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Improved Stave Machinery.

The annexed engravings are views of an improvement in stave machinery, for which a patent was granted to Jonathan E. Warner, of Boston, Mass., on the 15th of last November. Figure 1 is a perspective view, and figure 2 is a longitudinal section. The same letters refer to like parts.

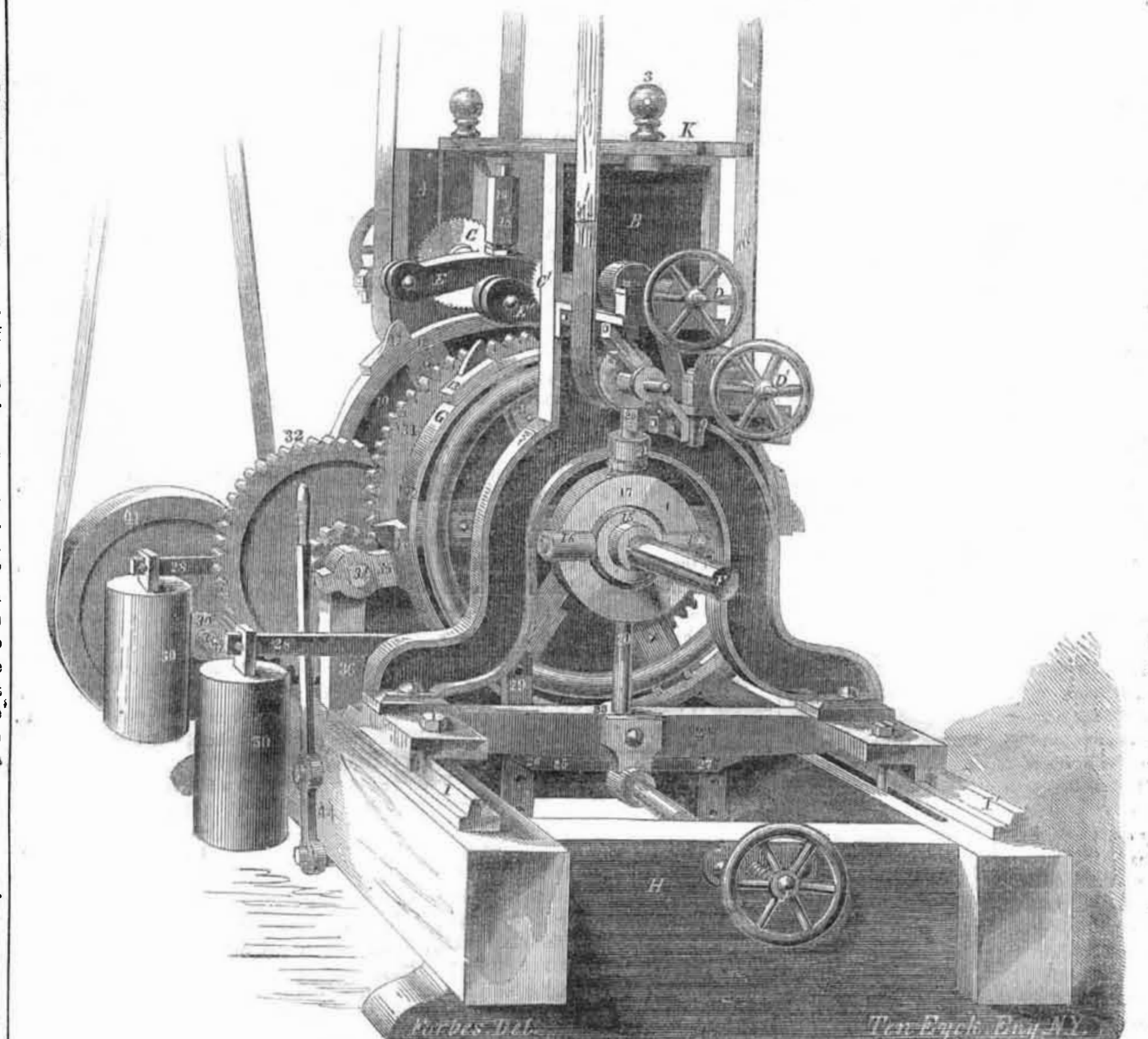
The object of this machine is to finish the two ends of a stave simultaneously, which includes four distinct operations, viz., cutting the proper length, bevelling the ends, "howelling," and "crozing." The combined operations are technically known as "working off." The nature of this invention consists, first, in the use of two circular saws to cut the staves to equal length. Secondly, in the use of two revolving cutter-heads, having in each three sets of movable and adjustable cutters, the first set for cutting the bevel on the ends of the stave; the second set for howelling, and the third set for crozing. Thirdly, in the use of a rotary bed, which, slowly revolving on its axis, carries the staves to the saws and cutters, and deposits them when finished on the opposite side of the machine. This bed is made to yield to the varying thicknesses of the staves, and by means of weights acting through systems of levers, the staves while being wrought are kept steadily in contact with fixed stops. The saws, cutter heads, and stops are supported in two uprightframes, the one being fixed and the other movable, upon the frame of the machine, by which means the staves can be cut to any required length.

A B represents two upright frames for supporting the arbors of the circular saws, C C', the cutter heads, D D', the stops, E E', and the axis, F, of the rotary bed, G. The frame, A, is firmly bolted to the bed, H, and the other, B, admits of moving laterally on the guides, I I', attached to the bed, H, by means of the screw, J, and secured at any distance from A, by the bolts, 1 1', which pass downwards through the slots 2 2', in bed H. The tops of the frames are steadied by the horizontal link, H, which is fast at A, and slotted to permit the bolt, 3, in the top of the frame, B, to move therein. By tightening the bolt, 3, the top of B is connected firmly to A. The circular saws, C and C', are of the ordinary kind, and are supported in the brackets, 4 4', which are bolted to the frames.

To the cutter heads, D D', are bolted the curved edge or howelling cutters, 5 and 5', the gauge cutters, 6 6', the crozing saws, 7 7', and the inclined cutters, 8 8, and 8' 8', which severally reduce the thickness of the stave at the ends, define the limits of and cut the groove for the heads and bevel the ends of the stave. These heads are attached to revolving arbors, and supported in brackets, 9 9', in the same manner as the saws, C C'.

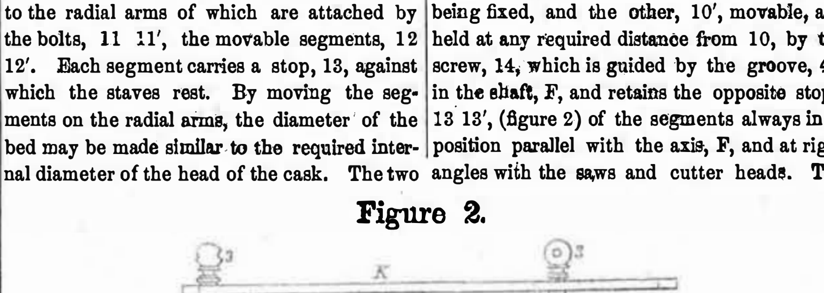
To obtain a simple, uniform, and constant feeding apparatus, and also to combine therewith the means of so carrying the staves that the form of the surface left by the revolving cutters in the heads, D D', should be similar to the required internal figure of the ends of the cask, there is the rotary yielding and expanding bed, G.

WARNER'S STAVE MACHINERY.---Fig. 1.



It consists of two similar wheels, 10 10', to the radial arms of which are attached by the bolts, 11 11', the movable segments, 12 12'. Each segment carries a stop, 13, against which the staves rest. By moving the segments on the radial arms, the diameter of the bed may be made similar to the required internal diameter of the head of the cask. The two wheels are placed upon a shaft, F, the one, 10, being fixed, and the other, 10', movable, and held at any required distance from 10, by the screw, 14, which is guided by the groove, 48, in the shaft, F, and retains the opposite stops, 13 13', (figure 2) of the segments always in a position parallel with the axis, F, and at right angles with the saws and cutter heads. The

Figure 2.



shaft, F, is supported and revolved in the bearings, 15 15', within the frames, A B. These bearings are of the kind known as swivel bearings, and vibrate on the screws, 16 16', within the rings, 17 17'. Above the rotary bed, and in a vertical line with the axis, F, are placed the spindles of the curved stops, E E', which can be set at any vertical distance from the path of the cutters in the heads, D D', which the required thicknesses of the stave demands, by means of the screws, 18 18', which pass through the shells of the sockets, 19 19'. These sockets are bolted to the frames, A B. The axis of the rotary bed has a yielding vertical movement, so that when a stave is carried by the revolving bed to the saws and cutters, in passing under the curved stops, E E', the axis lowers to suit the thickness of each end of the stave. To the opposite sides of the rings, 17 17', are fixed the spindles, 20 20', the upper ones, 20, pass through the eyes, 21 21', in the frames, A B, and have collars, 22 22', movable upon them to prevent the axis from being raised too high; the lower ends of the spindles, 20', slide through the eyes, 23 23', of the stretchers 24 24', and rest on the horizontal levers, 25 25'. 25 is one of a system of levers composed of movable fulcrums, 26 27, the fixed fulcrum, 27', the levers, 25 28, and the link, 29. To the levers, 28 28', are hung the weights, 30 30', by the gravity of which, acting through the system of levers, the axis of the rotary bed is raised until the collars, 22 22', strike the eye, 21 21', or the passing stave pressed against the curved stops, E E', prevents further vertical action.

The revolution of the bed is accomplished by a train of gearing, viz. :—31, on the shaft F, 32 33, on the shaft, 34, and kept in contact with the gear, 31, by the radius bars, 35 35', the end of the bars resting on the props, 36 36', fig. 2, and finally the pinion, 37, on the shaft 38. The shaft, 38, revolves in the bearings 39 40, and carries the loose pulley, 41. The pulley, 41, is thrown into connection with its shaft by pins on its face being brought in contact with similar pins or projections on the side of the circular plate, 42 (seen in dotted lines in figure 2), said pulley being moved laterally on the shaft, 38, in the usual manner by the fork, 43, embracing a groove in the hub of the pulley, the shipper bar, 44, and the lever, 45.

To bring the machine into action the circular saws are first set to the required length of the staves by moving the frame, B, on its bed; the curved stops, E E, are then set to position as described; the saws and cutters are made to revolve by a belt which passes under the carrier pulleys, 46 46′, over the pulleys on the saw arbor, and under the pulleys on the cutter head arbors, thence uniting with the other end over the main driving pulley; the loose pulley, 41, is then thrown into gear by the clutch arrangements, and a rotary motion being given to the bed, G, a stave laid upon the wheels, 10 10′, of the bed, G, parallel with its axis, F, will be carried by the stops, 13, under the stops, E E′, to the saws and cutters; the outer side of the stave being supported against the stops, E E′, by the action of the weights, 30 30′, upon the revolving feed bed, G, having passed from under the stops, E E′, the stave being unsupported, falls from the bed. Other staves are laid upon the bed as often as the several stops, 13 13′, &c., come around to the operator.

This machine has been in successful operation for the past two years, its duty averaging fifteen staves per minute for large work, and thirty for small work.

More information may be obtained by addressing, post-paid, Jonathan E. Warner, Boston, Mass.

Flax Industry.—No. 4.

The origin of the use of flax for textile and other purposes, is lost in the obscurity of antiquity. Its importance as affording the material from which one of our most valued articles of clothing is manufactured, was certainly known at a very early period, not only throughout a great portion of Europe, but also in Asia and the North of Africa. The history of the flax plant is even in some measure co-extensive with that of grain, since whenever man partially civilized appears united in societies, we see that he has become acquainted with the means both of nourishing and clothing himself, without it being possible for us to discover by what successive steps he has been enabled to attain this position, either by agriculture or manufacturing art.

Frequent allusions to the employment of flax occur in the Old Testament. "The flax and the barley were smitten, for the barley was in the ear, and the flax was bolled. But the wheat and rye were not smitten, for they were not grown up." (Exodus ix., 30, 31.) In this simple statement we discover the accuracy of the Mosaic account, for both in Europe and America, the flax ripens before the wheat. Rahab hid the spies with the stalks of flax which were laid in order on the roof of her house. Now as a nice regard is paid to the order in which flax is laid to dry at the present time, preparatory to scutching and spinning, doubtless, in this in stance, it was placed upon the roof for similar purposes.

Solomon had horses brought out of Egypt, and *linen yarn* ; the King's merchants received the linen yarn at a price. Job complained that his days were "swifter than a weaver's shuttle." From these quotations we learn that flax was cultivated, prepared, spun into yarn, woven into linen, and considered as an article of merchandise in the remote periods. "The Egyptians," says Belzoni, "were certainly well acquainted with linen manufactures equal to our own, for in many of their figures we observe their garments quite transparent," and among the folding of the mummies he observed "some cloth quite as fine as our common muslin, very strong and of an even texture." As the priests of the Egyptian Isis were clothed wholly in linen, Ovid has applied to this Goddess the term *Dea lingera*.

Numerous specimens of the linen of the ancient Egyptians may be seen in the collection of Dr. Abbot, now on exhibition in New York. An inspection of these samples would seem to warrant the inference that the linen of the Pharionic period was generally coarse and of an inferior character, the threads being loosely twisted and the weaving imperfect; the strength however, after the lapse of several thousand years, is still considerable.

The use of linen for clothing passed from Egypt to Greece, and from thence to Italy. It was little known at Rome under the Republic, but was in general use in the time of the Empire, at which period linen of great fineness and whiteness was manufactured. Pliny describes the different qualities of flax respectively produced by each country, with a peculiarity which argues that the manufacture of linen had already become an important branch of commerce to many nations.

At this date, also, the use of flax as a textile material was established among all the nations of Northern Europe. M. Theis, of France, who has made very complete historical investigations, is of the opinion that the art of preparing flax had not been communicated to these people by commercial intercourse with other nations, and considers it as a matter of no little interest, that these almost savage nations, were able to attain to a great perfection in the use of a material, the complicated preparation of which seems to imply an advanced stage of civilization.

All the barbarous tribes that came from the remote parts of Scandinavia, or Eastern Germany, were clothed in linen fabrics at the time of their migration into Southern Europe, aud it is to those emigrating about three centuries before the Christian Era, that the introduction of flax into Flanders and the low countries is attributed.

At the time of the extension of the Roman power to the Rhine, the article of clothing manufactured from flax, which is still worn and designated as the *sarran*, or blouse, formed part of the national costume, soon after the whole of Italy became dependent on this country for its supply of linen, which was famous for its fineness of texture, and whiteness. If Rapsæt, a French antiquary, is to be credited the introduction of the flax culture and manufacture into Flanders, dates back even to the period when the tribes dwelling on the Black Sea emigrated to Western Europe. But, however, this may be, it is certain that the want of any organization of the people into towns or villages under municipal laws, does not enable us to obtain any positive information concerning this branch of industry before the 13th century, at which period social organization of the people became general in Belgium. Since this epoch the manufacture of flax has become fixed and constant, and has been considered as a part of the necessary occupatiou of each rural family, equally with its cultivation. The first notice in the Government Records occurs during the 14th century, but Mathew Westminster cites a chronicle of the 13th century, which quaintly states that "about these times all the world came to Flanders to buy clothing."

During the 13th and 14th centuries, however, Nivelles enjoyed a greater reputation for linens than Flanders; it afterwards lost this reputation, and together with it, its population, which became reduced from thirty thousand to eight thousand inhabitants. From Flanders the linen industry extended to the neighboring provinces, to Brabant, Hainault, and especially to Tournay. The number of edicts and ordinances issued during the 15th and 16th centuries show how great an interest had already been excited in relation to the business. An order in 1565 prescribes the method of bleaching the yarn; another in 1619 relates to frauds which had been introduced in the manufacture of the cloth. Different edicts, the first dated in 1591, prohibited the importation of flax; another in 1667 prohibited the introduction of cloth prepared from the fiber of cotton or nettles, as likely to affect the use of the fiber of flax. Towards the close of the 17th century a commission was appointed to inquire into the condition of the various branches of industry followed in Belgium and Holland, in which the flax manufacture was especially noticed as worthy of protection and attention.

It appears from the official documents of this epoch, that the markets of Flanders furnished about one hundred thousand pieces of cloth, each piece measuring about eighty ells. In this is not included the quantity furnished for home consumption.

With the advancement of the age the fabrication of flax increased in importance. In 1735 there were sent out from the single market of Ghent 65,849 pieces of linen; in 1755, 79,040; in 1660, 83,305; in 1764, 86,315. At the same time, independently of the market of Ghent, there were in Flanders the markets of Andenarde, Alost, Renaix, Lockeren, Bruges, and Courtray. The total exportation of cloth in 1762, amounted to 13,115,241 ells, and in 1783 to 20,408,373 ells.

[For the Scientific American.]

Storm Lights.

There is a phenomenon of common occurrence in this part of the country, connected with the atmospheric influences that move about the earth during the seasons of mild temperature, which I had never been able to explain according to any laws with which I was acquainted. I allude to the lights frequently seen in a clouded sky at night in advance of storms. These lights, some suppose, are caused by fire on the prairies; while by others they are called storm lights, and are said to indicate snow. They differ somewhat from the Aurora Borealis, but still are analogous. The great similarity in certain respects of light, heat, and electricity, justly leads us to the inference that their action depends upon the same physical laws, and that whatever causes the liberation of caloric from matters, in like manner sets free its light and electricity. Atmospheric ascension is the principal cause of the condensation of the vapors of water, and this ascension in our climate depends on certain conditions imparted during the passage of atmospheric influences. I think that I have evidence sufficient to warrant the assertion that sometimes, when there is a general rising of the air, there are places where the ascending current is moving with a greater velocity than in the neighboring regions, and in consequence of which there is more light, heat, and electricity liberated in such places than where the ascending current moves with a less velocity. In restoring an equilibrium, light is set free. These luminous places in the clouds are only seen when the transfer of electricity is by convection, as is common in cool weather.

While this diffusion of light is due to such a discharge, the lightning flash may be properly referred to the disruptive discharge in the summer season. J. Hall.

Athens, Ill.

Wintry Weather in New Brunswick.

The spring is said to be very backward in the Province of New Brunswick. The Woodstock (N. B.) "Sentinel" says that in that vicinity the snow is from two to four feet deep in the open fields, and five feet deep in the woods. Cattle are starving to death in many parts of the country for want of food, and from present appearances at least a month must elapse before they will be able to procure a sustenance from the growing vegetation of Spring. It is said that in Frederickton the people, becoming somewhat impatient of the slow approach of warm weather, have commenced blowing up the ice in the river with gunpowder—a tin vessel containing the powder being placed beneath the ice, and the charge ignited by means of a galvanic battery.

[Although the spring has been very backward here—the latest we have had in a great number of years, still our lot has been favorable in comparison with those living further north.

Louisville Locomotive Works.

We learn by the "Louisville Courier," that very extensive works have been established and are in successful operation in that city, for building first class locomotives. It is about sixteen months since ground was broken for these works by Messrs. Olmstead & Co., and they have now about 250 persons in their employ; they have built three excellent locomotives for the Nashville Railroad, and six others are in course of construction for the Ohio and Mississippi Road. There are complete and ready for service a number of freight cars for the Nashville Road, and the elegant passenger cars on the Louisville and Portland Railroad were also built there.

Scientific Memoranda.

On Some Peculiar Reductions of Metals in the Humid Way—The following experiments were made for Professor Wohler, by Hiller. The observation first made by Bucholtz, that long crystals of metallic tin are formed when a rod of that metal is inserted in a solution of protochloride of tin, and the latter carefully overlaid with water, was first of all further tested. It appeared that, for the production of large crystals, the solution of chloride of tin must be acid. Of the tin immersed in the solution, there was always more dissolved than was made up by that which crystallized. In one experiment the proportions were as 7 to 6. These crystals are formed at the point of contact between the two fluids.—If the solution be neutral, they appear below this in the solution of the protochloride, and remain bright. Copper, inserted into a neutral solution of nitrate of copper, covers itself entirely with brownish-red crystals of protoxide of copper, and afterwards with sharp crystals of metallic copper. The copper is dissolved, especially at the point of contact of the fluids.—The same phenomenon is produced, but in a less degree, with sulphate of copper. In a solution of perchloride of copper, the copper is covered with crystals of the protochloride. A rod of zinc, under similar circumstances, covers itself with grey granules of metallic zinc, especially at its lower end. In this case, also, the zinc is dissolved at the point of contact of the fluids. Cadmium behaves in a similar manner in the solution of its nitrate; the reduced metal is more pulverulent, and therefore much more readily oxydized in the air than the reduced zinc. Lead in the solution of neutral nitrate or acetate of lead, furnished small shining crystals of lead. Bismuth precipitates the metal from a solution of protochloride of bismuth, if the latter has been overlaid first with muriatic acid, and afterwards with water On silver, immersed in a concentrated solution of nitrate of silver overlaid with water, metallic silver deposited in a dentric form, always originating from a few scattered points of the surface of the silver.—[Ann. der Chem. und Pharm.

To Make Oxyd of Gold—Figuier, who tested the several methods of preparing this oxyd, now so extensively used in electro-gilding, has determined the best to be as follows:—Dissolve 1 pt. gold in 4 pts. aqua regia, evaporate to dryness, re-dissolve in water, add a little aqua regia to take up the traces of metallic gold and of protochloride remaining undissolved. Evaporate again, re-dissolve in water, and mix with pure pottassa perfectly free from chloride, until it gives an alkaline re-action with turmeric paper. Turbidity immediately ensues, when it is mixed with chloride of barium; aurate of baryta precipitates as a yellow powder. When the precipitate begins to assume a whitish appearance, the addition of chloride of barium must be discontinued, as all the gold oxyd has gone down and the alkali commenced to act upon the baryta of the chloride. The aurate of baryta is then to be washed until the waste-waters cease to be precipitated by sulphuric acid. The aurate is then heated to boiling, with dilute nitric acid, in order to eliminate the oxyd of gold. By washing until the water no longer reddens litmus paper, the oxyd becomes pure, and must be dried between the folds of bibulous paper by exposure to air.—[Journ de Pharm.

Minot's Ledge Light-House.

The work for the construction of a solid and substantial light-house, on the site of the ill-fated structure, washed away some years ago, will be very soon commenced.

A Light on Bunker Hill.

The fixtures having been completed, Bunker Hill Monument was lit for the first time with gas on the evening of the 17th ult. There are ten "bat-wing burners," and the pipe passes up the well or inner circle, two hundred and twenty feet.

Were a cannon ball fired from the earth with a velocity of seven miles per second, it would never return.