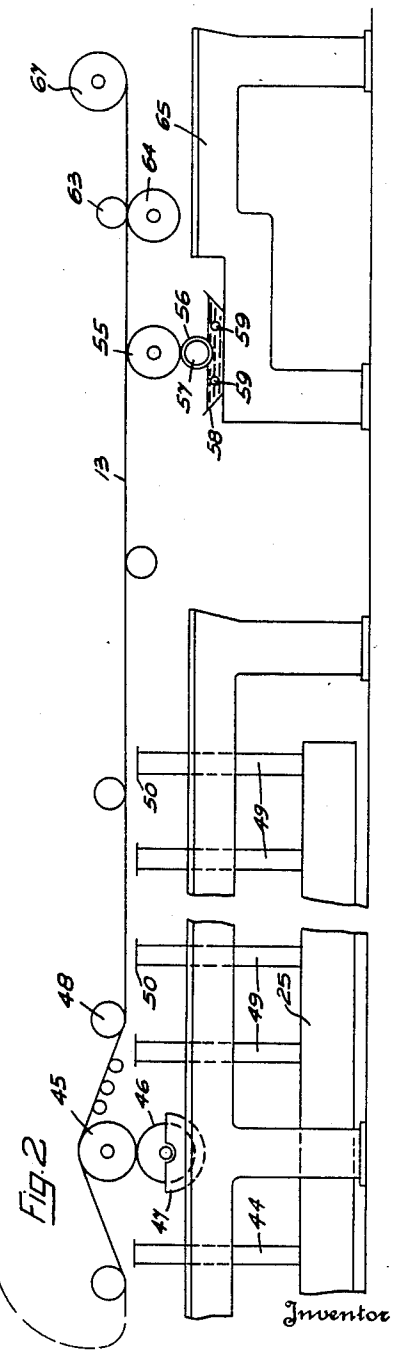

Fig. 2

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Examiner

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PAPER MANUFACTURE

Original Filed Aug. 30, 1929 2 Sheets-Sheet 2

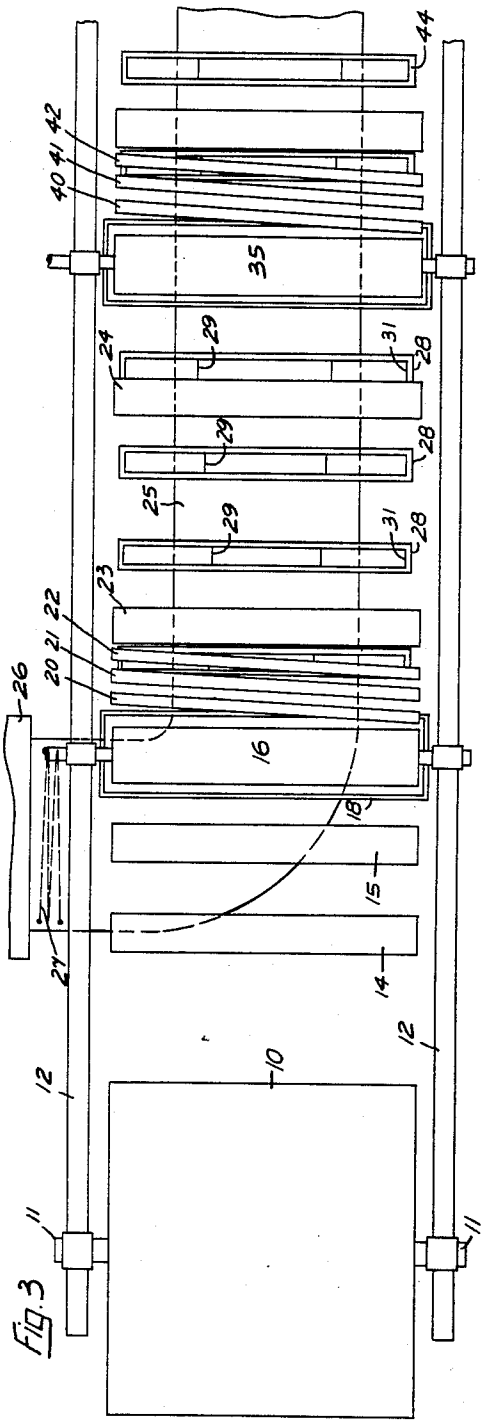

Fig. 3

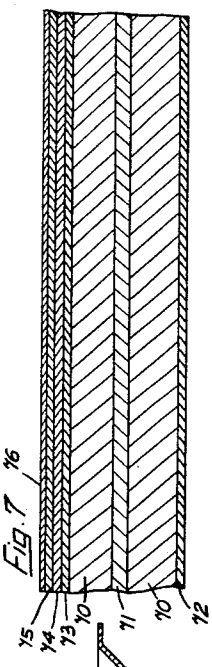

Fig. 7

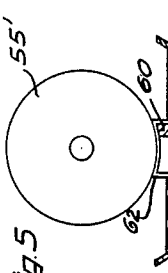

Fig. 5

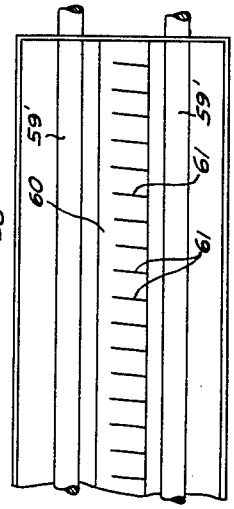

Fig. 6

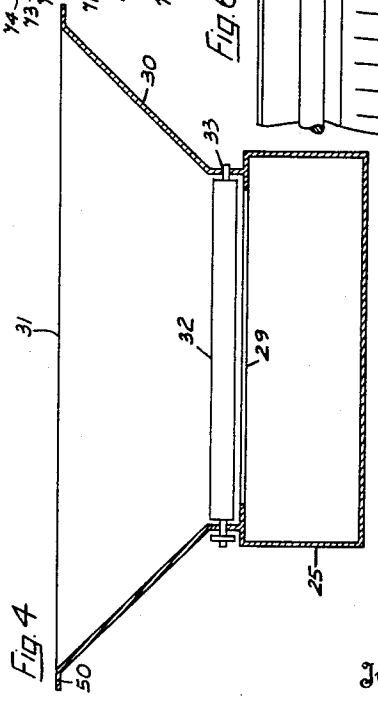

Fig. 4

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Patented Dec. 25, 1934

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UNITED STATES PATENT OFFICE

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PAPER MANUFACTURE

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Original application August 30, 1929, Serial No. 389,425. Divided and this application May 28, 1932, Serial No. 614,136. In Canada August 21, 1930

15 Claims. (Cl. 154—50)

This invention relates to the manufacture of paper, and particularly to the manufacture of board adapted for use in the making of containers and the like.

One of the principal objects of this invention is to provide a paper or board which is grease proof and moisture proof, is sufficiently flexible and elastic to permit bending, is substantially odorless and tasteless, stands up well in use and does not objectionably deteriorate upon standing for considerable intervals of time, and is commercially economical.

Another object of the invention is to provide a superior coating composition adapted for use in the manufacture of the above board product.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings, and appended claims.

This is a division of my copending application, Serial No. 389,425, filed August 30, 1929.

In the drawings in which like characters of reference designate like parts throughout the several views thereof,—

Fig. 1 is a partial diagrammatic side elevational view of apparatus constructed for carrying out the method of this invention;

Fig. 2 is a view similar to Fig. 1 disclosing another portion of the apparatus;

Fig. 3 is a plan view of the apparatus shown in Fig. 1, certain parts being broken away and in section to illustrate the construction thereof;

Fig. 4 is a vertical sectional view taken on the plane of the line 4—4 of Fig. 2;

Fig. 5 is a vertical sectional view of a modified form of apparatus for applying the final wax coating;

Fig. 6 is a plan view of the apparatus of Fig. 5 with the coating roll removed; and

Fig. 7 is a vertical sectional view on an enlarged scale through a piece of container board made in accordance with this invention.

This invention is particularly applicable to the rendering of paper or board, such as container board, impervious to grease so that containers made therefrom may be used for packaging greasy or oily substances which would otherwise penetrate through the package. When such a product is used for packaging foodstuffs, such as peanut butter or the like, it is particularly desirable that the surface of the container board be substantially tasteless and odorless. The coating should be of such character as to form an impervious layer on the surface of the board without pin holes which destroy the effectiveness of the coating, and it should be sufficiently flexible and elastic to permit bending of the board, such as is necessary in the formation of the box or container, without cracking. The coating should also be of a durable nature and one that will stand up well in use and will not objectionably deteriorate upon standing for considerable intervals of time. In accordance with the present invention, a coated paper product is formed which is unusually efficacious in satisfying the above requirements.

Referring to the drawings which disclose a preferred embodiment of apparatus constructed in accordance with this invention, a roll of paper to be coated is indicated at 10 carried by a suitable reel which is journalled at 11 upon a framework 12. The paper to be coated passes in a travelling web indicated at 13 over suitable guide rolls 14 and 15 and thence into contact with the upper surface of roll 16 of a coating press. This press comprises also a lower roll 17 dipping within a trough 18 to which the coating solution is supplied in any suitable manner. Rolls 16 and 17 are positively driven and are mounted in adjustable bearings so that they can be vertically adjusted relatively to each other to regulate the pressure at the nip of the rolls as desired. In operation, rotation of lower roll 17 within the coating solution serves to pick up a film of the coating material upon the surface of the roll. A portion of this film is transferred to the surface of the upper roll 16, the amount or thickness of the film being regulated by adjusting the pressure of contact of the rolls 16 and 17, and this film is then transferred to the travelling web 13.

The grease proofing coating composition applied at this point comprises essentially rubber latex and casein. The rubber latex is a relatively concentrated water solution of the pure sap of the rubber tree in colloidal state. The addition of an oil insoluble adhesive, such as casein, to the rubber latex imparts superior characteristics of adhesiveness and grease proofness. Rubber latex has qualities of elasticity and spreading ability and enables a relatively thin coating to be used with satisfactory covering power; it also functions very satisfactorily to lay any fuzz which may be protruding from the surface of the paper and covers up irregularities of the surface. It is also a good moisture proofing and water proofing agent.

Casein provides a very satisfactory oil insoluble adhesive, and when properly prepared mixes satisfactorily with the rubber latex. Other oil insoluble adhesives, such as alkali metal silicates, various animal or fish glues, or gelatine, may be used for this purpose. An alkaline compound, such as sodium carbonate, ammonia, sodium hydroxide, etc., is preferably added to preserve the alkalinity of the coating, this being found to assist in preventing deterioration of the coating on standing with increase in the effective life of the coating.

A preservative, such as formaldehyde, paraformaldehyde or borax, is preferably added to

the coating. This is found to preserve the coating from bacterial action and to act as a reducing agent to prevent objectionable oxidation or other deterioration of the coating. It also improves the quality of the coating, a very durable and resistant tough coating being produced, which is more grease proof and more water insoluble. A formaldehyde such as paraformaldehyde, which is a solid at ordinary temperatures and can be conveniently handled, is found to be highly satisfactory for this purpose, and remains stable in the coating after drying, also adding water proof qualities thereto. The addition of a polysulphide, such as sodium or ammonium polysulphide, to this coating is found to prevent deterioration and the formation of pin holes in the coating. The polysulphide may be conveniently prepared by first generating a relatively concentrated water solution of sodium or ammonium sulphide, and then adding a quantity of sulphur to the solution and dissolving the same therein. For example, the addition of about 50 to 75 grams of sulphur to the liter of a relatively concentrated solution of ammonium sulphide gives a very satisfactory polysulphide for this purpose.

In the preparation of the coating composition, where casein is used, a solution is first prepared by adding commercial powdered casein to water in the proportion of about one pound to the gallon. This mixture is allowed to soak for a period of time such as about an hour, with the addition of a quantity of an alkaline compound such as ammonia, sodium carbonate, sodium hydroxide, trisodium phosphate, or the like. For example, about one pint of ammonia added to ten gallons of the casein solution gives very satisfactory results. The addition of the alkaline compound facilitates solution, and the solution may also be heated somewhat to assist in the dissolving action. To this solution is added a preservative, such as paraformaldehyde, which assists in preventing thickening or coagulation of the casein solution, when these substances are properly prepared or mixed.

The paraformaldehyde is first made up into solution in a considerable quantity of water. Thus satisfactory results have been secured where the paraformaldehyde has been added to ten times its own weight of water, or even in higher dilution. Satisfactory proportions of the formaldehyde are from 2% to 25% on the dry weight of the casein used, about 10% on the weight of the casein being readily carried out in commercial operation. When substantially more than 2% of the formaldehyde is used, the solution thereof is added in small amounts to the casein solution which is agitated or flowing freely in a stream, this serving to prevent undesirable thickening of the casein.

The rubber latex is added in emulsion form. Preferably a rather concentrated latex emulsion is used, very satisfactory results being secured with an emulsion containing 38% solids in water, and also containing a small amount, about 2%, of an alkali such as ammonia or sodium carbonate to preserve the alkalinity of the emulsion. To the rubber latex emulsion is added the polysulphide solution prepared as above described, satisfactory results being secured by the use of about 2% by weight of polysulphide on the total solids of the emulsion. The casein solution containing the formaldehyde is then added to the latex emulsion, preferably with agitation. Various proportions of these ingredients may be used, depending upon the particular product or use of the product desired. Satisfactory results have been secured with compositions containing from 15% to 90% by volume of latex, the balance being primarily an alkaline solution of casein containing formaldehyde. Where the coating is used for a lower or base coat, it is found preferable to provide in excess of 50% rubber latex by volume in order to give a base coating which has high flexibility and high covering power.

As an example of a very satisfactory coating composition for the base coat which is applied to the paper or board, the following is mentioned: Rubber latex emulsion containing about 38% solids and in addition about 2% by weight of an alkali metal polysulphide and 2% by weight of an alkaline compound such as ammonia, is mixed with a casein solution containing about one pound of casein to the gallon of water, and also containing about 10% of paraformaldehyde on the dry weight of the casein, in the proportions of about 60% or more by volume of rubber latex and 40% or less by volume of casein solution to form the liquid coating composition.

The web 13 with the coating applied to the under surface thereof at the coating press 16—17 then passes with the coated surface in contact with smoothing and spreading rolls indicated at 20, 21 and 22 respectively. These rolls are positioned adjacent the coating press so as to contact with the coating just shortly after its application. Satisfactory results are secured where the first smoothing roll is positioned an effective distance of about six inches from the contact of the paper with the coating roll, the remaining smoothing rolls following in close succession, being spaced about six inches apart. A smoothing roll made of cold rolled steel having a diameter of about three inches is satisfactory. These rolls are positively driven, preferably against the direction of movement of the paper. Using a paper speed of about 50 to 150 feet per minute, good results have been secured where the rolls are driven against the direction of the movement of the paper at a surface speed of about 80 feet per minute. As shown clearly in Fig. 3, the smoothing and spreading rolls are arranged obliquely across the machine with reference to the travelling web of paper. This is found to minimize any tendency toward streaking of the relatively sticky coating, and to facilitate the smoothing and spreading of the coating.

The coated sheet then passes with the uncoated surface in contact with guide rolls indicated at 23 and 24. To facilitate the rapid drying of the coated web, drying blasts such as hot air blasts are supplied to the coated surface of the web. As shown a conduit 25 extends longitudinally beneath the coating machine, this conduit being supplied with drying fluid, such as air, by a pump indicated diagrammatically at 26, the pump forcing air under pressure across suitable heating coils 27. Adjacent the smoothing and spreading rolls are upstanding ducts 28, which serve to direct blasts of the heated air against the traveling web so as to dry the coating sufficiently to permit another coating to be applied with only a short travel of the web. These ducts discharge the heated air against the web opposite the supporting guide rolls 23 and 24, this arrangement serving to permit the proper tensioning of the web and serving to support and hold the web adjacent the discharge of the ducts to secure more satisfactory drying while minimizing danger of breakage.

Each of the ducts 28 is constructed as shown more particularly in Fig. 4. The conduit 25 is provided with a rectangular opening 29 over which is mounted a respective duct, the end walls of which diverge as indicated at 30 so that an upper outlet opening 31 is provided which extends across the full width of the web. The openings 29 in the respective ducts progressively increase in cross section from the duct closest to the pump and thence throughout the series to the end of the conduit to thereby equalize the distribution of air discharged from the respective ducts. Each duct is also provided with a throttle valve 32 journalled at 33 in the end walls of the duct. Each valve 32 may be separately controlled by a suitable lever 34, or the levers may be interconnected by suitable linkage for simultaneous actuation.

In accordance with the present invention, a composite greaseproofing coating is provided on the surface of the paper or board, which composite coating is made up of upper and lower coats having different characteristics and which are found to combine to give a superior resultant coating. The web 13 with the base coating treated as above described, then passes with the coated surface in contact with the upper surface of rotatable roll 35 of a second coating press. This coating press is constructed similarly to the first coating press, and has a lower rotatable roll 36 dipping within a trough 37 containing the coating material, whereby a film of coating of the desired thickness is transferred from the lower roll to the upper roll and thence to the previously coated surface of the travelling web 13.

The upper layer of the composite greaseproofing coating at this point comprises essentially a mixture of an oil insoluble adhesive such as casein, a polyhydric alcohol such as glycerine, and a preservative such as paraformaldehyde. The casein has high greaseproofing qualities, and also assists in securely binding the coating to the sheet. The addition of glycerine to the casein imparts characteristics of resiliency to the upper coating, and tends to prevent cracking thereof when the board is bent in the formation of the container, also improving the spreading and covering power of this top coating. Other polyhydric alcohols, for example glycols such as ethylene glycol, can be used with satisfactory results in substantially the same manner as glycerine. Other oil insoluble adhesives such as alkali metal silicates, glues or gelatine, can be used in place of casein.

In the preparation of the coating composition for this top coating the casein is made up into a solution in the manner and in the proportions as described above for the base coating, a preservative such as paraformaldehyde being added to the casein solution in the manner previously described. Glycerine is then added to the casein solution, satisfactory results being secured by using a weight of glycerine equivalent to about one-half to one and one-half times the dry weight of casein. As an example of a very satisfactory coating composition for the top coating the following is mentioned: Casein solution containing about one pound of casein to the gallon of water and also containing about 10% of paraformaldehyde by weight of dry casein and about 2% by weight of alkaline compound such as sodium carbonate is mixed with glycerine in the proportions of about an equal weight of glycerine to the weight of casein used in the solution.

The composite greaseproofing coating thus produced has superior characteristics to a coating formed by merely a plurality of coats of a particular composition. The first or base coat provides a permanent non-deteriorating coating next to the sheet which acts as a protective coating to prevent the upper coat from sinking into the sheet. The base coat has unusual flexibility which is quite important in container board which is subjected to severe bending in the manufacture of the ultimate containers. This coating, forming a flexible background for the overcoat, serves to prevent cracking of the overcoat upon bending of the board. A high percentage of a rubber compound, such as rubber latex, in the base coat acts as a water proofing and moisture proofing agent; and the spreading or covering power of this material, which is improved by the formaldehyde, together with its flexibility enables a substantially impervious coating to be formed with only a relatively thin film. This is materially assisted by the fuzz laying qualities of the base coating. The relatively high percentage of casein gives an overcoat having high greaseproofing qualities, and this greaseproofing layer is properly held upon the surface by the base coat. A coating having a backing of high flexibility with a surface of high greaseproofness is thus produced.

The web with the top coating applied thereto then passes with the coated surface in contact with smoothing and spreading rolls indicated at 40, 41 and 42, these rolls being similar in operation and construction to rolls 20, 21, and 22. Additional drying ducts 44 branching off of the conduit 25 supply heated air to the coated surface of the web adjacent the spreading rolls 40, 41 and 42 and assist in drying the coating. As many coats as desired may be applied to the travelling web 13. Thus as shown, a third coating press comprising an upper roll 45 and a lower roll 46 dipping within a trough 47 is provided. If it is desired to apply only two greaseproof coats as above described, coating solution is not supplied to the trough 47.

Where a coating material is used containing a substance such as casein, which is precipitated by the addition of a solution of certain metallic salts, such as salts of iron, aluminum, magnesium, copper and the like, it is found that the coated product may be further improved by passing the sheet with the coated surface into contact with a solution of such a metallic salt to precipitate or otherwise fix the coating. This gives superior water proofing qualities to the sheet. Thus very satisfactory results may be secured by supplying a water solution of a metallic salt, such for example as aluminum sulfate to the trough 47, a thin film of this solution being transferred by the rolls 46 and 45 to the coated surface of the web to thereby fix the coating as above described. Where a final overlying coat of a water insoluble wax is used, this treatment is not generally necessary.

The web 13 after leaving the last coating press passes under guide roll 48 and then travels unsupported above the discharge ports of additional drying ducts 49 to subsequent treating apparatus. The pressure fluid ejected from the ducts 49 not only serves to dry the web during its travel, but also sustains it suitably spaced from the discharge ends of the ducts so that the coated side of the web does not contact with solid objects until it is substantially dried. The upper end

of each of the ducts is formed with a rim or flange 50 of smooth metal so as to provide a supporting surface for the web when the machine is shut down or the web is being threaded through the machine.

A thin overlying film of a water insoluble wax is preferably applied over the greaseproof coating in order to protect the coating from exposure and to provide a substantially odorless and tasteless outer surface. Very satisfactory results are secured with paraffin, beeswax, montan wax, or other well known water insoluble waxes. From the standpoint of economy and ease of application, paraffin is preferred for this purpose. The overlying wax coat not only protects the under greaseproof coat from deterioration, but also adds to the water proofness or moisture proofness of the coating, which is particularly advantageous in the packaging of deliquescent substances, such as crackers for example.

In accordance with the present invention, this top film is applied by capillary attraction to the web so that an extremely thin controlled film is produced with resultant economy in operation. The use of a very thin outer paraffin layer is moreover advantageous, in that it more readily permits the greaseproof board to be glued such as is done by a gluing machine in gluing the flaps for the formation of the final box. As shown, a capillary coating press is provided beyond the driers for applying this top wax coat.

This coating press comprises a positively driven rotary steam heated roll 55 mounted to rotate in contact with a foraminous or felt covering 56 carried by a stationary supporting member shown as a cylindrical tube 57. Tube 57 is mounted within a trough 58 so that the outer felt covering dips within coating material supplied to the trough. Steam coils 59 within the trough serve to maintain paraffin, or other water insoluble wax supplied thereto, in molten condition. This wax feeds by capillary attraction through the foraminous covering to the surface of the coating roll 55, which in turn transfers a very thin film to the coated surface of the web which is brought in contact with the upper surface of this coating roll. The coating roll 55 is heated, such as in the manner of a steam heated drying drum or calender roll, so that the thin film of molten paraffin supplied thereto is maintained in proper molten condition until transferred to the coated web.

A modified form of wax applying press is shown in Fig. 5 in which the steam heated coating roll is indicated at 55'. This roll is mounted to rotate in contact with the curved upper surface of a wood block 60 mounted within a coating trough 58' containing heating coils 59'. The block 60 is provided with a plurality of thin transverse saw cuts or slits 61 through which coating material may be transferred by capillary attraction to the surface of the coating roll. If desired a foraminous or felt covering 62 may be positioned over the wood block, the ends of the covering extending down into the coating liquid.

The sheet then passes from the final coating press through pressure rolls 63 and 64 carried in vertically adjustable bearings by the frame 65. These rolls are preferably constructed in the manner of calender rolls and are steam heated. A high degree of pressure is used at these rolls and the pressure together with the heat serves to render the top wax coat fluid and spread it uniformly over the surface of the paper. The pressure rolls 63—64 also serve as driving means for drawing the paper through the machine. The coated paper then passes to a reel 67, or may be passed to suitable cutters and cut into sheets of desired size for the manufacture of containers.

If desired the paper or board previous to the coating as above described, may be first subjected to a sizing treatment. Thus the board, or the layer of the board forming the outer surface which receives the coating, may be a "hard sized" sheet, or one which has been made up from paper stock to which a sufficient quantity of size, such as rosin or paraffin size, has been added as to materially retard the rate in which water or ink penetrates into the sheet. Very satisfactory results are secured by forming a sheet from paper stock to which rosin size has been added at the beaters in the proportion of eighty to one hundred pounds or more of size to twelve hundred pounds of pulp. A sheet which will stand up for approximately five minutes or over in the water drop test, which means that water will not penetrate the sheet in that time, is quite satisfactory. Or the sheet may be given a surface sizing by an application of a size to the surface of the formed web, using suitable conventional sizing materials such as above specified. The surface sizing may be applied during the formation of the sheet prior to the application of the grease proofing coating. The sized paper is then supplied in roll form as indicated at 10 to the coating machine and the greaseproofing coating is applied to the sized sheet.

Referring to Fig. 7, a section through a prefered sheet or board is disclosed, which is found to be highly effective for use in containers for the packaging of greasy materials, and which protects the materials from water and damp atmospheric conditions. The sheet comprises inner layers of ordinary board stock 70, with an intermediate layer 71 of asphalt material such as an emulsion of asphalt and clay. The outer surfaces of the board are formed of good grade liner stock, providing a bottom liner 72 and a top liner 73. The top liner 73 which is adapted to form the interior of the container and to receive the greasproofing coating may be a hard sized sheet.

This board as above described may be formed on a conventional cylinder mold machine having a number of molds to form the various layers or plies of the sheet, these plies being brought together and united in the ordinary manner. Thus a conveying felt of the forming machine passes first across a cylinder mold containing the bottom liner stock and forms a web, and then passes successively across cylinder molds provided with board stock, asphalt emulsion, board stock, and finally top liner stock to form the complete built-up sheet of container board. The board as thus formed is then passed to the coating machine where the composite greaseproofing coating is applied, there being a lower or base coat of high flexibility indicated at 74 and an upper or overcoat of high greaseproofing quality indicated at 75. A final overlying water insoluble wax coat 76 is then applied over the greaseproofing coating. A container formed from this sheet is protected from water and moisture tending to penetrate from the outside into the interior of the container by the intermediate asphalt layer and by the base coat 74, and is made effectively greaseproof, water proof and moisture proof on the interior by the coating applied to the interior surface of the container.

While the forms of invention disclosed herein

constitute preferred embodiments hereof, it is to be understood that the invention is not limited to these precise forms, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. A highly moisture proof and grease proof container board adapted for the packaging of greasy materials, comprising a multiply sheet having an interior moisture proofing layer, one surface of said multiply sheet having a composite grease proofing and moisture proofing coating including a plurality of overlying coatings of different characteristics, the top coating containing an oil insoluble adhesive precipitated in situ to fix the coating.

2. A highly moisture proof and grease proof container board adapted for the packaging of greasy materials, comprising a multiply sheet having an interior asphaltic layer, one surface of said multiply sheet having a composite grease proofing and moisture proofing coating including a lower coating layer having high flexibility and an upper coating layer of high grease proofing quality containing a substantial proportion of casein precipitated in situ to fix the coating.

3. A highly moisture proof and grease proof container board adapted for the packaging of greasy materials, comprising a multiply sheet having an interior moisture proofing layer, one surface of said multiply sheet having a composite grease proofing and moisture proofing coating including a lower coating of high flexibility containing essentially rubber latex, casein, and a formaldehyde, and an upper coating of high grease proofness containing essentially casein, a polyhydric alcohol, and a formaldehyde, the casein of the upper coating layer being precipitated in situ to fix the coating.

4. A highly moisture proof and grease proof container board adapted for the packaging of greasy materials, comprising a multiply sheet having an interior moisture proofing layer, one surface of said multiply sheet having a composite grease proofing and moisture proofing coating including a lower coating layer having high flexibility, an overlying coating layer having high greaseproofness, and a top coating layer having high moistureproofness.

5. A highly moisture proof and grease proof container board adapted for the packaging of greasy materials, comprising a multiply sheet having an interior asphaltic layer, one surface of said multiply sheet having a composite grease proofing and moisture proofing coating including a lower coating layer having high flexibility and an upper coating layer of high grease proofing quality.

6. A highly moisture proof and grease proof container board adapted for the packaging of greasy materials, comprising a multiply sheet having an interior moisture proofing layer, one surface of said multiply sheet having a composite grease proofing and moisture proofing coating including a lower layer containing rubber latex, and an upper layer containing an oil insoluble adhesive.

7. A highly moisture proof and grease proof container board adapted for the packaging of greasy materials, comprising a multiply sheet having an interior asphaltic layer, one surface of said multiply sheet having a composite grease proofing and moisture proofing coating including a lower layer containing rubber latex and an oil insoluble adhesive, and an upper layer including an oil insoluble adhesive and a polyhydric alcohol.

8. A paper product of the character described comprising a container board made up of a plurality of plies of paper with an intermediate asphalt layer, the surface of said board having a composite greaseproof coating, one of the layers thereof comprising rubber latex, and an overlying coat of a water insoluble wax.

9. A paper product of the character described comprising a container board made up of a plurality of plies of paper with an intermediate asphalt layer, the top liner of said container board which is adapted to form the interior of the container being hard-sized and having a greaseproofing coating of rubber latex and an oil insoluble adhesive, and an overlying coat of a water insoluble wax.

10. A laminated board product of the character described comprising a sheet made up of a plurality of plies of paper with an intermediate waterproofing and moistureproofing layer, said sheet having on one surface thereof a greaseproofing coating including a rubber compound and an overlying coating rendering the said surface substantially odorless and tasteless.

11. A laminated board product of the character described comprising a sheet made up of a plurality of plies of paper with an intermediate waterproofing and moistureproofing layer, said sheet having on one surface thereof a composite greaseproofing coating, one of the layers thereof including rubber latex and an oil insoluble adhesive.

12. A container board adapted for the packaging of greasy materials comprising a sheet made up of a plurality of plies of paper with an intermediate waterproofing and moistureproofing layer, the outer ply of the sheet which is adapted to form the interior of the container being a sized sheet and having a greaseproofing coating including a lower coating layer having high flexibility and an upper coating layer having high greaseproofness.

13. A laminated board product of the character described comprising a sheet made up of a plurality of plies of paper with an intermediate waterproofing and moistureproofing layer, said sheet having on one surface thereof a plurality of superposed greaseproofing and moistureproofing coatings, an under coat of said coatings containing rubber latex.

14. A laminated board product of the character described comprising a sheet made up of a plurality of plies of paper with an intermediate moistureproofing layer, the sheet having on one surface thereof a greaseproofing coating comprising a lower layer having high flexibility and an upper layer having high greaseproofness, said sheet and said greaseproofing coating thereon being flexible to maintain continuity of said greaseproofing coating against disruptive effects during use.

15. A paper product of the character described comprising a container board made up of a plurality of plies of paper with an intermediate asphalt layer, the surface of said board having a composite greaseproofing surface coating thereon comprising a lower layer having high flexibility and an upper layer having high greaseproofness, said board and composite layer thereon being flexible to withstand the effects of bending during use.

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