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Improvement in Glassware Presses.

In the construction of glassware presses it is desirable that the movement of the platen or presser toward the bed shall begin with a rapid, and terminate with a slow but powerful movement; and it is also desirable that this movement shall be effected by means which will operate with so little friction and side thrust that the press will work sensitively, or so that the operator can determine, by feeling, the resistance offered just when the pressing should be discontinued; if the pressing is continued beyond the proper point the mold is injured and the ware spoiled.

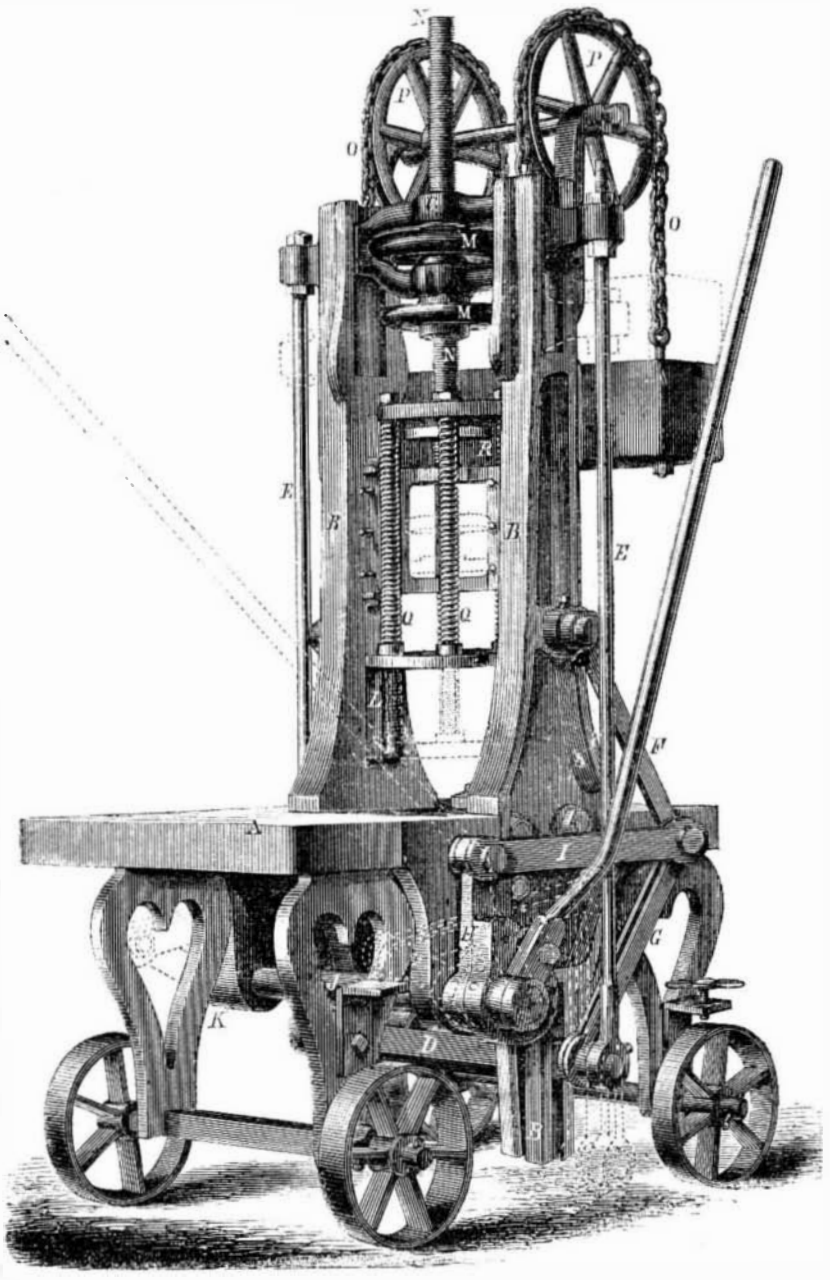
The press shown in the accompanying engraving has a peculiar combination of devices by which the moving parts of the machine operate to give the platen or presser a motion which changes from a rapid one at first to a slow but powerful movement at last, at the same time leaving the press delicate and sensitive in its indication, through the lever, of the resistance offered to a continued pressing movement.

In the engraving the parts are shown in the position which they occupy previous to making a stroke. The dotted lines show the position they occupy when the presser is brought to its lowest position in making an impression.

To the bed, A, are attached two uprights, B, in the top and bottom ends of which are formed guide ways, in which the ends of the crosshead, C, and crossbar, D, can be made to reciprocate simultaneously, being connected by the links, E. Toggles, made by links, F and G, on each side of the machine, are operated by the movement of the rocker lever, H, connected to the toggles by the links, I. Each link, F, of each toggle is pivoted to a fixed pivot in each upright, B; and the lower link, G, of each toggle is connected to the crossbar, D. The rocker lever, H, is fixed upon the rocker shaft, J, which carries, at the other end, a rocker lever, K, one of the links, I, being coupled to the rocker lever, H, the other to a rocker lever, K', said links being connected one to each toggle.

On the inner surfaces of the uprights, B, are guide ways, L, which guide the presser in its reciprocating motion, the presser being connected to the crosshead, C, by the screw hand wheels M, and screw, N, by which the platen can be adjusted toward and from the bed to suit various hights of molds. To counterbalance the gravitation of the moving parts, and thereby increase the sensitiveness of the press, chains, O, with a weight at one end, pass over the wheels, P, and are attached to the crosshead, C. It will be obvious that the first part of the movement of the lever toward the operator, will rapidly move the platen by straightening the toggles; and that the movement of the platen, proportionately to the movement of the lever, will grow less and less, and more and more powerful in effect as the toggles approach a straight line. The toggles thrust directly down upon the crossbar, which pulls through the links, E, in a direct line with the crosshead, C, thus avoiding all side thrust and strains on the crossheads and platen, so that the most delicate ware can be made on this press, as well as the heaviest. The friction, as in weighing apparatus, is reduced to a minimum by the system of pivots and centers. The springs for holding the mold in position, shown at Q, are of good length, four in number, and adjustable by the screw hand wheel, R.

This press was patented June 8, 1869. The presses are manufactured by the inventors and patentees, Messrs. Hawes & Hersey, well-known machinists and press builders, of South Boston, Mass., and arepronounced by those who have seen or used them, to be the best machine of the kind ever produced. For rights to build, or for presses, they can be addressed as above.

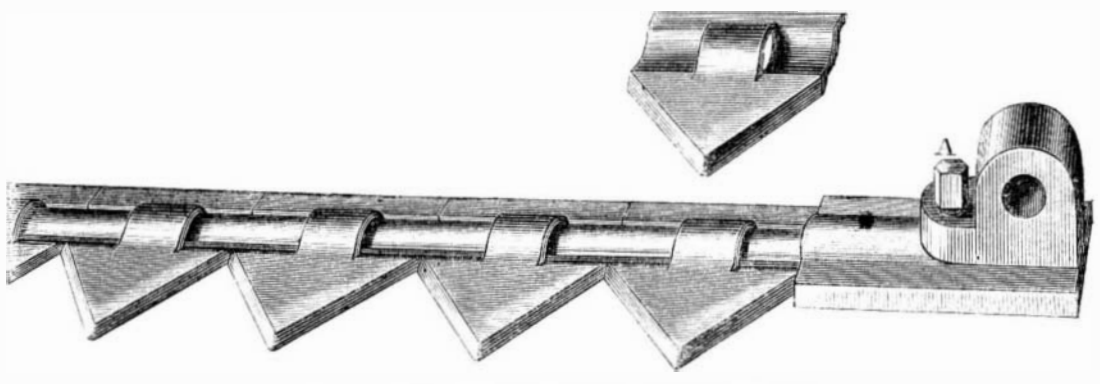


HAWES & HERSEY'S GLASSWARE PRESS.

Harvester Cutter Bar.

Our inventors are latterly turning out a series of unusually practical and valuable improvements. The one we now present to our readers, is a device that will save much time, trouble, and expense to farmers, and the convenience of which must be obvious upon even a cursory inspection. The cutter bar is made of the patent cold rolled iron of Jones and Laughlins, noticed at length on page 50, Vol. XX, SCIENTIFIC AMERICAN, and is made so that its cross section is of the form made by the intersection of two equal circles. It has not a rivet hole in its entire length—a fact which will be significant enough to farmers, when they recall the points of fracture in the finger bars they have broken in their practice.

Upon this bar are slipped the cutters, made in the form shown in detail at the upper part of the engraving. The terminal knife being fastened by a screw, shoulder, or any other suitable means, and the cutter bar being thrust in and held by the set screw, A, all are held firmly, yet any one can be reached and removed with the utmost facility, when occasion requires. Should a cutter bar break, all the knives can be removed, another bar inserted, and the knives replaced in five minutes. But as the shape of the bar and the absence of rivets give great strength with lightness, it is evident that not only will there be less liability to breakage, but the reciprocation of the bar will absorb less power than the old form of bar. The easy removal of the knives is also a great advantage in grinding, obviating any necessity for special appliances for this object. They can be perfectly and easily ground on the ordinary grindstone



ADJUSTABLE HARVESTER CUTTER BAR.

The inventor informs us that although his patent bears date June 8, 1869, he has already received orders for twenty thousand of these bars. Communications should be addressed to G. L. Du Laney Mechanicsburg, Pa.

CHINA AND THE CHINESE.

It is now conceded by shrewd observers of current events, that the Chinese element is destined to become in the future an important part of our population, and to exercise a great influence on the destiny of this continent. It is not therefore to be wondered at that the periodicals of the time should find the discussion of anything which pertains to this remarkable people acceptable to their readers. So little have China and Chinese customs been understood, that now when the public mind is awakened to the importance of better information in regard to that ancient empire, it is surprised at the very erroneous ideas it has hitherto entertained. This surprise arises not only from the differences between our customs and those of the Chinese, but also from the fact that the Chinese have made very much greater advances in civilization than has been generally supposed by other civilized nations.

Some of these facts have been put in a very acceptable dress by a writer in the *Atlantic Monthly*, for September, from which we extract a portion:

China is the type of permanence in the world. To say that it is older than any other existing nation, is saying very little. Herodotus, who has been called the Father of history, traveled in Egypt about 450 B. C. He studied its monuments, bearing the names of kings who were as distant from his time as he is from ours—monuments which even then belonged to a gray antiquity. But the kings who erected those monuments were posterior to the founders of the Chinese Empire. Porcelain vessels, with Chinese mottoes on them, have been found in those ancient tombs, in shape, material, and appearance precisely like those which are made in China to-day; and Roselini believes them to have been imported from China by kings cotemporary with Moses, or before him. This nation and its institutions have outlasted everything. The ancient Bactrian and Assyriankingdoms, the Persian monarchy, Greece and Rome, have all risen, flourished, and fallen—and China continues still the same. The dynasty has been occasionally changed; but the laws, customs, institutions, all that makes national life, have continued.

The authentic history of China commences some three thousand years before Christ, and a thousand years in this history is like a century in that of any other people. The oral language of China has continued the same that it is now for thirty centuries. The great wall bounding the Empire on the north, which is twelve hundred and forty miles long, and twenty feet high, with towers every few hundred yards—which crosses mountain ridges, descends into valleys, and is carried over rivers on arches—was built two hundred years before Christ, probably to repel those fierce tribes who, after ineffectual attempts to conquer China, traveled westward till they appeared on the borders of Europe five hundred years later, and, under the name of Huns, assisted in the downfall of the Roman Empire.

All China was intersected with canals at a period when none existed in Europe. The great canal, like the great wall, is unrivaled by any similar existing work. It is twice the length of the Erie Canal, is from two hundred to a thousand feet wide, and has enormous banks built of solid granite along a great part of its course. One of the important mechanical inventions of modern Europe is the Artesian well. That sunk at Grenoble was long supposed to be the deepest in the world, going down eighteen hundred feet. One at St. Louis in the United States, has since been drilled to a depth, as has recently been stated, of more than four thousand feet. But in China these wells are found in tens of thousands, sunk at very remote periods, to obtain salt water.

The method used used by the Chinese from immemorial time has recently been adopted instead of our own, as being

much more simple and economical. The Chinese have been long acquainted with the circulation of the blood; they inoculated for small pox in the tenth century; and about the same time they invented printing. Their bronze money was made as early as 1,100 B. C., and its form has not been changed since the beginning of the Christian era. The mariner's compass, gunpowder, and the art of printing were made known to Europe through stories told by missionaries returning from Asia. These missionaries, coasting the shores of the Celestial Empire in Chinese junks, saw a little box containing a magnetized needle, called Ting-nan-Tchen, or "needlewhich points to the south." They also noticed terrible machines used by the armies in China, called Ho-pao, or fire-guns, into which was put an inflammable powder, which produced a noise like thunder, and projected stones and pieces of iron with irresistible force.

The first aspect of China produces that impression on the mind which we call the grotesque. This is merely because the customs of this singular nation are so opposite to our own. They seem morally, no less than physically our antipodes. Their habits are as opposite to ours as the direction of their bodies. We stand feet to feet in everything. In boxing the compass they say "westnorth" instead of northwest," "east-south" instead of southeast, and their compass-needle points south instead of north. Their soldiers wear quilted petticoats, satin boots, and bead necklaces, carry umbrellas and ans, and go to a night attack with lanterns in their hands, being more afraid of the dark than of exposing themselves to the enemy. The people are very fond of fireworks, but prefer to have them in the daytime. Ladies ride in wheelbarrows, and cows are driven in carriages. While in Europe the feet are put in the stocks, in China the stocks are hung round the neck. In China the family name comes first, and the personal name afterward. Instead of saying Benjamin Franklin or Walter Scott, they would say Franklin Benjamin, Scott Walter. Thus the Chinese name of Confucius, Kung-fu-tsee, the Holy Master Kung; Kung is the family name.

In the recent wars with the English, the mandarins or soldiers would sometimes run away, and then commit suicide to avoid punishment. In getting on a horse, the Chinese mount on the right side. Their old men fly kites, while the little boys look on. The left hand is the seat of honor, and to keep on your hat is a sign of respect. Visiting cards are painted red, and are four feet long. In the opinion of the Chinese, the seat of the understanding is the stomach. They have villages which contain a million of inhabitants. Their boats are drawn by men, but their carriages are moved by sails. A married woman while young and pretty is a slave, but when she becomes old and withered is the most powerful, respected, and beloved person in the family. The emperor is regarded with the most profound reverence, but the empress mother is a greater person than he. When a man furnishes his house, instead of laying stress, as we do, on rosewood pianos and carved mahogany, his first ambition is for a handsome camphor-wood coffin, which he keeps in the best place in his room.

The interest of money is thirty-six per cent, which, to be sure, we also give in hard times to stave off a stoppage, while with them it is the legal rate.

We once heard a bad dinner described thus: "The meat was cold, the wine was hot, and everything was sour but the vinegar." This would not so much displease the Chinese, who carefully warm their wine, while we ice ours. They understand good living, however, very well, are great epicures, and somewhat gourmands, for, after dining on thirty dishes, they will sometimes eat a duck by way of a finish. They toss their meat into their mouths to a tune, every man keeping time with his chop-sticks, while we, on the contrary, make anything but harmony with the clatter of our knives and forks. A Chinaman will not drink a drop of milk, but he will devour bird's nest, snails, and the fins of sharks, with a great relish. Our mourning color is black, and theirs is white; they mourn for their parents three years, we a much shorter time. The principal room in their houses is called "the hall of ancestors," the pictures or tablets of whom, set up against the wall, are worshiped by them; we, on the other hand, are very apt to send our grandfather's portrait to the garret.

Such are a few of the external differences between their customs and ours. But the most essential peculiarity of the Chinese is the high value which they attribute to knowledge, and the distinctions and rewards which they bestow on scholarship. All the civil offices in the Empire are given as rewards of literary merit. The government, indeed, is called a complete despotism, and the emporer is said to have absolute authority. He is not bound by any written constitution indeed; but the public opinion of the land holds him, nevertheless, to a strict responsibility. He, no less than his people, is bound by a law higher than that of any private will—the authority of custom. In China, more than anywhere else, "what is gray with age becomes religion." The authority of the emperor is simply authority to govern according to the ancient usages of the country, and whenever these are persistently violated, a revolution takes places and the dynasty is changed. But a revolution in China changes nothing but the person of the monarch; the unwritten constitution of old usages remains in full force.

Setting Mineral Teeth.

Surgeon Duchesne, of Paris, has invented a method of fixing mineral teeth to the dental piece. Each tooth is furnished with a hollow of a size exceeding that of the orifice, by which orifice the rubber in its plastic state enters into the tooth, assuming inside the internal configuration, and, as it were, the shape of a nail-head of a pyramidal form, or of the form of a flattened cone, and the rubber being properly vulcanized, the tooth becomes firmly attached to the dental piece. The hole being obtained by placing on the rear side of the mold of the tooth, which is molded of materials well known to tooth manufacturers, the base of a piece of wood, or of any other suitable material, cut into the shape of a cone, and which can be consumed or melted at a lesser degree of heat than that required for the baking of the tooth; this piece of wood or other material being destroyed during the process of biscuiting, there remains in the center of the tooth a hollow, corresponding in size and shape with the material which has been burnt out. The principle of strength which is claimed for this tooth consists in the fact, that the rubber, a portion of the dental piece to which it is to be attached, entering into the tooth itself, the tooth actually forms part and parcel, so to speak, of the dental piece; and the principle of the invention consists in the hollow in the center of the tooth of a larger size than the orifice by which the rubber, or other plastic material is introduced, of whatever form this hollow may be, whether produced by the consuming, melting, or annihilating of any animal, vegetable, or mineral matter, that can be annihilated by a less heat than that required for the baking of the tooth.

THE MANUFACTURE OF PAPER---PAPER MADE FROM RAGS.

Rags are a marketable commodity, and command fixed prices according to their quality. As with all articles of commerce, these prices are governed in a measure by the mercantile law of supply and demand. As foreign rags are sold at a less price than the American article, and the consumption in the United States is considerably greater than the supply of the latter, large quantities are imported from Europe. The larger proportion of foreign rags that find their way to our Atlantic cities, are exported from Bremen, Hamburgh, Rostock, Ancona, Messina, Leghorn, Palermo, and Trieste. They arrive in our ports in closely packed bales, containing each about four hundred pounds, which, according to their respective qualities are branded S. P. F. F., S. P. F., F. F., F. X., and F. B. There are many varieties, even in these divisions, and their qualities afford very clear indications of the state of comfort and cleanliness of the particular localities from whence they were originally gathered. The rags of England and the United States are generally clean, and require but little washing and cleansing before they are ground into pulp; the Italian rags, on the contrary, are originally so dirty that they require to be washed in lime before they are fit for use. The greater portion of the rags from the north of Europe are so dark in their color and so coarse in their texture that one naturally wonders how they could have formed part of any tidy woman's garments; while those, on the other hand, which are collected in England, Scotland, and the United States, appear evidently to have belonged to a people much better clad. Having thus alluded to the material employed in paper making, the reader's attention will now be directed to the process of its manufacture. The visitor to a regularly organized paper mill is first conducted to

THE RAG ROOM.

The initial process of sorting the rags is conducted in a long room, in which from twenty to thirty women are employed in sorting, dusting, and cutting them. Each woman stands at a frame or table, the top of which is covered with a net-work of wire, through which to admit the dust; on her left is a quantity of rags conveniently placed, on her right is a box divided into three compartments. On a part of the table an upright knife is fixed for cutting the rags into suitable lengths. As it is the business of the woman to sort and cut the rags, she spreads a certain quantity on the wire frame, and as she shakes them a great deal of the dirt passes through the interstices of the wire into a box beneath. Those pieces that require to be cut she draws across the blade of the knife, by which it is instantly divided. All seams are thrown out, as the sewing thread, unless thoroughly ground, would produce filaments in the paper. These are afterwards picked out by children, and again find their way to the woman's table. The work of sorting and cutting rags is performed with great rapidity. When cut, sorted, and dusted, the rags are weighed into bags of a hundred pounds each and conveyed to

THE BOILING AND WASHING ROOM.

Here they are placed into large square chests or vats, in which steam is admitted from below and boiled with lime for a few hours. From the boiling room they are conducted in suitable vessels to an upper room in the mill, where they are emptied into troughs or cisterns, several of which are ranged in a row; these troughs and the machinery within them, are technically called engines, and are used for washing the rags. The troughs are usually ten feet long, four and a half feet broad, and two and a half feet deep, and are made of wood lined with lead. In each trough an iron cylinder 22½ inches in diameter and 26 inches wide is fitted; pure water is conveyed by means of a pipe or tube into the trough a few inches from the top, and another tube connects with the lower part for carrying off the soiled water. The cylinder being set in motion by means of steam or water power, about a hundred weight of rags are dumped in, as before mentioned, and as much water introduced as will raise the whole to within an inch or two of the brim. Into the cylinder is fixed a number of knives at given distances apart, projecting a little more than an inch from its axis; and beneath the roller is a plate in which is also attached a number of knives. When the cylinder commences its revolutions, of which it is made to make about 160 per minute, the rags are carried with great rapidity through the knives; and as the cylinder is depressed or elevated, the rags are bruised or cut as may be required. Above the cylinder is a cover made of a wire frame communicating with the pipe which admits the pure water. When, therefore, the whole mass is in agitation, the rags, after passing through the knives of the cylinder and plate are carried up an inclined plane in the trough and the foul water is carried off through the waste pipe below; in this way the rags are cut bruised, and washed.

After the above operation is continued for a sufficient time, the water is let off and the cleansed mass is removed to a press for the purpose of driving out the greater part of the water. They then undergo the process of

BLEACHING.

This process reduces all descriptions of rags to a uniform whiteness, and requires to be so conducted as not to injure the quality of the fabric. On being removed from the press the rags are placed in a receiver, or chamber made of wood, from which the external air is carefully excluded. Into this chamber are conveyed pipes communicating with a retort, in which a chemical chlorine is formed by the application of heat to a due proportion of manganese, common salt, and sulphuric acid. This part of the process is completed in a few hours. The rags are now white, but they have an intolerable smell. To remove this, and to preserve them from being injured through the effects of the bleaching, they undergo a second process of washing and bruising which entirely purifies them. From the washing engine the rags are conveyed to the beating engine, which is constructed similar to the other except that the knives on the cylinder and plate are closer together, and the former revolves with greater rapidity. Having been ground for several hours in this machine, the rags assume the beautiful appearance of pulp technically called "stuff." It should here be remarked that all paper manufacturers do not use the same materials for bleaching the rags. In several large paper mills a substitute for manganese is used. This is a mixture of phosphates of lime and soda ash which seems to answer the required purpose, and is much less expensive. The same may be said of the whole prescribed formulæ in paper making. So rapid are the strides of scientific progress, that ere a useful practical theory is put in full operation, new improvements are suggested, which, in many cases, are made to supersede it. Hence, no description of this extensive branch of art will fully represent every manufacturer's method. The essential features, however, of the processes employed in paper making, are similar in all paper mills.

As what is technically called "machine-made paper" is a comparatively late invention, it may properly be expected that this treatise should preface any remarks upon the subject with a brief description of

HAND MADE PAPER.

Until a little more than half a century since all descriptions of paper were made by hand. The process though simple is very beautiful, and evinces a remarkable degree of mechanical ingenuity. We have already described the various stages the rags have gone through up to the time they are reduced to a pulp. From this pulp or "stuff," which is about the consistency of pure milk, and resembling it in appearance, paper is made. The stuff is first poured into a vat, at the bottom of which is a copper vessel made to fit exactly within it, for the purpose of keeping the stuff warm. This warmth is communicated by means of heat supplied by a steam pipe from below. The workman forming the sheet, who is called a "vatman," is provided with two molds. These are slight frames of wood, covered with a fine wire cloth. Fitting to each mold is a dekle or movable raised edging which determines the size of the sheet. The vatman, putting the dekle on one of the molds, dips it vertically into the stuff, and bringing it to the surface horizontally, covered with pulp—which, to preserve an equal consistency is kept in a state of agitation in the vat—and shakes it gently so that all parts of the wire frame shall be equally covered with it. This operation requires a great deal of nicety, both in determining the required thickness of the sheet and in producing it of a uniform thickness throughout. The vatman then pushes the mold with the incipient sheet to his fellow workman, who is called a "coucher," and carefully taking off the dekle applies it to the second mold, and proceeds as before. The coucher, who receives the first mold, having a pile of porous pieces of flannel by his side (called "felt"), turns the mold carefully over upon one of these, and upon which the sheet remains, having been detached from the mold; he then places a felt on the sheet and is ready to turn over another from the second mold. Thus the vatman and the coucher proceed, only two persons being required at each vat, the one molding a sheet of paper and the other placing it upon the felt, until a certain quantity is made, when the pile of felts is subjected to the action of a powerful press. The sheets, after this pressure is completed, have acquired sufficient consistency to enable them to be again pressed by themselves. They are next parted, then dried; next sized in a mucilage, to give them greater body and strength, and again dried and pressed, and finally counted into quires and reams. Any number of vats, each requiring the services of two men, may be used at the same time. This is a matter, however, usually regulated by the capacity of the mill and the means of the manufacturer.

MACHINE MADE PAPER.

As previously intimated, the progress of mechanical science of late years, in paper making as in many other branches of art, has been so rapid in its onward march that manual labor is in a great measure superseded by machinery. In paper making, machinery is not only a saving of manual labor, but economizes time and money, and largely multiplies the facilities for its manufacture, as will be made plainly manifest to the most indifferent observer.

The process of converting a thin pulp into paper by machinery is a rapid though complicated operation. In the