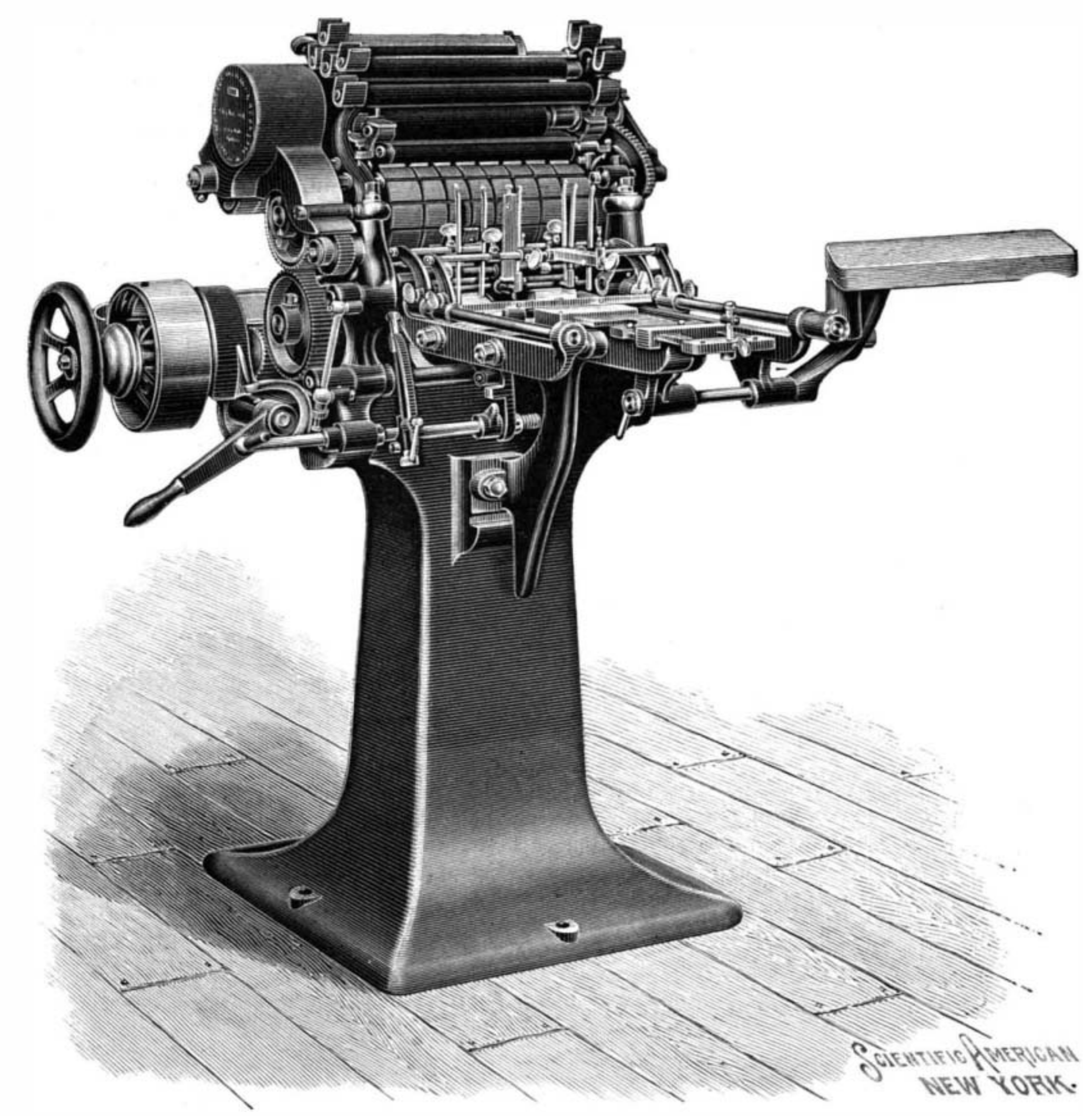
A NEW FAST JOB PRINTING PRESS.

Printers everywhere cannot fail to be interested in the fast automatic feed card and envelope press shown in the accompanying illustration, which has been recently patented in the United States and several foreign countries, and is being manufactured by the Harris Automatic Press Company, of Niles, Ohio. In all considerable job printing offices a number of presses are usually kept employed on small work, such as the printing of cards and envelopes, etc., about a thousand impressions per hour being the ordinary rate of speed, and each press requiring the close attention of a feeder. The Harris press is self-feeding, the cards and envelopes being supplied to it by the pack, and it works easily at speeds ranging from 8,000 to 10,000 impressions per hour. Working at this rate, it is about as much as one hand can do to open envelope boxes or packages of cards for feeding, and replace in the boxes or packages the printed work, but the feeding, printing and delivery are automatically performed. The press is designed to do all classes of work, from the finest half tone on glazed cards to the thinnest manila envelopes, taking sizes from the smallest envelope corner to an 11 × 13 inch plate. It prints from curved electro or stereotype plates, readily adjusted to exact position on the impression cylinder by clamps, and adapted to be "underlaid" with good results, as the plates are only three-sixteenths of an inch thick, the "making ready" of all kinds of jobs being thus greatly facilitated.

The points which will first attract the attention of the practical printer are the nicety and exactness of the feed and the connected parts. The cards or envelopes are placed in a pile within the space formed by the vertical rods or posts in front of the impression cylinder, these guards and supports being quickly adjustable for all sizes of stock, and the bottom card or envelope is automatically pushed forward by the feeding mechanism to the printing cylinders. For envelopes the flap is engaged by fingers, by which the envelope is fed forward through a gate, so nicely adjusted, according to the thickness of the paper, as to prevent the passage of more than one envelope at a time. In printing cards, the bottom card of the pile is pushed forward by fingers which extend beneath the card, but which have on their upper face an adjustable flange or lip, to be raised just sufficiently to nearly equal the thickness of the card. In the adjustment of this lip or flange, as in that of the gage to prevent more than one card or envelope to be passed at a time to the printing cylinders, the devices are very simple, and admit of almost instantaneous adjustment for any special thickness of cards or paper. The feeders are carried on a light reciprocating frame, and, should an envelope or card fail to be fed forward, an automatic throw-off device lowers the impression cylinder and a friction clutch or brake stops the press, thus preventing the smearing of the tympan sheet and the spoiling and wasting of stock. The press gives perfect register, the stock being "overfed" against adjustable gage stops on the impression cylinder and held there by two short tapes until pressed under the types, and the adjustment of the impression is easily and accurately made when the machine is running at full speed. The printed stock is delivered on a circular tray at the back, the tray being slowly revolved and thus laying out the printed matter in such a way as to prevent offset. The ink distribution and roller adjustment and interchangeability apparently leave nothing to be desired. The company furnish with the machine, when desired, a small plate making outfit. The press occupies a floor space of 3 feet 6 inches by 5 feet, and weighs 1,100 pounds.



THE HARRIS AUTOMATIC CARD AND ENVELOPE PRESS.

THE GLACIERS OF GREENLAND.

BY PROF. RALPH S. TARR.

That great triangular area of land between northern Europe and America, by some strange reason called Greenland, is almost entirely covered by snow and ice. Its margin is that of an extremely irregular land quite like northern Europe and America, with many peninsulas projecting, and many fjords, bays and straits indenting the coast. The projecting parts of the land, the peninsulas and islands, are mainly free from glaciers, though even upon these, in the protected valleys and on the higher peaks and plateaus, there are glaciers of great or small size. However, taken as a whole, the margin of Greenland is free from ice. All the interior is ice covered and the total area of the ice is estimated to be about five hundred thousand square miles. In some parts of the interior this great ice cap attains an elevation of not far from ten thousand feet.

Fig. 1.—LAND MARGIN OF CORNELL GLACIER.

After passing the land margin of Greenland one comes to an ice wall, sometimes very precipitous, but more often sloping so that it can be ascended. This wall rises one or two hundred feet above the base, and then the ascent becomes more gradual. Here the surface of the ice is generally smooth and easily traversed, though if by chance the ascent is made on a part of the glacier that is rapidly moving, the surface is so rough that traveling across it is impossible. Within a few miles of the margin, the elevation of the ice is one or two thousand feet above the sea level, and looking onward toward the interior of Greenland, there is a great plateau or mountainous expanse of snow and ice. It looks like a plain, but as one traverses it the barometer shows that the elevation is constantly increasing. Near the margin, where the elevation is slight, the summer sun has melted the surface, so that it is solid and hard and firm under foot. Its surface is pitted by circular depressions caused by melting, and the walls of these wells are seen to be made of pure ice. If the journey chances to be made during the autumn, it is possible that the form of precipitation may be that of snow: but it is very much more likely to be in the form of rain. However, as the high interior is approached, the climate becomes colder and colder, and even in summer rain does not fall, nor does the surface of the ice cap melt and show the solid ice of the glacier. It is then a snow-covered glacier, sometimes with hard surface, at other times enveloped in soft and drifted snow. According to the description of Peary, the summer climate in the interior of Greenland is one of the most disagreeable of any that have so far been found in the world.

This constant fall of snow, with almost no loss by melting, has completely buried the interior of Greenland. Whatever the land condition beneath the ice may be, it is so effectually buried that even the great irregularities appear to produce no effect upon the surface of the ice cap. Judging by the margin of Greenland, this interior must be a highland of mountains and irregular topography, but it is entirely smoothed over by the ice. The fall of snow in summer and winter has not only obscured the topography of the land, but has raised the level of Greenland far above the normal. It is impossible to say how much this snow fall amounts to in the course of a year, but it can hardly be less than ten feet. Practically none of this melts and but a portion of it is blown away to regions where melting can occur. Hence, if no means of escape could be found, the elevation would continue to increase practically indefinitely. A thousand years at this rate would increase the elevation ten thousand feet.

It happens that the ice find means of escape other than that of wind action and melting. As the snow accumulates, the pressure of the crystals against one another, under the burden of the snow above, causes an increased compactness, and eventually a change from the loose condition of snow to that of solid ice, as one may change a snowball to ice by pressure. There is a question in the minds of some whether ice is a viscous body or not, and hence it may be well not to speak of it here as a viscous substance. In any event, it cannot be denied that ice moves and behaves like a viscous body. If we should pile a mass of wax upon a table and subject it to pressure, it would spread outward from the center of pressure in all directions, because the wax is a viscous body. The same is true of ice, which, although apparently brittle, will flow when subjected to a strong but slowly applied pressure. The weight of the accumulation of snow in the interior of Greenland squeezes this ice that has been formed and causes it to move outward from the center of greatest elevation. It is possible also that this movement is aided somewhat by gravity, for it may be that the land base in the interior of Greenland is higher than the land margin, and that there is, therefore, a gradual slope from inland to the sea.

No means of determining the rate of this ice movement are at hand. The studies of the Greenland ice sheet have been entirely too limited in number to allow even a guess upon this point. Some of the tongues from the ice have had their movement measured, but the great ice cap itself has never been studied from this standpoint. One has but to look at the glaciers of Greenland to see that the rate of motion of the ice cap is exceedingly slight, probably to be measured by only a few inches a year.

Fig. 2.—NORTHERN END OF GLACIER, SHOWING ICEBERGS AND FRAGMENTS OF GLACIER ICE FLOATING IN THE FJORD.

If the movement were more rapid than this, the surface would be broken by cracks caused by the strains on the ice as it moved over its bed. Cracks or crevasses are confined to small portions of the glacier where the ice is moving down the valley toward the sea, and hence moving rapidly.

The surface of the glacier is absolutely free from all foreign materials, with the exception of moraines, which extend seaward from the few mountain peaks that rise above the surface of the ice near the margin. Beyond the limit of mountainous islands in the ice, or nunataks, even this supply of débris is absent. The second exception is found in a small amount of dust transported to the ice surface from the land by the action of the wind. This dust is made of extremely fine particles of clay, and over the ice surface near the margin there is a considerable quantity of it. It represents the accumulation of years, and is not in sufficient quantity to darken the surface of the glacier. Indeed, it generally remains below the surface at a depth of a few inches or a foot; for, being dark in color, it absorbs the solar heat and bores its way into the ice by warming and melting it. Making a beginning of this sort in one place, the dust from other neighboring areas is washed toward the depression, and so a considerable quantity—perhaps as much as a quarter of a pound of dust—is found in a depression whose diameter is six or eight inches. The hole is bored into the ice only so far as the sun's rays can reach directly, which, of course, is not very far in this latitude, where the sun does not rise high in the heavens. These dust-filled depressions are known as dust wells, and they render the surface of the glacier near the land margin exceedingly irregular. In the winter they are frozen over and buried beneath the snowfall. The next summer they are perhaps reached again by the melting and added to by the accumulation of that year. In the meantime they are moving onward toward the margin and finally disappear into the sea with the ice itself. There is a zone extending from the land outward for a distance of a few miles where these dust wells occur. Beyond this zone, partly because the dust does not reach so far and partly because the melting action of the sun is not powerful enough to cause the wells, these phenomena are not observed.

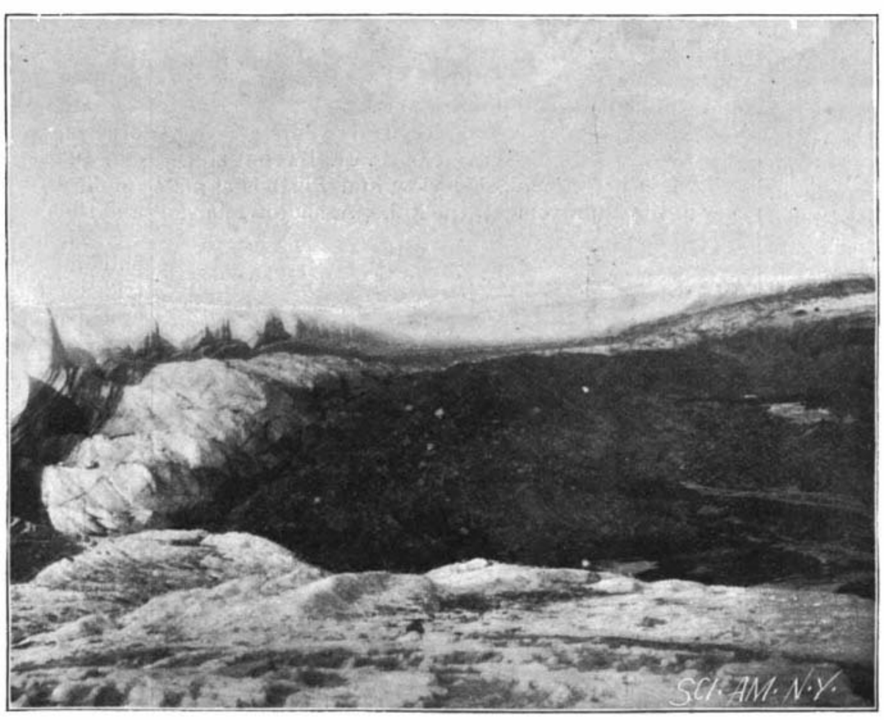


Fig. 3.—DISTANT VIEW OF LAND MARGIN OF CORNELL GLACIER.

Moving onward toward the sea in all directions, the ice near its margin encounters different conditions in different places. The movement of the ice in the glacier is in some respects not unlike that of a river. It resembles the river in this respect that it will seek and follow the lowest ground; but it differs in doing this less rapidly and successfully. Coming to the land margin, the glacier finds the topography to be irregular. There are hills, and ranges of hills, with intermediate valleys; and while, within the margin of the ice, all the land excepting the highest peaks is covered, the ice movement at the margin is mainly down the valleys. Therefore, since the valleys terminate in the sea, there are two important conditions along the ice margin, the contact of the greater part of the ice with the land itself, and the entrance of a few small portions or valley glacier tongues into the sea. The ice from the interior advances toward the sea and then, as it comes to this margin, changes its course somewhat in accordance with the topography. It slopes down into the valleys and in some cases has its course changed nearly at right angles to the general direction of the movement of the ice cap itself.

If one should travel across Greenland near the coast, and parallel to the general trend of the coast line, he would pass over a mountainous peninsula, then across a bay, then another small peninsula or series of islands, and so continue in succession along such a series of valleys and hills. If the journey happened to be a little further inland, where the ice exists, he would at first pass over an ice covered highland, or possibly along the contact of this with the land, crossing a divide, as he did upon the land, and then, descending, would cross the very rough surface of an ice tongue, which extends down toward the fjord valley, and finally he would again ascend to another divide. From one divide of the ice cap margin to the opposite there is a distinct slope downward on both sides, and it is evident that the ice is slowly moving down this slope, while in the central depressed portion of the glacier tongue proper the movement is outward to the sea, with such rapidity that the surface is cracked by innumerable crevasses, some of which are very deep. So rough is the surface by reason of these crevasses, and the effects of melting, that it is practically impossible to cross the surface. The rate of glacier movement, which during the summer season varies from a few feet to nearly one hundred feet a day, is so rapid that the ice cannot bend when it passes over the irregularities, but must break.

As has been said, the edge of the glacier near the land has a slope of considerable steepness, and in some cases a precipice of ice from fifty to one hundred feet in height. The ice rests directly on the ground and is evidently in motion. The evidences of movement are in the first place the banding of the ice, a banding due to layers of gravel and pebbles whose sources must be at some place other than their present position, for oftentimes there are pebbles of rock different in kind from that over which the ice is moving. The second evidence of motion is found in the more or less continuous series of low hills and ridges of gravel and bowlders which have been brought by the ice and piled at its foot. There must be a supply for this material, much of which is foreign to the region, and this supply is of course the ice. In order to bring them, it must of necessity have moved. As it comes to the margin, where it is ending, it is prevented from proceeding further, partly because its movement is then diagonal to the general motion of the ice sheet, and hence down into the valleys, and partly because the melting by the summer sun prevents its further progress. Evidence of this melting is partly the piles of accumulated materials at the base of the ice sheet and partly the drainage along the margin. This marginal drainage of the ice is exceedingly interesting. The water is furnished chiefly by the melting of the ice, and it comes not merely from melting on the front, but also from the surface. Every few feet along this margin there are tiny cascades and rills, and in some cases even rivulets, flowing rapidly down the front, and joining the stream that skirts the margin of the ice between the glacier and the land. Sometimes the water which flows along the margin is deflected from the immediate contact of the ice, and is forced to pass down some steep and rocky slope, forming then a beautiful cascade or waterfall. At other times it escapes beneath the ice, through a tunnel, reappearing again at distances varying from a few feet to several hundred yards. Again the accumulation of a moraine, or a barrier caused by ice, prevents the water from passing along as a stream and transforms it locally to a lake. These marginal lakes, some of which cover an area of a square mile, are exceedingly abundant, and in them the streams are depositing clay beds.

Along this land margin one can sometimes penetrate beneath the glacier in one of the ice caves which the marginal streams have cut in the glacier. Here he can see the ice, with a load of rock for tools, engaged in carving its bed. The bowlders and gravel in the bottom layers are firmly frozen in the ice, and, as they are dragged along, they are grinding upon the rock, for they are the tools with which the glacier does its work of erosion. Along these bottom layers the ice is discolored for variable distances, sometimes to the height of one hundred feet above the base. This discoloration is due to rock fragments that the ice is carrying, and at first glance one gets an erroneous impression concerning the amount of this material that is being carried. Where streams have cut valleys in the ice front, as they course down its margin, it is seen that the discoloration of the ice surface is due to the action of melting, which has washed down over the surface a sheet of rock fragments which have been derived from only a relatively few layers. Above its bed the ice is carrying only a small amount of debris, and this decreases as we ascend, until, finally, the upper part of the glacier is pure, clear, white ice. Where it is present in the bottom of the glacier, it is stratified with layers of clear ice.

Another kind of glacier front in this region is the sea wall of the valley tongue which is in rapid movement. This in places rises one or two hundred feet above the water, and extends to depths several times as great beneath it. As seen from the fjord it is a wall of marble whiteness, absolutely free from all impurities. Whatever rock debris the ice is carrying into the sea it is transporting below the water level. The top of this ice front is extremely irregular, partly by the cracking along the crevasses and partly by the action of melting. It is so irregular that travel over the end of the glacier is an impossibility.

In the front of the ice one sees numerous cracks, and the whole mass has an extremely unstable position. That this cracking does really represent instability is every now and then plainly proved, by the reports that proceed from the ice front, and by the fragments which one may see drop from its top and sides. Along the front of a large glacier there is a constant shower of these ice fragments, and the sea near by is littered with the bits of the glacier that have thus fallen into the sea.

Not only are fragments thus broken off by the melting and cracking above the water, but the ice is made unstable by the action of the waves at the shore line. When the tide is low one may see extensive undercut cliffs and sea caves of ice, which add distinctly to the instability of the ice cliff. This loss from the glacier front partly balances the advance, but not entirely. As one watches the front of one of the Greenland glaciers, every once in a while he sees a great block, hundreds of yards in length, crack off from the ice front and float away. Sometimes this ice breaks off from the glacier without producing much commotion, but much more frequently the masses of ice fall forward as they break off, and stir up the water, producing waves whose effects are felt miles away. The reason for the breaking off of these large bergs is the advance of the glacier into the fjord so far that the buoyancy of the water lifts and cracks it.

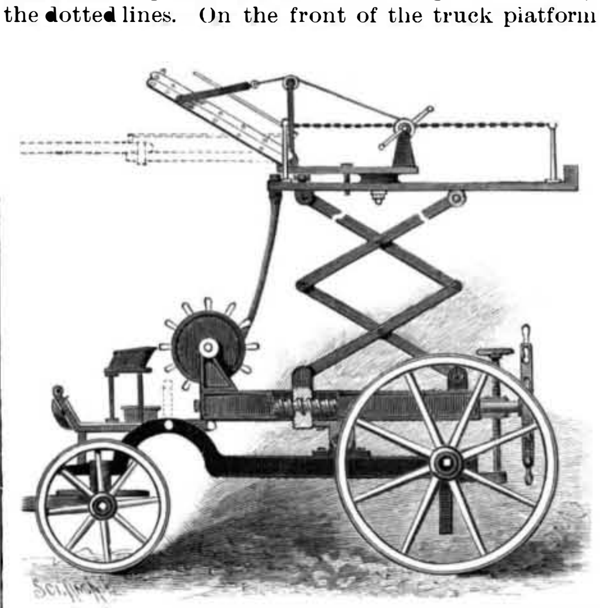
Hence the glacier which covers so large an area of Greenland advances outward until it is either destroyed by melting along the land margin or until it reaches some place in the sea where it breaks off and floats away. So long as the supply and these causes for the destruction of the glacier exactly counterbalance one another, the front of the glacier will remain permanently in one position; but if the supply exceeds, then the front of the glacier must advance upon the land and extend farther out into the sea; but, on the other hand, if the causes of destruction exceed the supply, the front of the ice must withdraw. This withdrawal may be accounted for either by a decrease in the supply of snow or a change in the climate, which causes an increased melting.

Studies along the margin of Greenland show that land now bare has within very recent geological times been encompassed by ice. In that part of Greenland near latitude 74°, where my studies were carried on, I found proof that the glacier has reached at least thirty miles further, covering all the land, some of which reaches nearly three thousand feet above the sea level. This means a very much greater extent of ice than the present. Even now the glacier is in process of retreat, and moraines that were evidently built at the base of the ice are now at some distance from it. Some of these moraines have been left by the ice so recently that no vegetation whatever, not even lichens, has found time to develop on the rock. Therefore, even at present the Greenland glacier is engaged in a withdrawal from the land, and this has been in progress for some time and has succeeded in uncovering a part of the margin of Greenland. How far this will go, and whether Greenland may again become the seat of a temperate climate and the site of a temperate flora, as it was before the glacial period, no one can even estimate.

Cornell University.

A FIRE ESCAPE AND WATER TOWER.

The illustration represents an improved fire department apparatus by which a platform may be readily raised and lowered to make connection with windows, enabling the firemen to enter the upper stories of a building for rescuing persons and facilitating the throwing of streams of water where desired in a burning structure. The improvement has been patented by Michael W. Hennessey, of No. 203 Sands Street, Brooklyn, N. Y., the inventor being chief machinist on the United States cruiser Columbia. On the truck is a platform frame, and means are provided for readily swinging the platform into level position when the truck stands on uneven ground. On the platform are two pairs of connected lazy tongs, the lower members of which on one side are pivotally connected with a stationary bracket, while the other lowermost members are pivotally connected with a cross piece sliding in bearings and formed with screw nuts in which screws a longitudinal screw rod. The outer end of this rod carries a hand wheel, by turning which the cross piece is moved forward or backward by the screw rod, closing or opening the lazy tongs. The uppermost members of the lazy tongs on one side are pivoted to a platform to be raised, and the corresponding members on the other side carry rollers which loosely engage the under surface of the platform, the latter having posts and chains forming a railing on its sides and ends. On the platform is a turntable which may be turned to and locked in any position by removing and inserting a pin. On an extended portion of the turntable is pivoted a ladder, connected near its outer end to a yoke from which a rope passes over a pulley at the top of a post on the turntable and thence to a windlass, by means of which the ladder may be placed at any desired angle to connect the turntable and platform with the window of a building, the ladder preferably being made with extension sections, and its position as extended being indicated by the dotted lines. On the front of the truck platform



HENNESSEY'S FIRE ESCAPE AND WATER TOWER.

frame is a reel, one end of the shaft of which is hollow and adapted for connection with a water pipe, the inner end of the shaft being connected with a hose wound on the reel, and the outer end of the hose being connected with a threaded pipe in the platform raised by the lazy tongs, the latter pipe being adapted to receive a hose nozzle for the use of the firemen. The lazy tongs, when in extended position, are preferably steadied by guy rods or ropes leading to the ground.

BATCHELOR'S RIPPING ATTACHMENT FOR SEWING MACHINES.

The illustration represents a simple device readily attachable to a sewing machine table and operated by a lever connected with the needle bar for rapidly ripping seams or cutting material. It was patented in July last by Francis M. Batchelor, of Portland, Oregon, and, as will be seen by the accompanying letter, this inventor has sold his patent for a handsome sum of money. The following letter speaks for itself:

American Steel Company,
Portland, Oregon, March 6, 1897.

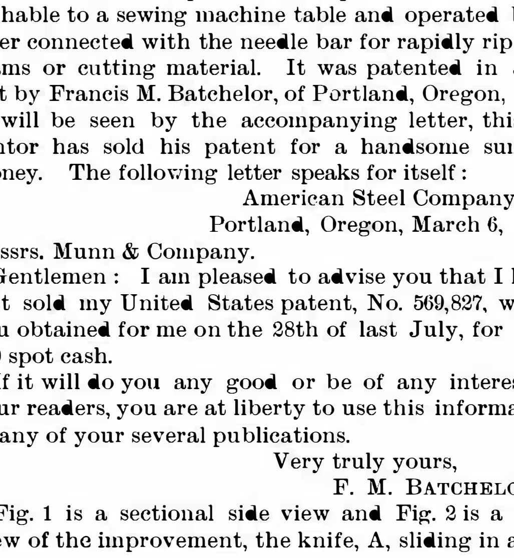
Messrs. Munn & Company.

Gentlemen: I am pleased to advise you that I have just sold my United States patent, No. 569,827, which you obtained for me on the 28th of last July, for $50,000 spot cash.

If it will do you any good or be of any interest to your readers, you are at liberty to use this information in any of your several publications.

Very truly yours,
F. M. BATCHELOR.

Fig. 1 is a sectional side view and Fig. 2 is a plan view of the improvement, the knife, A, sliding in a slot



SEWING MACHINE RIPPER—A $50,000 INVENTION.

in the apex of a peak-shaped rest, B, secured on a table, C, resting on a sewing machine table, D. The material to be ripped or cut is advanced on the apex of the rest against the cutting edge of the reciprocating knife. The latter is guided in its up and down movement by a guide, E, engaging a vertical slot, A^2, in the blade, and in the upper end of the knife is a pivot, F, engaging a slot in a lever, G, fulcrumed and held vertically adjustable at the upper end of a post, H. The outer end of the lever has an elongated slot engaging a stud, J, secured on the needle bar, K. The table carrying the ripping attachment may be readily adjusted and secured in proper position on the sewing machine table.

We desire to congratulate Mr. Batchelor upon the success he has attained with his patent. His letter was sent to us without any solicitation on our part.

The Hippocratic Oath.

A correspondent of the Medical Record seeks information regarding the Hippocratic oath, taken by physicians upon graduation.

He states that he has inquired as to the substance of this oath of many physicians, who have been unable to give him a satisfactory answer. It is highly probable that but a few of our best educated physicians ever knew the text of the oath they were taking. The Medical Record gives the following translation of the oath in full:

"I swear by Apollo the physician, and Æsculapius, and Health, and All-heal, and all the gods and goddesses, that, according to my ability and judgment, I will keep this oath and this stipulation—to reckon him who taught me this Art equally dear to me as my parents, to share my substance with him, and relieve his necessities if required; to look upon his offspring on the same footing as my own brothers, to teach them this art, if they should wish to learn it, without fee or stipulation; and by precept, lecture, and every mode of instruction, I will impart the knowledge of the Art to my sons, and those of my teachers, and to disciples bound by stipulation and oath according to the law of medicine, but to none others. I will follow that system of regimen, according to my ability and judgment, I consider for the benefit of my patients, and abstain from whatever is deleterious and mischievous. I will give no deadly medicine to any one if asked, nor suggest any such council; and in like manner I will not give to a woman a pessary to produce abortion. With purity and with holiness I will pass my life and practice my Art. I will not cut persons laboring under the stone, but will leave this to be done by men who are practitioners of this work. Into whatever houses I enter, I will go into them for the benefit of the sick, and will abstain from every voluntary act of mischief and corruption, and, further, from the seduction of females or males, of freemen and slaves. Whatever in connection with my professional practice or not in connection with I see or hear, in the life of men, which ought not to be spoken of abroad, I will not divulge, as reckoning that all such should be kept secret. While I continue to keep this Oath unviolated, may it be granted to me to enjoy life and the practice of the Art, respected by all men, in all times. But, should I trespass and violate this Oath, may the reverse be my lot."

Laws of Teaching.

1. There is no school unless the father, the mother, the teacher, and the pupil keep school together.

2. Know thoroughly the subject to be taught and explain to the pupil why you teach it.

3. Gain and keep the attention of the pupils. Excite their interest.

4. In your teaching use language that your pupils understand.

5. Begin with the known and go by easy steps to the unknown. Take the whole class with you!

6. Excite self-activity in the pupils and lead each to discover truth. Show the class how to study.

7. In each lesson let a halt be made and then have pupils fix points already made, the conclusions reached, and the premises upon which the conclusion is based.

8. The teaching must touch the whole nature of the child and stimulate to higher action and more industrious habits of work, of silence, of obedience, honesty and truthfulness. Three-fourths of education is a habit of work.—J. M. Greenwood in Midland Schools.

A Quick Piece of Work.

One of the quickest pieces of work on record in the way of installing a ventilating plant was recently completed at Harrisburg, Pa., says the Engineering Record. It may be remembered that the building containing the assembly rooms of the Senate and House of Representatives at the State Capitol was destroyed by fire on February 2. An unoccupied church was temporarily secured, but this building being without a suitable heating plant or any ventilation whatever, it was necessary to install a new plant before the building could be occupied. Accordingly, an order was telegraphed on February 4 to a blower company, instructing them to ship two 6,000 foot coils with 60 inch fans as soon as possible. One apparatus was placed on board the cars within twelve hours and the duplicate within thirty hours from the receipt of the order. In the meantime, a large force of men was at work on the ground, putting in the foundations, steam mains, and air piping required for the apparatus. The heating plants were completed and the building ready for occupancy within one week from the date of the fire.