Fruit Flavorings.

I give instructions by which all confectioners may extract and preserve their own fruit essences, and so guard the health and add to the pleasure of all for whom they provide. Among the juicy fruits are strawberries, raspberries, blackberries, cherries, and currants; among non-juicy fruits are the apple, pears, peaches, quinces, apricots, and plums.

Mash the juicy fruits in a basin to a pulp. Place on the fire and make scalding hot. Now pour into a hair sieve and allow the juice to strain through. Put into bottles and securely tie down. Place these bottles in a caldron of cold water and boil for twenty minutes. Remove from the fire and allow to remain in the caldron until cold. Then set away for use.

In the case of non-juicy fruits, such as apples, pears, peaches, etc., put the fruit into a basin. Cover with water and boil to a pulp. Now place on a hair sieve and allow to drain without any pressing. Observe now that it is only the liquor which passes through the sieve without pressing which is to be used for flavoring purposes. What remains in the form of pulp is not adapted for these uses. Now put the juice obtained as above into bottles, and proceed to treat as already laid down for the juicy fruits.

The foregoing processes are to be gone through with in the case where the extracts are to be kept transparent and clear, as for sirups, cordials, and beverages.

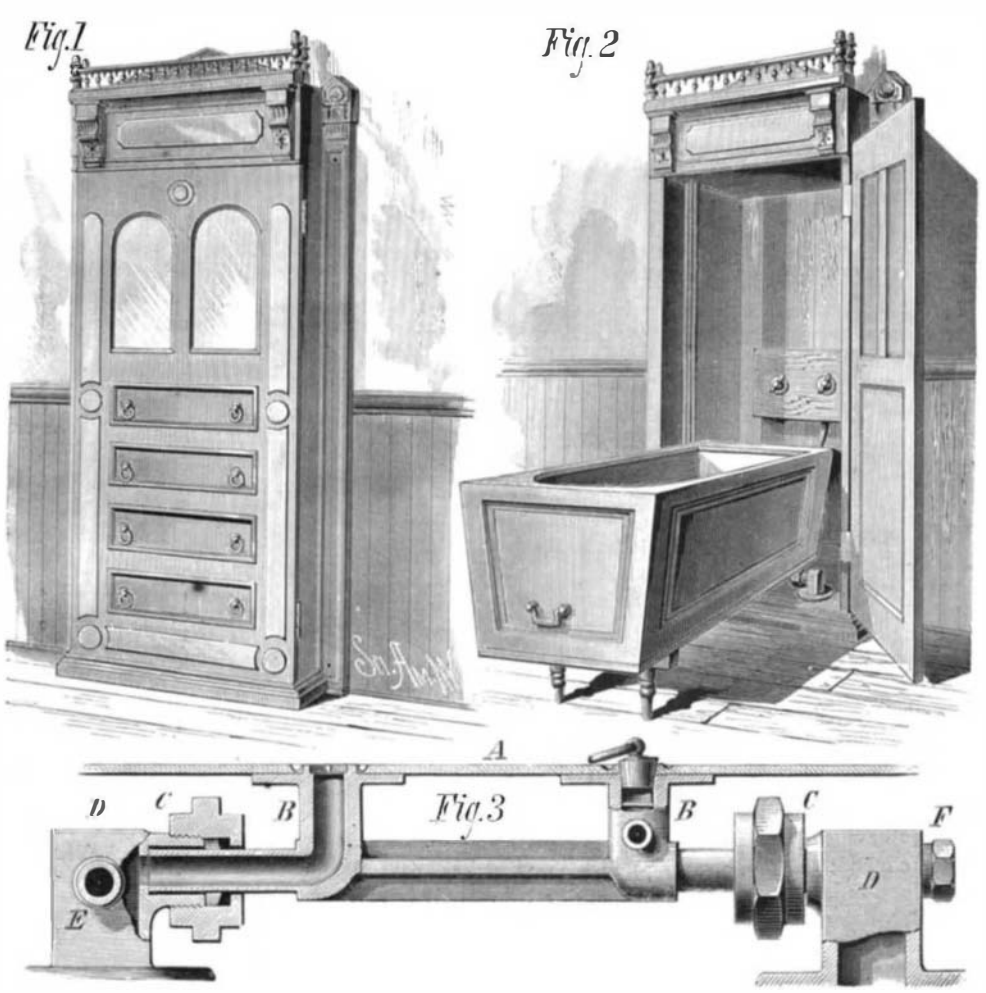
In case where the flavorings are to be used for any purpose where transparency or clearness is not desirable, such as for ice creams, fruit ices, or bonbons, then I would use not only the clear fluid, but the pulp of the fruit also. I would for these opaque purposes save and utilize everything of the fruit except the skins and seeds. This pulp to be treated as already laid down.

As thus obtained and preserved our confectioners can supply themselves with a quantity of perfectly pure extracts of all their favorite fruits, and which can always be at hand, for flavoring every description of pastry, cakes, pies, tarts, puddings, creams, ices, and beverages, and at any season of the year. Especially when there is any one in the house who is sick or feverish, cordials may be flavored with these delightful sub-acids—these remedies and restoratives of kind mother Nature herself—such as will shoot through all the veins of the most debilitated and infirm the most delicious sensations of happiness and hope.—*James W. Parkinson, in Confectioners' Journal.*

NEW FOLDING BATH TUB.

We give an engraving of a very convenient folding bath tub lately patented by Mr. George Damen, of 88 Luqueer street, Brooklyn, N.Y. When closed, as in Fig. 1, this device has the appearance of a chiffonier or bookcase, and forms an ornamental piece of furniture; and when opened for use, as in Fig. 2, it is in every way as convenient as the ordinary stationary bath tub. This construction admits of placing a bath tub in every sleeping room without occupying space valuable for other purposes. The arrangement of pipes by which the water is introduced and removed from the tubs, is shown in Fig. 3.

To the bottom of the tub, A, are attached flanges of the elbows, B, whose horizontal arms extend through stuffing boxes, C, on the hollow supports, D, and form the pivots on which the tub turns. One of the hollow supports, D, has two nipples, E, one on each side, one for cold water and the other for warm water, the two water pipes being provided with stop valves, seen in the back of the case. The outlet is provided with the usual plug and strainer, and a pipe, F, leads to the water or sewer pipe. The overflow at the foot of the tub is connected with the outlet pipe in the usual way. The bath tub has a pair of legs hinged under the head, so that they fold automatically when the tub is raised up. To economize room the wall is recessed to receive the tub when folded up, and, if desired, the tub may be placed in a small wall closet, where it will be concealed by an ordinary closet door. In some cases the inventor attaches to the closet, walls, or door a series of folding doors or screens which may be unfolded to form a temporary bath room. One of the great advantages of this invention is that it permits of taking a bath in a room that is comfortably warmed and obviates the necessity of warming the bath room.



DAMEN'S FOLDING BATH TUB.

INSTINCT OF BEES.—Here is something new, and whether it exists in fact or not, it forcibly exhibits what most people call the "instinct" of bees. In a hot dry valley in New South Wales, the bees suffered last year from a long-continued drought. This year, says a contemporary of that colony, the wonderful little fellows have made provision against another like trouble, by filling a large number of external cells in each hive with pure water instead of honey.

IMPROVED ROPE-CLAMP.

The engraving shows an improved clamp for fastening ropes and cordage, recently patented by Mr. James C. Covert, of West Troy, N. Y. It consists of a short thimble having a boss on one side, which is threaded internally to receive the pointed clamping screw. There is an opening in the thimble opposite the boss to admit the end of the screw. The clamp is applied to the rope as indicated in the engraving, the thimble being slipped over the rope, the screw passing transversely through the body of the rope between its strands.

ROPE-CLAMP.

Another New Composition.

The discoverer of celluloid is reported to have composed a new composition for buttons, boot heels, and other like purposes. A foreign contemporary gives the following as the ingredients and the process of manufacture: Leather cuttings are soaked in hot water to remove the oil, and then dried and ground to powder. The powder is afterward subjected to high pressure in suitable moulds, at a temperature of 240° to 250° Fah. This produces surface hardening, leaving the interior of the casting in an elastic state. If the powder is mixed with any other ingredient, a temperature of 290° to 310° Fah. should be employed, so as to secure partial fusion of the leather.

Disinfection with Sulphurous Acid.

At the instance of the Swiss Federal Department of Commerce and Agriculture, Dr. Fatio lately made a number of experiments at Geneva, primarily with reference to the prevention of the spread of phylloxera. He has shown that it is always possible to disinfect vehicles and objects suspected of carrying dangerous germs by means of anhydrous sulphurous acid, either by injecting it in the gaseous state into vehicles that are closed, or by pulverizing the liquid against surfaces directly exposed to the open air. Various degrees of moisture in the surrounding atmosphere require considerably different doses of the acid in the poisonous mixture. With regard to disinfecting plants, he finds they resist the deleterious action of the poison better when they are treated at a stage distinct from that of vegetation; also the more aged, dry, and completely ligneous they are. The various collections of natural history (dry preparations) may be quickly, easily, and without danger freed of their parasites by simply pulverizing anhydrous sulphurous acid in their receivers, in quantity proportioned to the size, and less the more nearly hermetical the closure. Dr. Fatio further considers the method is applicable to removing parasites from furniture or tissues. He advises, *e. g.*, injection of the acid through a small hole and with a siphon into rooms infested with bugs (about 50 cubic centimeters of liquid per cubic meter of air), the rooms to be first well closed and isolated, and not to be occupied or slept in for some hours after the operation.

Oakland Harbor.

Work for the improvement of the harbor at Oakland, in San Francisco bay, is being carried on. Some idea of the extent of this great engineering enterprise may be better realized when we state that the two jetties, which are nearly parallel, extend from the shore line out into San Francisco bay a distance of 12,076 feet. This is 1,000 feet longer than the jetties built by Capt. Eads, at the mouth of the Mississippi river, about which the public has heard so much.

The stone contract now under way at Oakland contemplates raising both existing walls up to high water level, by building a heavy dry-stone coping on its old walls as a foundation. The stones on this coping are being carefully placed in position, the stones weighing frequently from one to two tons each, the spaces between these large stones being carefully filled in with smaller size by hand, so as to make a good compact wall.

Where most exposed to the sea the crest is made eight feet wide and with a slope of two to one, composed of stone carefully laid down to a point two feet below low water.

The total amount of stone required to finish this present contract is estimated to be between 60,000 and 75,000 tons, the price per ton delivered and placed in proper position being $1 and $1.19, depending upon size.

The stone now being added to the walls is taken from McNear's quarry at Pedro Point, opposite the Sisters' lighthouse, at the entrance to San Pablo bay, whence it is brought in large light draught barges, towed by a tug, and delivered at the site of the jetties at the rate of 8,000 tons per month. These barges are drawn up parallel with the walls at high water, and the rock is thrown on to the wall or wheeled down in position, according to the work being done. The men who are doing the contractors' work live in a floating barge, which is moored near by the scene of their labors. Work has gone on pretty rapidly this winter, as we have had smooth water so much of the time, few gales having occurred.

The object of raising the walls up to high water is to confine the ebbing tide from the inner harbor more effectually than has been heretofore done by the low walls built during previous contracts, and which have permitted the best half of the tidal water to escape laterally over their tops. This has, of course, lessened the scouring action of the ebbing waters, as they were not properly confined in the channel between the walls. On the very high tides a vast mass of water sweeps laterally across the jetties, and it is not until the tide has half fallen that the water can do what scouring is necessary to keep the channel clear. This lateral sweep of the water is dangerous for sailing craft during light winds, since, instead of the tide taking them to the mouth of the harbor, it is apt to sweep them on to the north wall with the ebb and south wall with the flood tide.

The walls, as they have been for a few years past, might have been considered obstructions rather than aids to navigation. Being out of sight except at half tide, schooner men had to be very careful not to run on to them.

In addition to the stonework now going on, it is contemplated shortly to dredge out and widen the present deep water channel between the jetties, so as to offer better facilities for navigation. The channel dredged out is now so narrow that steamers passing are crowded, and sailing vessels are apt to get ashore. It is confidently expected that the effect of raising the jetties to high water level will be to maintain such a channel free from sandy deposit, no matter whether it comes from the inner harbor or from the wave action of San Francisco bay.

The work on this harbor has been going on under the direction of Lieut.-Col. G. H. Mendell, U. S. Engineer, ever since its commencement in 1874, and the results have been very successful in developing the commercial value of this well known sheltered and safe harbor, being one of the few such on the Pacific coast. Mr. L. J. Le Conte is the engineer, under Col. Mendell, in immediate charge of the work. In 1874, boats drawing over 5 or 6 feet of water could hardly bump along over the bar at high water and carry cargoes of not more than 60 to 100 tons.

Since 1878 ships and barks from 1,800 to 2,100 tons bur-

den have been running regular trips and drawing from 16 to 16·5 feet of water. The completion of this year's work will admit of easy navigation for vessels drawing from 21 to 22 feet of water, which is ample for most foreign vessels that come over the bar off the Golden Gate.—*Min. and Sci. Press.*

How Opium is Produced in India.

[Calcutta Correspondent of San Francisco *Chronicle.*]

Owing to the ever poverty-stricken state of the Indian *raiat*, or husbandman, the government advances the means whereby he can engage in poppy cultivation. The nature of their engagements is about as follows: The cultivator undertakes to sow a *bigha*, or about one-twentieth of an acre, with poppy seed. For this he is given the requisite amount of seed. If a well has to be dug, he is not only given a sum on loan, sufficient to carry out his purpose, but also money enough to buy bullocks in order to enable him to draw water from the well when it is finished. This is termed the first advance, and is simply given to prepare his land for the sowing of poppy seed. The second advance is given when the plant begins to shoot above the earth's surface, and the third, when the plant is about to mature. In January or February the plant comes to maturity; in that state the pods are lanced in the afternoon. The opium is allowed to exude till next morning, when it is carefully taken off by an iron scraper. At the same time precaution is exercised to close the incisions by running the finger over the cuts. About five to six incisions suffice for the drawing of the juice.

The opium is placed in brass vessels, slightly tilted, so as to drain off the dew or any other watery substance. It is then manipulated and placed in new earthen vessels, and is thus kept till it is brought to the weighing station. The cultivator of poppies does not employ labor. His holdings are mere garden patches; so all the aid he requires, from the sowing of the seed to the maturing of the plant and the gathering of the opium, can be had from the members of his family. The whole of this work is done by himself, his wife, and his little ones. Many of these opium garden plats, worked by the man and family, amount to only one-sixth or one-twelfth of an acre, perhaps; in a few isolated instances one man is wealthy enough to own half an acre.

There are many reasons which conduce to this. First and foremost is that the native does not like to lease more land than he himself can plow and work. Even with the growth of opium, where so many untold advantages are offered for extended enterprise, the Indian husbandman prefers to give his attention to a tiny garden rather than to be put to the expense of working, with paid help, a few acres. His outlay is nothing, and thus he is enabled, at tremendous profit, to grow opium for sale to the government. He does not pay for help; manure is always handy, as human excrement only is used, and nothing is cheaper and more effective. Irrigation is equally simple. A rude well is sunk; two posts and a cross beam, over which is placed a wheel, form the only apparatus for the drawing of water. A rope is passed over the wheel and attached to it a huge leathern bucket, which is let down and drawn up by bullocks. The water is emptied into a reservoir; running from this are numerous drains, which carry off the water and flush the lands requiring moisture. The stronger members of the family are engaged in this toil, while the children, who in other lands would be deemed infants, make themselves generally useful in picking weeds and many other duties necessitating light labor.

Before the sun gilds the horizon, and while the dew is yet fresh on the grass, the family are astir, and from early morning till evening their entire attention is bestowed upon their crop, either in weeding, watering, or picking during the day; and sometimes at night, in keeping wild animals from intruding and destroying in a single hour the labor of years.

The wants of the husbandman are but few. Four mud walls and a thatched roof compose the family mansion; and in such a hovel will he live for generations. A scant cloth tied round his loins serves for coat and pantaloons. When he desires to appear to advantage a huge cotton sheet, thrown in graceful folds around his body, serves as gala costume on occasions of great festivity. His little children are in a state of utter nudity, even in the coldest weather; and when it is borne in mind that from October till February the weather is a great deal colder than it is in San Francisco, some idea of the hardy nature of native children can be formed. The women are somewhat better clothed; a simple petticoat and a gray-colored sheet has for the last three thousand years formed their attire. But, whatever money the husbandman gains, he converts into jewelry, which forms the real wealth of the native landowner, and is regarded by natives much in the same way as a European looks upon a bank account. In times of acute distress he can always part, even at a premium, with his wife's ornaments. The Hindoo religion demands that certain ornaments must be worn by married women. When the contracting parties are poor they make them of lead, but directly fortune smiles favorably they are exchanged for gold and silver. The small farmer lives with but three objects, that is, to load his wife with ornaments, to eat off brass platters, and to be able, on the marriage of his son, to make a grand display. To attain this end he will suffer years of deprivation and inconvenience, and his many years' savings will be wasted in a single week of jollification.

We can imagine how glad must be the raiat when the poppy plant has begun to exude opium, and when his opium has all been gathered he waits patiently for the order to march, with the fruits of his labor, to the weighing station. It depends entirely upon the season as to when the cultivators can bring their opium to the government stations to be weighed.

DISPOSING OF THE CROP.

As a general rule, the month of April is the commencement of the weighing season. Intimation is then given to the opium cultivators that they must present themselves on a certain day with their opium, in order to have it tested and weighed. In the districts where the poppy plant is cultivated all are astir, and grand preparations are made for a general exodus. The opium is collected safely in red earthen pots, which are put in wicker crates, and the whole family, with burdens on their heads, make for the weighing stations. The picturesque Indian lanes are crowded with these men, marching like sheep to their destination. They only travel during the night. The sultry heat of midday forces them to seek the grateful shelter of the gardens and groves so liberally planted along the dusty highways. Directly a halt is called, and preparations are made for the daily meal. After this is finished some lively spirit starts a story, recounting the savage doings of the stranger who rules the land. With terrified countenances and anxious ears they listen to these fabulous tales; but inwardly they bless the "white face" as they think of the money he is soon to disburse.

Many of these ignorant cultivators have never seen, in their life, a European; and accept with easy credulity anything detrimental to the character of their governors. No wonder is it then that the native approaches the sahib or gentleman with the most abject fear painted on every limb. He holds his breath when he hears him speak, and is ready to faint at the slightest display of anger or impatience. These sensational stories are generally propagated by rascally natives, who profit by the credulity of their countrymen in order to extort money. These men represent that nothing can be done without the bakshish or blackmail present, and they are the agents for the sahib, sent by him to collect toll. If the ignorant wretch demurs, his torturer paints a picture to which the torments of hell are but a trifle. The poor fellow, anxious to escape such calamities as he is threatened, pays the demand, and further presents his friend with a trifle in order that nothing should go wrong.

WEIGHING AND TESTING.

Early in the morning the weighing and tests commence. Notice is given to the cultivators, and they proceed to the factory, ranging themselves in a long line before the examining officer. Some men connected with the department then mix up the opium and take out a small quantity for examination. The officer, after inspection, marks the quality on the side of the earthen basin in chalk. The samples are again mixed up and tested with a solution of tincture of iodine. If it happens that the cultivator has been attempting to adulterate his opium with farinaceous matter the solution will discover the deceit. Experienced officers are alone trusted with this important duty, and it is expected of them to be able to distinguish the class of the opium as much by the feel and sight as by a chemical analysis. The consistency of the opium is easily told by a man who has been long at the work by simply turning the opium over with his hand or with the aid of a knife. If the opium is of a first-class quality the color is a rich brown, and it is so stiff that there is some difficulty experienced in turning. The poorer the quality the blacker the color and the thinner the consistency.

After the opium has been weighed and filled into separate jars according to its quality, they are sealed up and dispatched to the factory, where all the opium is again mixed up to a certain consistency and made into balls ready for exportation and sale at Calcutta. After the opium has once been delivered into the hands of the government officer, the cultivator has nothing more to do. He is paid so much by the pound; his former advances are deducted, and the connection between the *raiat* and government closes. When the balls are made they are packed into boxes called "opium chests," and sent down to Calcutta.

Mr. Bishop's Platinum Works.

At the recent convention of Mining Engineers in Philadelphia an excursion was made to the platinum works of Mr. Joaquin Bishop, of Sugartown, Chester County, Pa. Mr. Bishop is said to be the only platinum worker in the United States, by which must be meant the only one who has an establishment devoted entirely to that metal. He has made a specialty of platinum working for forty years. In 1845 he took a premium, but at that time the demand for platinum was so small that it only occupied him one day in the month, using the metal principally for rivets to fasten artificial teeth. Before the engineers, Mr. Bishop melted a piece of platinum with the ease that a plumber melts lead. The intense heat used may be imagined when it is known that a steel file held in the blast burned like a piece of wood.

The Population Center of the United States.

Ten years ago the center of the population of the United States was about forty-eight miles east of Cincinnati, Ohio. The Superintendent of the late census announces that the growth of the great West during the past decade carried the center of population about fifty miles west, while the large increase in the Southern States carried it a little southward. The result places the center of population within the limits of Cincinnati.

Last Year's Petroleum Product.

The conditions which prevail throughout the petroleum trade—including the export, the home, and the producing elements—are far from flattering to those who look for better prices in the immediate future, as the following points show:

1. The production seems to have continued without decline for the past month, showing an average per day of 72,390 barrels, against an average per day for the preceding month of 72,214 barrels.

2. During the past month we have added to stocks in the region (by excess of receipts into the lines over the quantity shipped from the lines) 1,162,073 barrels. This quantity of addition to stock for one month is unprecedented in the history of the trade.

3. On taking a year's view of the production and shipments of the lines we find that for the twelve months of 1880, while the average daily production was 71,124 barrels, the average daily shipment was 37,100 barrels, showing a daily excess of production over shipment or consumption, for the year, of 34,024 barrels.

4. With a stock of over 20,000,000 barrels—which, with the existing relation of excessive production to demand, must continue to increase for some months to come—there is no reason for buoyancy in the carrying of this stock, and except for the plentitude of money which has prevailed for the past six months, we are of opinion that it could not have been carried at the existing prices.

5. While nothing of any importance has arisen within the past month to indicate an extension of the field, the fact that the production has been so well kept up in the severe winter months just passed rather indicates that we may expect an increase in developments and production as the weather becomes more favorable for operating.

Notwithstanding the exceptional severity of the winter now passing, the table of statistics of drilling wells shows that more wells were drilled during this winter than in any preceding winter; thus showing a persistent determination on the part of the producer to keep up the excess of supply, if possible.

We have endeavored to hope for better condition in the trade by looking at the definition of the territory and at the plethora of money, to support the excessive and growing stocks; but in examining carefully the statistics of the business, we are forced to the conclusion that a substantial appreciation of prices based upon the relation of supply to demand is not likely to come to us for yet awhile. It will take considerable falling off of production and a considerable increase of consumption for the present year as compared with the past year to overcome the excess of 34,024 barrels which we accumulated each day of last year.

Taking the great activity in the region, together with the slow rate at which production has declined in the past few months, we fear some months must yet elapse before there come to us substantial reasons for better permanent prices. —*Stowell's Reporter.*

A New Disease.

A boy lately died at the Sainte Eugénie Hospital, Paris, of hydrophobia. His saliva, taken four hours after death, has been found by M. Pasteur to have remarkable properties, causing what appears to be a new disease. Two rabbits immediately inoculated with the saliva diluted died in about 36 hours. Other rabbits were inoculated with the saliva or with the blood of the first, and death ensued even more rapidly. The process was several times repeated, and with like effects. The animal, in five or six hours, loses appetite, afterward becomes weak and paralyzed, and at length dies of asphyxia. The windpipe is a good deal congested and shows hemorrhage. There is also a swelling of the ganglions on either side, and of the groin and axillæ, etc. M. Pasteur has observed in the blood of the inoculated animals a small organism, or microbe, which (by his method of artificial cultivation) he finds good reason to regard as the agent of the malady. It is a very short rod, slightly contracted about the middle; a sort of aureola appears round it, probably due to mucous substance. It is somewhat like the microbe of chicken cholera, but differs entirely in its effects. Fowls inoculated with it are not in the least affected. It is further singular that while the rabbit is always so quickly killed by the effect of inoculation, the guinea-pig, so closely related to the rabbit, retains its vigor and appetite weeks after inoculation. Whether there may not in this case be a long incubation of the virus remains *sub judice*. The new malady seems thus far distinct from rabies in the absence of the usual incubation, the nature of the anatomical lesions, and the transmission by inoculation with the blood of the dead animal. Further, dogs inoculated with the boy's saliva died in a few days without presenting rabid symptoms. M. Pasteur, however, thinks it would be rash to affirm the absolute independence of the two disorders; and if rabies may be attributed to the presence of a microscopic organism, some hope is offered that science may find a means of attenuating the action of that terrible malady.

The Jubilee of the Hanover Technical Academy.

Doubtless many of our readers will be interested in the announcement elsewhere in this paper of the 50th anniversary of the Polytechnic Institute of Hanover, Germany, to be celebrated next June. The festival committee are desirous that all former students at that institution shall send in their names at once, even though they cannot accept the cordial invitation to participate.

How the Telegraph is Kept in Order.

Every one has seen a "line man" walk up a telegraph pole as readily as if he were going up a flight of stairs. With a quick, nervous jerk of the foot he drives the spurs into the wood, and takes a firm hold every time. This dexterity comes from practice. It looks dangerous when a man is near the top of the pole, but that there is really little danger is proved by the fact that accidents very rarely occur. The men become accustomed to working at a great height, and mind it no more than sailors on a ship. An experienced man looks out for rotten poles and rotten cross beams, and once confident of these, he feels no further alarm. He hangs on by his legs as cleverly as a monkey by its tail, and thus has the free use of his arms and hands.

The spurs are of steel, and consist of a flat bar with a bend, which passes under the instep. A sharp point projects diagonally downward so as to bear a heavy weight from above. The greater the weight the deeper the point sinks, and the wood would have to be very rotten for it to slip. It leaves behind on the pole those queer little holes, which so much resemble the work of a woodpecker on a tree.

The line men are divided into two classes, climbers and ground men. The latter rank little higher than ordinary laborers, but in time, if they are ambitious to learn, they graduate into climbers. Climbers are paid from $40 to $75 a month, and at present are in great demand owing to the large amount of telegraph construction going on throughout the country. Ground men dig holes, plant poles, carry wire, and do whatever other labor is necessary.

The climber is provided with a pair of pliers, a hand vise, and a strap. He catches up the broken ends of wire, draws them together with the vise and strap, and splices them with the pliers. Care is taken to leave a certain slack, so as to allow for contraction by cold in winter. In large cities a number of climbers are kept constantly on duty at the central office, so as to be sent out at a moment's notice to repair a break. If a pole falls prompt action is taken. The fallen portion is chopped into sections and dragged out of the way of traffic. The stump is dug out. If a hole is to be dug, it is bored with a great earth auger, which does its work more neatly and quickly than spades.

There are different ways of raising the poles. If it is a very long pole—say seventy feet—a short pole is temporarily inserted and used as a guide. These long poles are becoming common in the city, for the reason that they raise the wires above the great mass of wires that covers the streets with a network of iron. Smaller poles are raised with pikes. A slanting ditch is dug from the surface of the ground to the bottom of the hole. The pole is laid in this, and this raises the upper end from the ground. Eight or ten men with pikes get under it. These pikes are long, smooth poles, with a sharp spike in the end. The men drive the spikes into the under part of the pole, and raise all together. They stand in such a way that the center of gravity of the pole falls among them, and there is no danger of its toppling to either side. Of the ten men eight will retain the advantage gained by the lift. The other two loosen their pikes, and, going in front of the others, insert their spikes lower down. Another lift is given, and this process is continued until the pole is raised to a perpendicular. The earth is then firmly wedged in about it, and it is ready to receive the wires.

The wires used are generally of size No. 8. For very long circuits Nos. 6 and 4 are used. The Western Union Telegraph Company has two No. 4 wires running to Chicago. The telephone companies use smaller wires, generally No. 12. This accounts for the greater damage done them by a sleet storm such as that of the 21st of January last.

The insulators are of glass, and cost from three to four cents apiece. Very many other devices and various kinds of material—stone, porcelain, rubber, etc.—have been used as insulators, but glass has been found to be the best and cheapest.

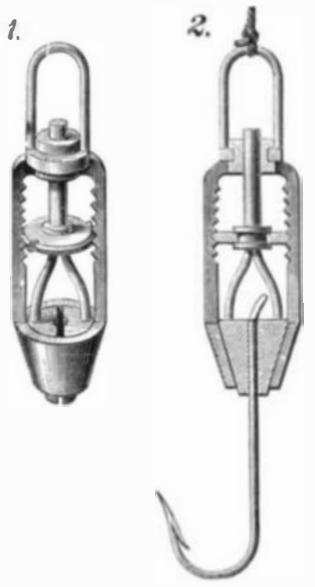
The chief operators of the offices in the large cities have charge of repairs for a wide circuit about them. At the American Union office, in this city, the chief operator has control to Philadelphia, to Hartford, and to Albany. At various stations along the lines between these points are test offices. The operators in these are required to be on duty at seven o'clock every morning. The chief operator in New York at that time calls up Philadelphia. Receiving a response, he tries every wire to Philadelphia. If all work properly it is all right. If a wire fails to work, the chief operator calls the test office nearest Philadelphia. If he again receives no response, he continues calling the successive test offices until he receives an answer. He thus locates the place of trouble, and then orders out the line men who are in waiting at the test stations on either side, who go along the line until they discover what is wrong. Another method is to call the test officers, beginning at New York, and cause each to ground its wire, until the point of damage is located.

It is easy to locate a break in the city where line men are constantly on the lookout, but in the country it is a different thing. Line men, who are necessarily climbers, are engaged by the month, and have each a certain tract of line assigned to their care. If the lines run along a railroad a man has control of an average of fifty miles. In case of a break he travels on a baggage or hand car to the place of trouble. These line men are under the control of certain head offices, and can be concentrated at any serious point of damage. In many instances the operators at unimportant stations also act as line men, and this is a part of their regular duty. Where the operator works on commission, he is paid extra for his line work. If the line runs on a turnpike away from a railroad, the line man has only fifteen miles under his care. He is obliged to live within call of the nearest station, and to be ready to go out at any time. Night or day, hot or cold, he must be prepared to start for the scene of trouble. The lines often run through desolate places, on the sides of mountains, and in wide prairies. The line man on horseback dashes from pole to pole, following the wires with his practiced eye. He often camps out all night, for he must not stop until the work is completed. In the winter some of these men travel on snow shoes, and lately, out West they have had the strange experience of digging down to the wires, where the snow was so deep as to cover the poles. It is a rule that the line man must go over the line once a week, to see that the poles are in order and to replace broken insulators. His hours of toil are often repaid by days of ease. He is alert for duty, but may have nothing to do for a long time. His pay continues just the same, and as long as he keeps within call he can do what he pleases.

The telegraph companies would like to run their wires under ground, but they find it won't work. They have been unable to insulate the wires so that they will work properly for any length of time. This compels the use of poles, which are generally of two kinds, cedar or chestnut. Cedar is the lightest, trimmest, and best looking, but chestnut lasts longer. Wires last from six to eight years. Rust is their great enemy, and smoke is another foe. Neither wires nor poles are expensive. Labor is the great item in making repairs, and in times when there is universal disaster to lines the companies have to pay high wages.—*N. Y. Sun.*

IMPROVED SWIVEL-HOLDER FOR FISH-HOOKS.

The engraving shows a simple and effective holder for fish-hooks of different sizes. The housing or head has at the top a cylindrical sleeve, to which is attached a swivel



HYMERS' SWIVEL-HOLDER FOR FISH-HOOKS.

loop for receiving the line. The bottom of the housing is connected with a conical sleeve for receiving conical jaws attached to a forked rod extending upward through the cylindrical sleeve. This forked rod carries a double cam, which engages notches in opposite sides of the housing, and holds the conical jaws in any desired position. The device is adapted to hooks of different sizes by inserting the conical jaws to a greater or less distance into the conical sleeve and fastening them by means of the cam.

This device facilitates the removal and replacement of broken fish-hooks, and admits of using on a line, hooks of a size suitable for any purpose. It answers as a sinker, and may be made small enough for catching minnows or large enough for the largest lines in use. It is a perfect swivel and a reliable holder. The inventor applies the same holder to rods, wire rope, etc.

This device was recently patented by Mr. C. Hymers, of 1601 Monroe street, St. Louis, Mo., who may be addressed for further information.

A Great Crucible Steel Casting.

Messrs. Jessop & Sons, Brightside Steel Works, Sheffield, have recently cast the largest crucible steel casting yet produced. It is a spur ring 28 feet in diameter, machine-moulded, and cast whole. To cast it 270 pots were used, each pot holding 80 lb. weight of molten steel. When the steel had been poured into the three large ladles, the plugs were removed, and it ran into the mould, the weight when cast being about 10 tons. In its finished state the weight will be about 8½ tons. It is, without doubt, by far the largest crucible cast steel casting of its kind that has ever been produced. Messrs. Jessop & Sons anticipate that this will be the beginning of an important trade with Lancashire mill owners, as they discover how much more durable steel wheels are than the cast iron wheels at present in general use. The firm have previously cast wheels 13 feet and 14 feet in diameter, but to 28 feet was a great leap. Now, however, they are prepared to undertake castings up to 34 feet. The operation of casting occupied 8½ minutes.

NEW INVENTIONS.

Mr. Henry B. Burin, of New York city, has patented a machine for threading bolts and tapping nuts, so constructed that when one tap or die is forced forward to do its work another die or tap will be withdrawn from its work. Thus the machine works continuously, and no time is lost in withdrawing the die or tap.

Mr. Major Thorp, of French Creek, West Va., has patented a cattle shed for use as temporary shelter in open pastures or fields. It consists of a roof pivoted to an upright support in combination with a windwheel and connecting devices, whereby the roof is turned so as to afford shelter from the wind coming from any quarter.

Mr. Elmer P. Newman, of Dimondale, Mich., has patented a copy holder for writing-books ruled parallel with the binding edge. The copy holder is formed of metal or other suitable material, having the ends bent under to form grooved flanges, which embrace the edges of the pages, and the upper longitudinal edge is bent over forward on the upper side to form a longitudinal flange for holding the copy, which is also held by the bent prongs on the lower edge of the holder.

Mr. Matthias Naumier, of Port Byron, N. Y., has patented an improvement in grain cradles, which relates to cradles made with either straight or bent snaths, and has for its object to give increased strength to the implement, and which consists in a novel system of bracing, which strengthens the snath, post, and fingers.

Mr. James E. Gowen, of Peabody, Kansas, has patented a self-adjusting weather strip for doors. It consists of a wood or metal strip, which, by means of springs, is caused to fit tightly against the casing of the door when the latter is closed.

Mr. Robert I. Draughon, of Perdue Hill, Ala., has patented a cotton chopper, which can be easily guided along a row of plants, whether straight or crooked, and around stumps or other obstructions, which will chop the plants to a stand without throwing the soil out of place, and which will allow the horse to walk at the side of the row

Mr. James H. Brown, of Boston, Mass., has patented an improved machine for sawing kindling wood, which automatically feeds the sticks to the saw. The principal feature of the machine is a wheel with radial arms and spring clamps, by which the sticks are presented to either a circular or reciprocating saw, and devices for thrusting the sticks longitudinally to insure the cutting of definite lengths.

Mr. Carl L. Praeger, of Philadelphia, and Hubert F. Praeger, of South Bethlehem, Pa., have patented a self-adjusting wrench for bolts and nuts. The invention consists in a curved handle, one end of which serves as a lower jaw, and which is socketed and chambered to receive the shank and operating mechanism of the upper jaw. By means of a spring, slotted wedge, and lever, the upper jaw is adjusted and held. Some modifications of these devices are shown in the patent, but the principal features are as stated.

Mr. Arthur S. Pierson, of Harvard, N. Y., has patented a jointer for circular saws, so constructed that it can be readily adjusted to operate on saws of different diameters, and which will bring all the teeth to a uniform length. It is an ingenious, simple, and effective device.

Mr. George W. Miller, of Fawn Grove, Pa., has patented a rein holder for holding reins high enough above the dash-board of a vehicle to keep them out of reach of the horse's tail. It consists of a wire frame hooked on to the upper edge of the dash-board, a rectangular loop of the same material extending down in front to rigidly hold the frame, this loop being fastened to the front end of the box.

Mr. James A. Raney, of Cross Cut, Pa., has patented a sieve for middlings purifiers, so constructed that all parts of the sieve cloth will be covered by the middlings, thus preventing the air blast from passing through any uncovered portion of the sieve and the consequent waste of fine middlings.

Mr. Godfried Laube, of Wausau, Wis., has patented a car heater and ventilator, so constructed as to constantly reheat the air contained in the car, which allows a supply of fresh air to be introduced into the car when desired, which allows the hot air to be moistened before its introduction into the car, and which can be advantageously used for heating rooms and buildings.

Messrs. Herman H. Beckman, Claumer H. Beckman, and Christ Beckman, of Clayton, Iowa, have patented an improved windmill, so constructed that it turns more or less toward the wind according to the velocity with which the wind blows, and always remains in balance on its supports.

Mr. Richard Poindexter, of Bethania, N. C., has patented a tire shrinker, which is a cheap, simple, and effective device for holding a tire upon the anvil while it is being operated upon to shrink it, or upset it by hand forging.

Mr. William B. Van Hutton, of La Bahia Prairie (Burton P. O.), Texas, has patented a folding crate for the transportation of poultry, small animals, fruit, vegetables, etc, which is firm, strong, and durable, and may be folded so as to occupy little room in reshipment.

Mr. William J. Suttie, of New York city, has patented a nose piece for eye-glasses for holding the glasses and supporting the spring. The nose piece has several points of attachment to the lens or bow, and a socket for the end of the spring.

Mr. John Flanagan, of Newburg, N. Y., has patented an improvement in submerged pumps, which consists of a double cylindered pump provided with pistons composed of elastic diaphragms secured at their edges in the sides of the