(20) P. S. asks: What do traveling glass blowers burn in their lamps to make such a great heat as they produce? I have seen them blow up a ball in the middle of a glass rod, and then, by suction with the mouth, bring some kind of a melted liquid into said ball, and silver it over on the inside. A. They generally use alcohol. 2. What do they use for the silvering? A. The following alloy is frequently used: 3 parts lead, 2 tin, 5 bismuth.

(21) H. L. C. says: 1. What appearance has porcelain clay in its natural or crude state? A. Clays are naturally white, yellow, blue, or green. Pure clay is white; colored clays are the result of several admixtures. White clay contains but small quantities of protoxide of iron, and becomes after burning yellow or red; these colors, originating from the numerous organic substances, disappear after being volatilized by many firings. The colored clays change their color during firing, becoming red or red yellow. Fine clays are prepared only from those becoming white by continued burning. 2. Would a good mine of porcelain clay be of great value? A. You had better have a sample analyzed, and so determine its exact value. 3. What is the proper name for porcelain clay? A. The technical name is kaolin.

(22) H. A. M. asks: What will harden coal tar, so that the heat of the sun will not cause it to run or melt? A. The only process that we know of in this connection is the distillation of the tar, to obtain pitch or asphalt.

What would be the results attaching a force air pump to the steam tube leading to the cylinder and forcing air in with the steam? Our engineer thinks the expansion of the air would add to the power, and prove a saving. A. Sufficient data are not sent. In general, this plan would be anything but economical.

(23) W. E. L. asks: Could not photographers place a looking glass in such a position that anyone sitting for a picture could look at themselves, and be sure to get the desired expression of countenance? A. They could. It is an old idea.

(24) F. M. H. asks: How can I ascertain how many feet a belt runs at any given speed of rotation of pulley? A. Find the circumference of a circle whose diameter is equal to that of the pulley on which the belt runs increased by the thickness of the belt. Multiply this circumference by the number of revolutions that the pulley makes per minute.

What are the principal questions that are asked of a person in order to get an engineer's license? A. You should apply to the local supervising inspector.

(25) J. D. W. asks: How are glass globes, reflectors, etc., silvered? How can I silver a bent glass without having to use a hot solution or the ordinary method of tinfoil and quicksilver? A nitrate of silver solution would be too costly, as it would take too much and the waste would be of no use. A. We can give you no recipe that will answer all your requirements.

(26) C. B. W. says: 1. I have tried to construct a cheap telescope as described by you, but it will not work. The lenses are a meniscus of 1¼ inches diameter and 48 inches focus, and a plano-convex ½ inch in diameter, 1 inch focus. Which way should the lenses be set, convex side toward the eye or otherwise? A. Otherwise. 2. Will not a straight tube do as well as a tapering one? A. Yes. 3. How far should the above lenses be from each other? A. 49 inches.

(27) C. J. W. says: I intend to make a telescope with a two inch achromatic object glass of 30 inches focus. 1. How can I make a terrestrial eyepiece for it, having a power of 80, and another having a power of 20. A. The equivalent focus of a terrestrial eyepiece is about equal to the mean of that of the first and last lenses. Thus if the object lens (A) is 1·5″ focus, amplifying lens (B) 2″, field lens (C) 1·6″, eye lens (D) 1·2 focus; the equivalent focus will be 1 35″ and the power 22 If you wish a pancratic or variable power eyepiece, make the foci (in sixteenths of an inch): A 19, B 24, C 24, D 11; the apertures respectively 9, 7, 9, 7. From A to B = 27, C to D = 20. From A to D = 74, when the draw tube is shut; A to D = 124 when it is open. Power 16 shut, 30 open. Diaphragm aperture 2, distant 18 from A toward B. Ditto aperture 5, distant 8 from C toward D. 2. Has the Huyghenian eyepiece any advantage over a single equivalent lens? If so, what is it? A. There is less aberration. 3. How do you tell the focal length of the Huyghenian eyepiece, when given the focal length of the two lenses? A. Divide focus of objective by ⅓ focus of field lens. 4. Will you please give me a formula for making a terrestrial eyepiece of any power for any focal length of object glass? A. Sir D. Brewster's formula is; Foci, 14, 21, 27, 32. Distances, 23, 44, 40. Apertures 5·6, 3·4, 13·5, 2·6; diaphragm at inside focus of eye-lens. 7.

(28) Z. says: I have an object glass 2 inches in diameter and of 24 inches focus. I wish to increase the length of the focus by means of a concave lens placed between the object glass and the eyepiece, so that my telescope shall be equal in power to an ordinary telescope of 48 inches in length with an object glass two inches in diameter. What must be the size and focus of the concave lens, and at what distance must it be placed from the object glass? How is the calculation made? A. Place, 12 inches from your objective, a concave achromatic lens of 1 inch aperture, and 24 inches virtual focus. For optical formulæ, see any work on physics.

(29) W. B. asks: What is the cause and what is the remedy in case of a person's hair getting prematurely gray? Is it poverty of the particular constituents of the blood, which furnished sustenance for the hair? If so, what should be added to enrich it in that respect? A. It may be congenital or accidental, depending upon some constitutional peculiarity in the organization of the individual; causes which have been observed to cause it are mental emotion, disease, and injuries. Grief and terror have been known to cause it, varying in time from a few hours to years. Bichat says: "The different passions of the mind have a remarkable influence over the internal structure of the hair; often, in a short period, grief effects change in its color, blanching the hair, probably by means of absorption of the fluids contained in its tissue." The treatment is to remove the causes of debility existing in the constitution by tonics, especially chalybeates and phosphoric acid, and (where defective nutritive power prevails) by means of preparations of iron and arsenic, and to stimulate the skin locally by abundant brushing and some gentle stimulant, such as cologne and aqua ammonia used at the same time.

(30) R. H. says: If you sprinkle salt on a fly which is dead from drowning, it will come to life again and fly away. What is the cause? A. The fly is not dead, although he may be apparently lifeless. The salt absorbs the water from the breathing apparatus of the insect, and so restores animation.

(31) W. P. H. asks: 1. How is the concave surface of a glass reflector for a reflecting telescope silvered on the inside? A. Draper's method of silvering glass: Dissolve 560 grains Rochelle salt in 3 ozs. of water. Dissolve 800 grains nitrate of silver in 4 ozs. of water. Add silver solution to an ounce strong ammonia until brown oxide of silver remains undissolved. Then add alternately ammonia and silver solution carefully until the nitrate of silver is exhausted, when a little of the brown precipitate should remain. Filter. Just before using mix with the Rochelle salt solution and dilute to 22 ozs. Clean the mirror with nitric acid or plain collodion and tissue paper. Coat a tin pan with beeswax and rosin equal parts. Fasten a stick ⅛ inch thick across the bottom. Pour in the silvering solution. Put in quickly the glass mirror, face downwards, one edge first. Carry the pan to a window and rock the glass slowly for half an hour. Bright objects should now be scarcely visible through the film. Take out the mirror; set it on edge on blotting paper to dry. When thoroughly dry, lay it face up on a dusted table. Stuff a piece of softest thin buckskin loosely with cotton. Go gently over the whole silver surface with this rubber in circular strokes. Put some very fine rouge on a piece of buckskin laid flat on the table, and impregnate the rubber with it. The best stroke for polishing is a motion in small circles, at times going gradually round on the mirror, at times across, on the various chords. At the end of an hour of continuous gentle rubbing, with occasional touches on the flat, rouged skin, the surface will be polished so as to be perfectly black in oblique positions, and, with moderate care, scratchless. It is best, before silvering, to warm the bottle of silver solution and the mirror in water heated to 100° Fah. 2. What is the best composition for a metallic speculum for a reflecting telescope, and what proportion should the metals have? A. Copper 126·4, tin 58·9 parts. 3. How can I grind and polish a concave metallic speculum for a reflecting telescope? A. Coarse, fine, and elutriated emeries, then rouge, must be applied to the surface in curves, at first circular, then in adjustable hypocycloid curves, by appropriate machinery or by hand. The hollow is ground by lead and by iron surfaces, and is polished by pitch tempered with rosin.

(32) T. S. K. asks: How can I cement a broken crucible? A. We know of no authentic recipe that answers your purpose.

(33) G. B. asks: How can the black scale on sheet steel be removed most efficiently? Cold acid will not touch it; and for a small quantity, the expense of a lead bath and apparatus is too great. A. We know of no method other than those you mention.

(34) R. A. says: I have a Rhumkorff induction coil. The connections are perfect as far as I can see, and I have a Smee's battery of two elements. Is the battery strong enough? It will work at times, but will give no perceptible shocks. Occasionally the keeper will tap for a few moments, then stop. If I touch it it will start again, only to stop as before. Can you inform me as to the probable cause? A. It is necessary for the proper working of the machine that the keeper and all connections should be perfectly free from dust, corrosion, etc. Your battery is amply sufficient for the purpose.

(35) W. L. L. says: In Humboldt's "Cosmos," I read that "the early races of mankind beheld in the far north the glorious constellation of our southern hemisphere rise before them, which, after remaining long invisible, will again appear in those latitudes after the lapse of thousands of years." Again: "The places of the north pole will successively be indicated by the stars *Beta* and *Alpha Cephei* and *Delta Cygni* until, after a period of 14,000 years, Vega in *Lyra* will shine forth as the brightest of all possible pole stars." If this be so, are not the zones and climates moving around the earth, slowly but surely, so that what now is the frigid zone was once the torrid zone, and *vice versa*? Again: If, as Herschel says, the sun is leading this system through space, is another glacial period possible? What caused the glacial period? Was it the physical condition of the sun, and was the ice destroyed by the growing heat of the sun? Is the sun's heat increasing or decreasing? Are not all the living beings on this earth doomed to certain extinction through and by the course of the natural laws of the Universe in the distant future? Will not the earth become as the moon is now, dead and non-productive? A. Glacial periods have occurred in both hemispheres, and may have been caused: 1. By elevation of land 5,000 feet. 2. By changes in the obliquity of the ecliptic, causing an alternate accumulation of ice at either pole. This occurred here from 80,000 to 200,000 years ago. 3. The sun, being now a variable star, period 11 years, may have emitted less heat. 4. The solar system may have travelled in cold spaces comparatively destitute of stars. The life history of a planet is supposed to be entirely comprised in the short period requisite to cool its surface from the boiling to the freezing point of water, being inhabited only for an infinitesimal part of its existence.

(36) F. O. C. asks: Can you give me a sample test by which I can tell pure oxide of zinc from adulterated, before it is ground in oil? A. Oxide of zinc and its hydrates are white powders, which are insoluble in water, but dissolve readily in hydrochloric, nitric, and sulphuric acids The oxide of zinc acquires a lemon yellow tint when heated, but it reassumes its original white color upon cooling. When ignited before the blowpipe, it shines with considerable brilliancy. You do not state with what you consider the zinc to be adulterated. The substance most commonly used is sulphate of baryta; this substance is insoluble in the acids (except in an almost imperceptible amount) and can be separated from zinc in that manner, the insoluble residue left from a strong acid solution in this instance being baric sulphate.

What is a good test to detect impurities in hydrochloric acid? A. Pure hydrochloric acid must be colorless, and leave no residue upon evaporation. Hydrosulphuric must leave it unaltered, and sulphocyanide of potassium must not impart the least red tint to greatly diluted acid.

I have been told that, in one of Sorel's formulæ for the oxide and chloride of zinc cement, he used a portion of carbonate of baryta. Is this so? A. One of Sorel's cements contains 3 per cent of borax or the same proportion of sal ammoniac, but we have no record of any baryta salt being used.

(37) F. H. B. asks: What vessels have made the fastest time across the ocean, on record? A. We believe that the run of the steamer Adriatic of the White Star line, from Queenstown to the lightship off Sandy Hook in 8 days less 5 minutes, is the quickest western trip on record. The Adriatic is 450 feet long, and has a beam of 41 feet.

(38) E. L. H. asks: How can I set the lenses of an eyepiece to a telescope? It is composed of two plano-convex lenses. A. The Huyghenian eye lens is one third the focus of the field lens, and is placed its own focal length within the focus of the latter.

(39) J. C. B. of Berlin, Germany, asks: 1. What is expected of a mechanical draftsman in America when he takes a position in the drafting room of machine works? A. If he is the head draftsman, he is expected to design and superintend the construction of all work. 2. What percentage on the estimate of an engine does a mechanical draftsman charge for the drawings, etc.? A. No general answer can be given to this question. The compensation received depends upon the ability and reputation of the designer. 3. How do the proprietors of machine works charge for work done in their shops, and also for a man going out to do work? A. From 20 to 25 per cent profit may be considered an average amount.

How many editions of "Uncle Tom's Cabin" have been published altogether? A. It is stated on good authority that the number of copies sold amounts to millions. We do not think that the number of editions is known. The work has been translated into 17 languages.

(40) J. H. F. asks: 1. Will turpentine do to preserve animals in place of arsenic? A. No, because of evaporation. 2. Is there any book on the animals of New York? A. The "Natural History of New York" contains all the information you require.

What is a standard work on civil engineering? A. Mahan's "Civil Engineering."

Is gasoline dangerous to use? A. Yes, very.

(41) W. C B. asks: What is a foot pound? Well's in his "Chemistry" says that is a force sufficient to raise 772 lbs. weight to the hight of one foot; but he does not say how long a time may be occupied in raising it. A. A foot pound is the amount of work required to raise a weight of one pound one foot high, We think you are mistaken in the definition you attribute to Mr. Wells.

(42) H. B. says: Your correspondent J. A. asks where the fallacy is in the following demonstration: $x=1$, $y=1$; then $x=y$. $x^2=xy$. $x^2-y^2=xy-y^2=(x+y)(x-y)=y(x-y)$. $x+y=y$. $2=1$. He might have obtained the same result by a shorter course of algebra: $2\times0=1\times0$; or both sides divided by 0, $2=1$. The fallacy consists in dividing the two sides of an equation by a divisor equal to 0, in which case the resulting equation is not necessarily right, though it may be so in most cases.

(43) B. F C. says, in answer to J. L. L., who asked as to fire clay for a boiler furnace: Take common earth, well mixed with water, to which is added a small quantity of rock salt; let the water stand until the salt dissolves, which will take about 2 or 3 hours. It is then ready for use. Apply it as fire clay is used, and your furnace will stand much longer.

(44) B. F. C. says: I see that a mechanic of Cleveland, O., secured a good draft and succeeded in consuming the smoke from his furnace by the application of steam in small jets, which you seem to doubt. I have a similar apparatus; but instead of two jets there are five, and it not only creates a bright light, but, with careful firing, it consumes at least two thirds of the smoke. Where you have a good draft, I would not advise any one to use it, as it creates rapid combustion, and would cause a waste of fuel.

(45) D. M. says, in answer to I. A., who asks: Where is the fallacy in the demonstration given that $2=1$? It should be remembered that multiplying an equation by a factor of the first degree raises the equation one degree and introduces a new solution which is found by making that factor equal to zero. Inversely, if we divide an equation by a factor of the first degree, the quotient is an equation one degree less, and has one solution less, which solution is that expressed by making the diviser = 0. Thus, in the present instance, $x=y$ or $x-y=0$ has but one solution. Multiplying by x, we have $x^2=xy$, or $x(x-y)=0$. which, being of the second degree in regard to x, has the two solutions $x-y=0$ and $x=0$. If we divide by $x-y$, the supposition that $x=y$ disappears, and there remains only $x=0$ From which it appears that in $x+y=y$, the quotient obtained by I. A., x should be made equal to zero. The quantity y^2, subtracted from each member of the equation $x^2=xy$, since it does not alter the equation, has nothing to do with the result obtained.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined with the results stated:

W. F. S. and G. S. A.—Your insects have been put in the hands of a distinguished entomologist for examination, and will be reported upon as soon as an answer is received.—W. E. D.—It is plumbago.—J. E. B.—They are both specimens of trap rock, and would possibly make such a paint as you desire.—J. B.—No. 1 is bituminous shale. No. 2 is brown hematite, with considerable amount of clay. No. 3 is jaspery hematite. No. 4 is laminated argillaceous brown hematite. No. 5 is clay and sand, cemented with hydrated sesquioxide of iron. No. 6 is fossiliferous yellow and red hematite No. 7 is compact clay. No. 8 is bituminous clay. No. 9 is argillyte. No. 10 is galena.—F. J. R.—It is hornblende and quartz.—C. O. R.—No. 1 is chalcopyrite. No. 2, the gray part is fibrous zeolite; the green is in too minute particles for satisfactory examination. No. 3 is fibrous amphibole. No. 4 is leucopyrite or arsenide of iron. No. 5 is azurite. There was no No. 6 in the box. No. 7 is flesh-colored calcite.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

On Cribbing in Horses. By D. C.

On the Decomposition of Eggs. By Z. M. P. K.

On Mosquitoes. By W. C.

On the Treatment of Criminals. By H. H.

On Floating Magnets. By H. P. H.

On a Carpenter's Bench. By J. C. P.

On a Boiler Explosion. By M. A. K.

On the Potato Bug. By E. S. W.

On the Phylloxera. By R. J., and by R.B.S.

On Tides. By P. G. McE.

On an Amalgamator for Gold and Silver Ores. By W. T. B.

On Crucibles. By J. D.

Also enquiries and answers from the following:

G. S.—R. H. P.—J. N. B.—E. F. C.—E. L. W.—O. P. S.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail if the writer's address is given.

We have some queer correspondents: One writes to know if we will not be so good as to send a messenger to an address which he gives—distance two and a half miles from our office—to make certain inquiries for him. It would require one and a half hours' time to do the errand, and not a stamp inclosed. Another wants us to write a letter and tell him where to get a combined thermometer and barometer. Another: "Will you be good enough to give me the names and addresses of several of the makers of the best brick machines"; another wants water wheels another threshing machines; each writer desires our written opinion as to which is the best device, with our reasons, and not one is thoughtful enough to inclose a fee, or to reflect that to answer his request will consume considerable of our time. Another party wishes us to write to him the recipe for making ornaments out of coal tar, where he can buy the mixture ready for use, and how much checkermen will sell for in the New York market. For this information he sends us the generous sum of three cents in postage stamp. Mr. C. wants us to tell him of some valuable invention, of which he can buy the patent cheap, that would be suitable for him to take to sell, on his travels out West, by towns, counties, etc., three cents inclosed. Others want us to put them in communication with some person who will purchase an interest in their inventions, or manufacture for them, or furnish this or that personal information, our reply to be printed in the SCIENTIFIC AMERICAN. We are at all times happy to serve our correspondents, and when they present enquiries which we consider of general interest to our readers, we give space for them in the above columns; but if replies to purely personal errands are expected, a small fee, say from one to five dollars, should be sent.

[OFFICIAL.]

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APPLICATIONS FOR EXTENSION.

Applications have been duly filed and are now pending for the extension of the following Letters Patent. Hearings upon the respective applications are appointed for the days hereinafter mentioned:

31,082.—DOUGH MIXING MACHINE.—W. Hotine. Dec. 23.
31,330.—CARRIAGE WORK COLLARS.—M. Seward. Jan. 20.

EXTENSIONS GRANTED

30,153.—ATTACHING SAW HANDLES.—I. Pelham.
30,138.—SADDLE TREE.—S. E. Tomkins.
30,175.—EARTH BORER.—A. S. Ballard.

DESIGNS PATENTED.

7,763 & 7,764.—CARPETS.—H. F. Goetze, Boston, Mass.
7,765.—OIL CLOTH.—H. Kagy, Philadelphia, Pa.
7,766 to 7,770.—CLOCK CASES.—F. Kroeber, Hoboken, N.J.
7,771.—SODA WATER APPARATUS.—G. F. Meacham, Jas. W. Tufts, Bedford, Mass.
7,772 to 7,774.—WATCH CASES.—S. Strasburger, Boston, Ms.
7,775.—BASE BURNING STOVE.—N. S. Vedder *et al.*, Troy, N.Y.
7,776—SPOON HANDLES.—W. K. Vanderslice *et al.*, San Francisco, Cal.

TRADE MARKS REGISTERED.

1,990.—ELECTRIC CHAIN BELT.—J. Bryan, New York city
1,991.—CAKES, ETC.—W. E. & N. H. Camp, Phila., Pa.
1,992.—WASHING MACHINE.—J. Campbell *et al.*, West Alexandria, Ohio.
1,993.—OIL.—J. B. Hay, Philadelphia, Pa.
1 994.—DENTIFRICE.—M. F. Keeshan & Brother, Cincinnati, Ohio.
1,995.—STOVES.—C. Noble & Co., Philadelphia, Pa.
1,996.—CORN SALVE.—J. H. Richelderfer, Philadelphia, Pa.
1,997.—SOAP.—Schultz & Co., Zanesville, Ohio.
1,998.—BREAD.—H. C. Stewart & Co., Cincinnati, Ohio.
1,999.—FINISHED LEATHER, ETC.—G. H. Thomas & Co. Middleville, N. Y.

SCHEDULE OF PATENT FEES.

On each Caveat $10
On each Trade Mark $25
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On appeal to Commissioner of Patents $20
On application for Reissue $30
On application for Extension of Patent $50
On granting the Extension $50
On filing a Disclaimer $10
On an application for Design (3½ years) $10
On application for Design (7 years) $15
On application for Design (14 years) $30

CANADIAN PATENTS.

LIST OF PATENTS GRANTED IN CANADA

SEPTEMBER 25 to 30, 1874.

3,868.—W. C. Stone, Pictou, Prince Edward county, Ont. "Stone's Instantaneous Process for Dressing and Dyeing Furs, Wools, Hairs, Skins, Pelts, and Hides." (Extension of provincial patent No. 3,260.) Sept. 25, 1874.

3,869.—P. Gamboni, Valparaiso, Chili. Improvements in the means of and apparatus for producing and maintaining motive power or assisting to produce and maintain such power, called "Gamoini's Mechanical Movement." Sept. 25, 1874.

3,870.—D. Whittemore, Boston, Suffolk county, Mass., U. S.; assignee, W. H. Rounds, Brockton, Plymouth county, Mass., U. S. Improvements on heel trimming machines, called "Round's Improved Heel Trimming Machine." Sept. 25. 1974.

3,871.—D. H. Dotterer, Philadelphia, Philadelphia county, Pa., U. S., and H. Wood, same place. Improvements on locks for sliding doors, called "Dotterer's Railway Freight Car Door Lock." Sept. 25, 1874.

3,872.—J. Behel, Rockford, Winnebago county, Ill., U. S. Improvements on whiffletree hooks, called "Behel's Whiffletree Hook." Sept. 30. 1874.

3,873.—William Fost, Glenwilliams, Halton county, Ont. Improvements in a machine for tilling land, called "Fost's Combination Beam." Sept. 30, 1874.

3,874.—O. T. Springer, Wellington Square, Holton county, Ont. Improvements in windmills, called "The Ontario Farmer's Windmill." Sept. 30, 1874.

3,875.—G. d'Infreville, New York city, U. S. Improvement in sending messages by a current of electricity in opposite directions by the same wire and simultaneously, called "Improvement in Duplex Telegraphy." Sept. 30, 1874.

3,876.—T. Groom, Guelph, Wellington county, Ont. Improvements in cooking ranges, called "Guelph Economical Cooking Range." Sept. 30, 1874.

3,877.—G. B. Durkee, Alden, Erie county, N. Y., U. S. Improvements in axle boxes, called "Durkee's Improved Axle Box for Wagons." Sept. 30, 1874.

3,878.—C. L. Page, Cambridge, Middlesex county, Mass., U. S. Improvements in elevators, called "The Page Safety Elevator." Sept. 30. 1874.

3,879.—M. G. Crane, Newton, Middlesex county, Mass., U. S. Improvements in automatic signal boxes for electro-magnetic fire alarm telegraphs, called "Crane's Automatic Signal Boxes for Electro-magnetic Fire Alarm Telegraph." Sept. 30. 1874.

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ASSIGNEE'S SALE.

PUBLIC NOTICE IS HEREBY GIVEN, that the undersigned, Assignee of the estate of Margaret E. Hanson and Silas F. Connor, Bankrupts, will on the

THIRTIETH DAY OF OCTOBER, A. D. 1874,

at 10 o'clock A. M., at the shops known as the Alton Agricultural Works, Alton, Illinois, sell at public auction, for cash, the following described personal property, belonging to said estate:

IRON WORKING MACHINERY:

1 sixteen foot Engine Lathe, 1 eight and one-half foot Engine Lathe, 1 ten foot Engine Lathe, 1 seven foot Engine Lathe, 3 Boring Lathes, 2 Drill Lathes, 3 Press Drills, 1 Bolt Cutter, 1 Screw Cutter and Dies 1 Power Punch and Shears, 1 Power Punch with Punches and Dies, and self-acting gauge for cider mill hoop, 1 three and one-half foot Planer with milling attachment and key seat cutter, 1 Balancing Frame, Pulley and Counter Shaft, 2 Horton Chucks, 3 cast Gear Chucks, 1 Patent Chuck, 1 Key Seat Cutter, 1 Nut Machine, ninety feet Line Shafting and Pulleys, 5 Grind Stones, shafts and frames, machinist's tools, taps, dies, die plates, etc, etc.

1 Blacksmith's Fan with counter shaft and pipe, Bolt Machines, Tyre Bender, Eye Bolt Machine, 1 Trip Hammer with counter shaft, Anvils, Sledges, Hammers, Tongs and other Blacksmith's Tools, 1 Foundry Fan and Pipe, lot of iron Flasks, lot of wooden Flasks, Patterns, Ladles, Rattle Box, Coal Mill, Stoves, 3 Platform Scales, Oil Cans.

WOOD WORKING MACHINERY:

1 Cross Cut or Railway Saw and Rip Saw and Table, 1 Band Saw and Table, 2 Rip Saws and Tables, 1 Gaining Machine and Saw, 1 Gang Saw and Table, 1 Head Saw and Gang Boring Machine, 1 Gang Boring Machine, 1 Boring Machine, 1 Power Mortiser and Boring Machine with Tools, 1 Foot Mortiser, 1 Turning Lathe with Tools, 2 Pin Machines, 1 Fan Side Machine, 2 Sand Papering Machines, 1 Emery Wheel Saw Gummer, 1 Saw Gummer and Dies, 1 Rogers' Planer, 1 Upright Shaping Machine, 1 Tenoning Machine, 1 Matching Machine, 1 Chamfering Machine, 1 Daniel's Planer, 1 Fay & Co.'s Iron Frame Molding Machine (largest size), 1 Sixteen foot Lathe with Scotch Rest, 1 Paint Mill, 1 Power Shears, 3 pair Shears, Circular Saws, Augers, Sledges, Patterns, Hand Trucks, Wheelbarrows, Hydraulic Elevators, Line Shafting, and all other tools about said Machine Shops, together with 2 Champion Threshing Machines, complete, 2 Second-hand Champion Threshing Machines, 120 Cider Mills, 1 large Portable Press, Lumber, Iron, Machine extras, Safes, Desk, Letter Press and other office furniture.

Also, the life estate of Margaret E. Hanson in the following described real estate, viz: Lots 1, 2 and 3, in block 5, including the buildings thereon, known as the Alton Agricultural Works of Hanson and Connor; the Machine Shop is 3 story brick, with slate roof 50 by 100 feet, brick foundry 60 by 60 feet, brick blacksmith shop 20 by 65 feet.

The above property is desirably located on the bank of the Mississippi river, near the depots of the Chicago, Alton and St. Louis, and Indianapolis and St. Louis railroads.

A. T. HAWLEY,
Assignee.

PATENTS

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