

How
Fine Paper
is Made



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How Fine Paper is Made



EIGHTH EDITION

American Writing Paper Co.
Incorporated
Makers of Eagle-A Papers
Holyoke, Massachusetts

A Brief History of Paper Making

THE art of papermaking ranks among the first of the industries contributing to the advancement of the human race. Paper is the only medium for preserving the records of history, government and commerce and is the most important factor in furthering knowledge, in promoting religion, education, literature and art. If our ancestors had been confined to the use of stones, leaves, prepared skins or even the Egyptian papyrus (from which our word "paper" was derived), the world would probably not yet have emerged from the Dark Ages. If the supply of paper were suddenly and entirely cut off, the whole civilized world would practically come to a standstill.

Paper is so small in bulk, light in weight and so easily portable that nothing has been found to replace it for convenience or utility.

The Chinese were the originators of the first papermaking processes. They used bamboo, silk and, subsequently, old linen and fish nets. The industry flourished in China, and it was not until the 11th century that papermaking made a foothold on the continent.

The early papermaking processes were very crude, but the basic principles are the same today. The modern improvements are chiefly of a

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HOLYOKE, MASSACHUSETTS

mechanical nature to simplify and shorten the various processes so that production could be increased.

In the early days the rags were washed by hand and then steeped in closed vessels for several days. This caused a fermentation or retting which softened the rags so that they could more easily be separated or de-fibered. This de-fibering was first done by means of a mortar and pestle, later by stamping rods which were raised and released by cams on a shaft turned by the power from a small stream. After the rags had been thoroughly washed and the fibers separated they were run onto a mold and the water allowed to drain off, leaving the felted mat of paper behind. This old process is very similar to the process still employed in the making of hand-made papers.

The invention of the Hollander or beating engine invented in 1770 replaced the stamping mill and is used today with only minor modifications.

Paper was made on molds in small sheets until 1800 when the paper machine was introduced and sheets of paper of very great width and of any length were made possible. The modern paper machine differs from the machine of the early twenties only in width, length and productive power.

Rags

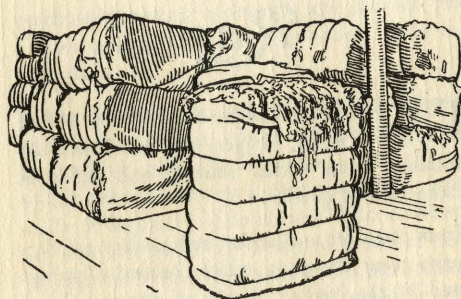
THE RAGS used in the manufacture of Rag Content Bond, Ledger, or Linen Papers are obtained from varied sources and differ in character and quality.

From the shirt and collar and underwear factories come the new, white, unused clippings used in the highest grades of papers. Other classes of textile factories yield their grades, and even the lowly household rags are graded by Rag Dealers, and eventually find their way to a paper mill.

Only Cotton or Linen Rags, however, are adaptable to, or utilized in, making the better grades of business paper.

One of the most interesting features of paper is that the materials from which it is manufactured are of little or no use for any other purpose. It is, therefore, obvious that the manufacture of rag content paper is the utilization and reclamation of materials which would otherwise be considered a waste product, and the development of them into one of the most needed and essential commodities of our present day life.

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The Rags ~

Rags are collected, graded, and sold to paper mills by Wholesale Rag Dealers. They arrive at the mill in bales of about 1,000 lbs. each, wrapped in burlap and bound with wire.

These are graded and range from new, white rags used in the highest grades of paper, — other grades and colored rags for intermediate grades of paper, — down to old, low grade rags for the cheaper rag content papers.

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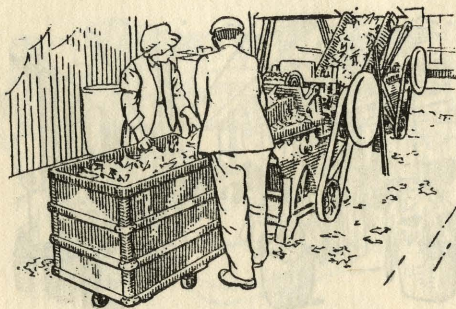


The Rag Room ~

After the bales are opened the rags are taken to the rag room.

Here, if the rags are an intermediate grade, they are hand sorted and all foreign substances such as rubber, buttons, metal, etc., are removed and sewed seams ripped. Here they are also carefully inspected and further graded for quality.

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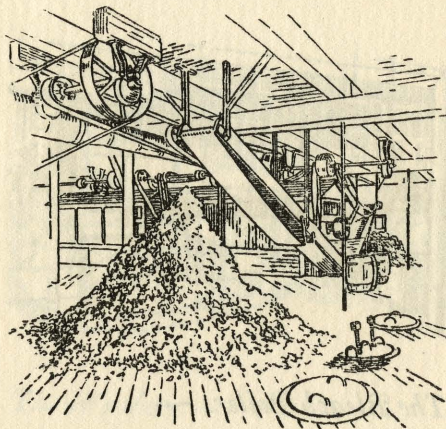


The Rag Cutter ~

From the Rag Room the sorted and inspected rags are taken to the Cutter where they are reduced to pieces of fairly uniform size by the action of rotary knives which operate on the same principle as a feed cutter.

From the Cutter they are carried on a canvas belt to the Duster.

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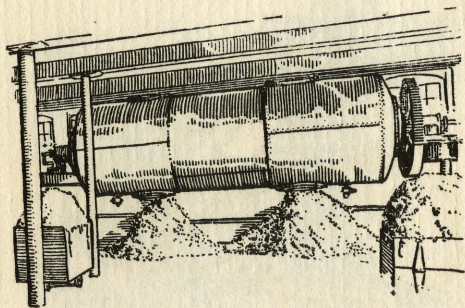


The Rag Duster ~

The Dusters located in the small house in the background consist of revolving wire covered drums which are equipped inside with blades which agitate and stir up the rags.

The mesh of the wire is such that dirt falls through, while the rags are retained. The lint that is sifted out in this manner is sold to be used for roofing materials.

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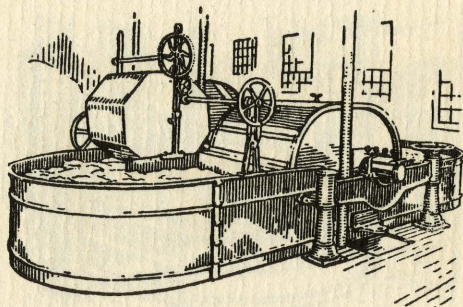
The Bleach Boilers ~

After being dusted, the rags are put into large revolving boilers of about five-ton capacity.

Here they are boiled under steam pressure with a solution of alkali. This cooking removes all dirt, grease, color, filler or other impurities, and renders the rags more suitable for washing and bleaching.

This illustration shows the Boiler being emptied of rags.

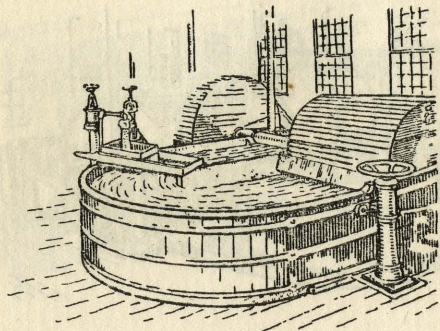
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The Washers ~

The rags next go to the washer where they are washed with filtered water, added at one end and discharged at the other. The action of a roll of blunt bars brushing against similar bars at the bottom of the washer shreds out and loosens the fibers without cutting or injuring them.

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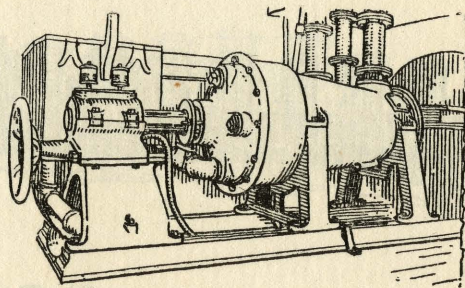


The Beater ~

In the Beater the stock, or rags, is reduced to a form suitable for the paper machine. Here, by means of a heavy roll with blunt bars or knives, rotating against similar bars at the bottom of the machine, the cotton fibres (rags) are further frayed or teased apart and mechanically hydrated.

Upon the length of time and the treatment of the fibers in this operation depends the character and quality of the paper made. Here, too, the Beater sizing and color are added.

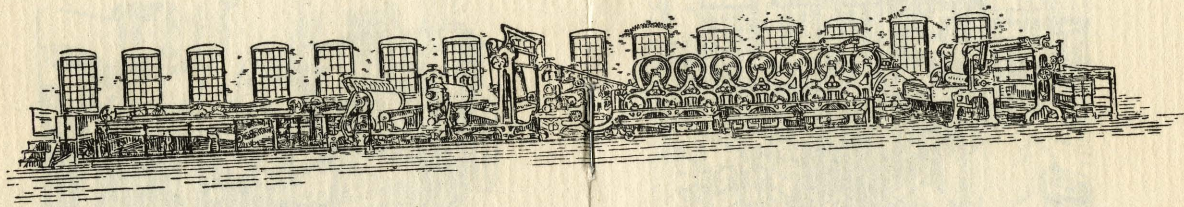
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The Jordan or Refining Engine ~

The Jordan is a refining engine and supplements the work of the Beaters. The large cone-shaped shell is lined with steel or bronze bars set lengthwise. A conical plug of similar bars fits into this shell and rotates at high speed.

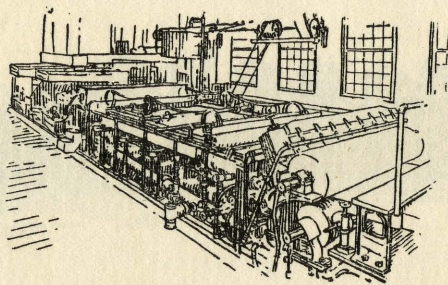
The stock is pumped through the Jordan which cuts it to a uniform size for the paper machine.



The Paper Machine ~

From the Jordan Engine the diluted stock goes to the Paper Machine. Here it first passes through screens of bronze plates with narrow slots which permit the passing of the fibers, but not of dirt or any foreign substances. Paper Machines vary in width and length from the 20 3/4 inch super-dreadnought

type of machine used in the manufacture of Newsprint, running at a high rate of speed and producing approximately 120 tons daily,—to the 80 inch width machine which is the average in mills making High Grade Papers, and which produces from 3 to 6 tons a day according to the grade manufactured.

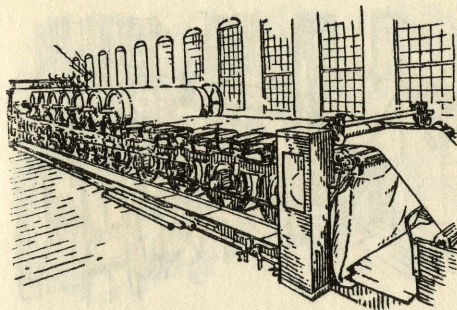


*Another View of the
Paper Machine ~*

This is known as the wet end

From the screens the stock flows onto the travelling wire where the paper is formed by the removal of the water. Rubber deckle straps on the edge of the machine prevent the stock from overflowing.

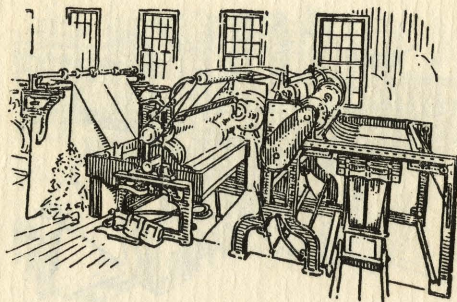
At this stage the paper is Watermarked, a name or design being impressed into its texture by the Dandy Roll.



*Another View
of the Paper Machine ~*

This is known as the dry end

When enough water has been removed from the paper by drainage and pressure so that it will hold its own weight, it passes from the wire onto the Drying Drums or Cylinders. These are heated with steam and serve to remove more water and moisture and to compact the sheet.



Sizing and Layboy —

On leaving the drying rolls the paper is cut into strips of standard width and submerged in a bath of animal size or glue to increase the strength of the paper and to give the surface the necessary non-absorbent qualities for ink and typewriting.

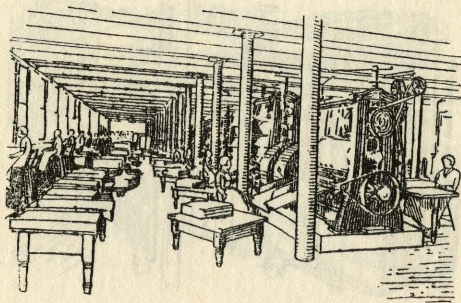
From the Size Tub, the paper then passes between warm rolls, thru cutters, and is stacked up in sheet form by the 'layboy.'



Loft Drying —

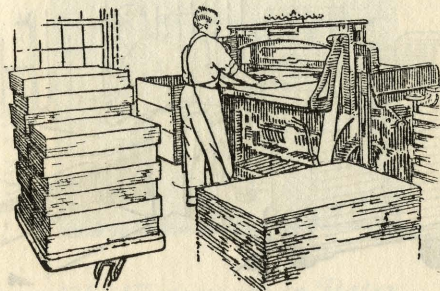
From the 'layboy' the paper is carried to the Loft for drying. Here it is hung on poles and left for several days to dry—to contract or expand under natural conditions.

No method of drying has been found which equals Pole Loft Drying for producing or preserving inherent qualities and characteristics in Rag Content Paper.



Calendering and Inspecting ~

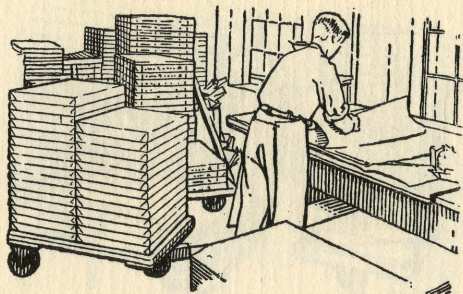
The paper comes rough-dry from the Loft and must be ironed smooth and given a final finish. This is done by passing it between heavy iron rollers. It is then hand sorted and any imperfect sheets are thrown out.



Trimming ~

The paper passes from the sorters to the counters, where the sheets are counted by hand. It then goes to the cutters to be trimmed to uniform sizes.

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Sealing ~

After being trimmed the paper is wrapped and sealed in packages of 500 sheets and is labeled. It is now ready to be cased and shipped.

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The Watermark in Paper

To read the watermark in a sheet of paper hold it to the light.

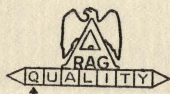
A genuine watermark is a word or design, or a combination of both, usually of an outline character, impressed into the fibers while the paper is being formed on the paper making machine. A real watermark might be called an internal mark, in that it is an actual part of the paper and is not discernable on, nor does it mar, the surface of the paper. All rag content papers have this character of watermark.

There is another method of watermarking, so called, which is a *surface* mark impressed on the paper after it is formed, similar to the embossing of paper. This surface mark is used most generally on all wood (sulphite) papers.

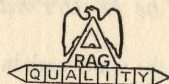
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Fac-simile water-marks which

Rag-content Eagle-A Bonds are
water-marked RAG QUALITY.



COUPON BOND



AGAWAM BOND



PERSIAN BOND



CONTRACT BOND



AIRPOST BOND

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identify the Nine Eagle-A Bonds

The position of the arrow, under the word
QUALITY, indicates the relative grade.



CHEVRON BOND



ACCEPTANCE BOND

SULPHITE BONDS
are marked SULPHITE



NORMAN BOND



TELEPHONE BOND

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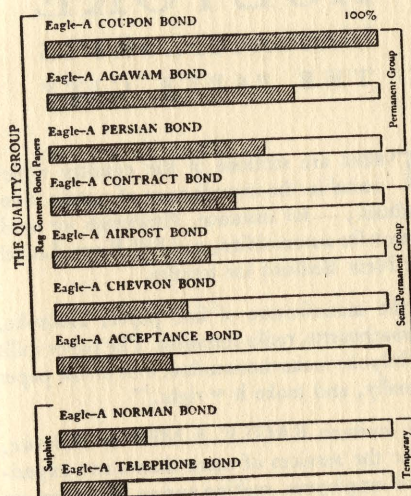
THE SPECIFICATION CHART OF BOND PAPER USES													
QUALITY FACTORS CONSIDERED		RAG CONTENT PAPERS										SULPHITE PAPERS	
Life Strength Appearance Printing Qualities		Coupon Bond	AGAWAM Bond	AGAWAM Bond	Contract Bond	Airpost Bond	Chevron Bond	Acceptance Bond	NORMAN Bond	Telephone Bond			
PERMANENT			SEMI-PERMANENT				TEMPORARY						
CONTRACTS		A-1	1	1	2	2	3	3					
LETTERHEADS		A-1	1	2	2	3	3	3					
INVOICES		A-1	1	2	2	3	3	3					
STATEMENTS		A-1	1	1	2	2	3	3					
DEEDS			1										
STOCK CERTIFICATES			1	2	3								
POLICIES			1	2	3								
MORTGAGES			1	2	3								
PURCHASE ORDERS			1	2	3								
ACKNOWLEDGMENTS			1	1	2	2	3	3					
DRAFTS				1	2	2	3	3					
NOTES				1	2	2	3	3					
RECEIPTS				1	2	2	3	3					
CHECKS					1	2	3	3					
FACTORY ORDERS					1	2	2	3					
REQUISITIONS					1	2	2	3	3				
STOCK REPORTS					1	2	2	3	3				
INVENTORY FORMS					1	1	2	2	3				
PRICE LISTS						1	1	2	2	3			
REFERENCE BOOKLETS							1	1	2	2	3		
INTER-DEPT. LETTERS									1	2	3		
FILE COPIES										1	2	3	
RECEIVING REPORTS										1	2	3	
TIME SLIPS											1	2	3
MEMO SLIPS												1	2

A-1 = Extra First Choice-1-2-3-1st, 2nd, 3rd Choice

A-1 = Extra First Choice—1-2-3—1st, 2nd, 3rd Choice

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THE GRADE CHART OF BOND PAPERS



The Grade Chart indicates the relative price quality position of each of the Nine Eagle-A grades. These nine grades cover every bond paper need.

The Grade Chart supplements the Specification Chart, and will assist the buyer in determining whether a first, second or third choice should be made.

Eagle-A COUPON BOND is considered 100%. The other grades are all shown in price and quality relation to it — represented by the solid line. The white portion indicates the relative sacrifice in quality factors (Life, Strength, Appearance, Printing Qualities).

HOLYOKE
MASSACHUSETTS
THE PAPER CITY

THERE are sections of the country which excel in the manufacture of certain commodities; — for instance, Pittsburgh for steel, Detroit for automobiles; and Fall River, Lowell and New Bedford for textiles.

In the manufacture of fine paper, Holyoke, Massachusetts, ranks foremost. The paper mills of Holyoke make thousands of tons of fine paper annually, and make it "right."

The fourteen EAGLE-A Mills in Holyoke, utilize the services of more than 2200 experienced employees, making papers of the famous Eagle-A Quality, known the world over.

THE HOLLAND-AMERICAN
PAPER COMPANY

HOLYOKE MANUFACTURING CO. PAPER CO.

THE HOLYOKE MANUFACTURING CO. PAPER CO.
PAPER CO. HOLYOKE, MASS.
PAPER CO. HOLYOKE, MASS.
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THE HOLYOKE MANUFACTURING CO. PAPER CO.
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THE HOLYOKE MANUFACTURING CO. PAPER CO.
PAPER CO. HOLYOKE, MASS.
PAPER CO. HOLYOKE, MASS.
PAPER CO. HOLYOKE, MASS.

This text stock is
AMERICAN EGGSHELL TEXT
White, Laid, 25 x 38-120M

This stock is
EAGLE-A HERCULEAN COVER
Yellow, Antique, 20 x 26-130M