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Young and Old, by Samuel Evans Clark**

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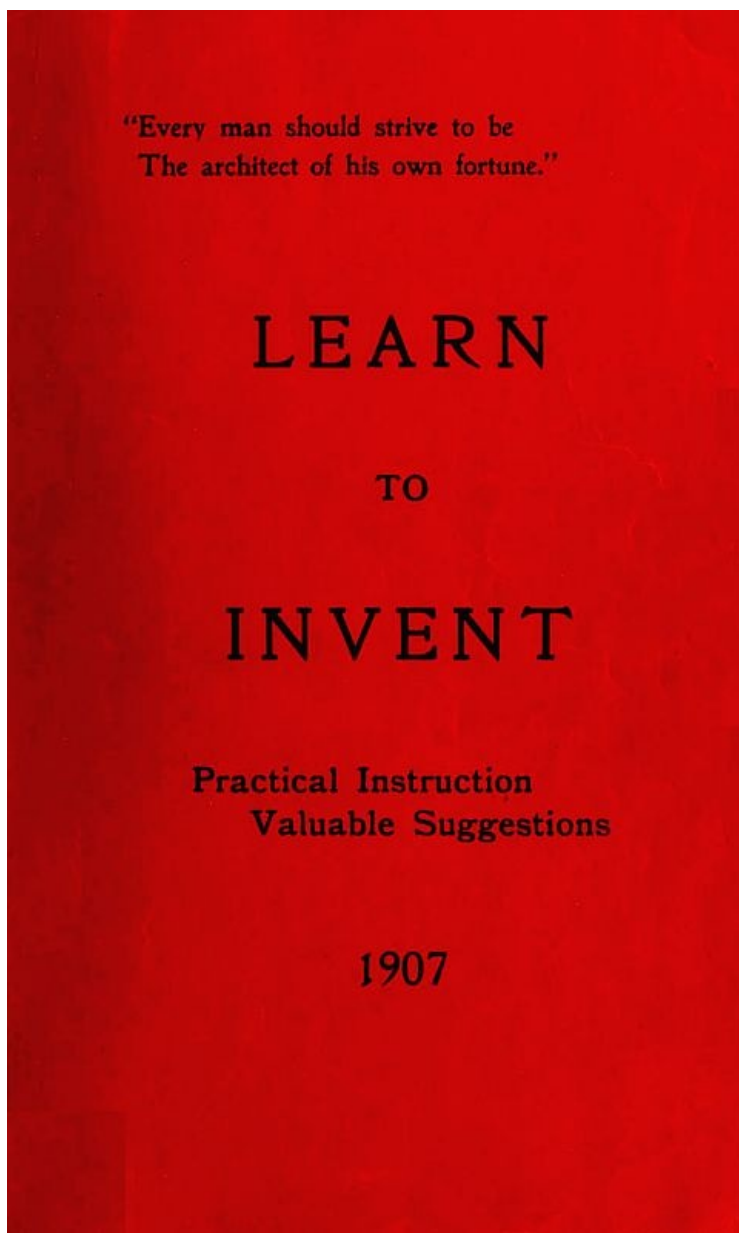
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*** START OF THE PROJECT GUTENBERG EBOOK LEARN TO INVENT, FIRST STEPS FOR
BEGINNERS YOUNG AND OLD ***



LEARN TO INVENT
FIRST STEPS FOR BEGINNERS
YOUNG AND OLD

PRACTICAL INSTRUCTION

VALUABLE SUGGESTIONS

TO

LEARN TO INVENT

We should apprentice ourselves as it were to the

INVENTOR

Study the original lines of his thoughts

As

The young artist studies the master work.

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S. E. CLARK

PHILADELPHIA

PENNA.

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PREFACE.

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The booklets "Mental Nuts" and "A Book of Maxims" have met with so much favor I have decided to try again. I submit this little effort to those young and old who desire information and suggestions on the subject, in the form of a "first step" or introduction, for those who would learn to invent.

Though it is entirely a subject for the deepest study, I favor a personal talk, digressing at times in an effort to interest and instruct, to enliven and cheer. I see little hope for the casual reader. "As ye sow so shall ye also reap." My faith rests in the careful, persevering student. I sincerely hope that as a whole the effort may prove helpful to many. As to the future, may you all realize.

"Full many a pupil has become more famous than his master."

S. E. C.

Philadelphia, Pa., Sept. 3, 1907.

INTRODUCTION.

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Invention is the fountain source of material progress. It would indeed be a fruitless effort to try to express in adequate language its wondrous possibilities and practical worth to mankind. Its field of action surpasses all others. It is most apparent in our daily walks of life. Every human effort owes it homage. The fame of many inventors has encircled the earth. They have been feted and honored in many ways, their names indelibly inscribed on the roll of the earth's greatest men. Fortune and fame have been showered on them with a lavish hand, and yet little or no effort is made to direct thought into this vast and unlimited field for study, that people may learn to invent. The whole subject is left quite in the dark. It is on the go-as-you-please, hit-and-miss plan. People become inventors by mere chance, and are viewed as possessing a special gift of nature. I hold that invention is just as tangible as any of the sciences and can just as well be taught. The human mind is naturally inventive. The trend will improve and grow or it will wilt and die, according to the attention it receives. To learn to invent we should apprentice ourselves, as it were, to the inventor, take up his invention and study the original lines of his thought, as the young artist studies the master work. First learn to imitate, and the creative thought will follow and develop. I shall be content to confine my effort to the simplest forms of devices I can call to mind, a first step. But don't mistake nor be discouraged. To the average man and the particular people to whom I hope this pamphlet will appeal the small and simple devices are the cream of the field. They are easily handled, quickly turned, and many pay fabulous sums. Oftentimes the idea will flit before the mind like a will-o'-the-wisp or its zephyr-like touch is not realized. I believe many people have experienced a semi-consciousness of the presence of opportunity and allowed it to pass unheeded by, that had they taken it up intelligently and properly studied and developed it they would have become famous.

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We should inform and prepare ourselves. Be ready to act on the slightest intimation. "There is a tide in the affairs of men which, taken at the flood, leads to fortune; omitted, all the voyage of their life is bound in shallows and in miseries."

"The nearer to the practical men keep
The less they deal in vague and abstract things
The less they deal in huge mysterious words
The mightier is their power,

* * * * *

The simple peasant who observes a truth,
And from the fact deduces principle;
Adds solid treasure to the public wealth,
The theorist who dreams a rainbow dream
And calls hypothesis philosophy,
At best is but a paper financier
Who palms his specious promises for gold,
Facts are the basis of philosophy;
Philosophy the harmony of facts."

Thomas L. Harris, in "Lyrics of a Golden Age."

LEARN TO INVENT

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SMALL TALK.

Since we will interest ourselves in the very small affairs that hang like a great cloud of fringe on the science of invention, I think it well to make a note of some of the bright little things that have been brought forth. Many of these little mites have proven to be veritable gold mines to the fortunate originator or patentee. They are too numerous to classify. They appear so very simple, embodying but a single thought, we naturally associate "luck." Indeed, many did come to mind uninvited, but it was to an observing mind, a thinking mind. If we desire to participate in and avail ourselves of these wondrous opportunities we must observe and think.

The dents on the old tin tobacco boxes, one on the box, the other on the lid, placed to register with and thus secure it when closed, was certainly very simple.

It is said a man was sewing and the needle would often slip off the end of the thimble when he would attempt to push it through. He became vexed and struck the thimble a blow on the end with a hammer. It was first convex, but the blow from the hammer made it quite flat on the end. Upon renewing the sewing he found the thimble worked splendidly; the needle did not slip. He became interested and finally took out a patent for a thimble with a concave end.

Certainly, to any one who would attempt to get up a machine to do sewing it would appear as a mere matter of force of circumstance to use a needle with the eye in the point, since necessarily the other end would be attached to the machine.

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The return ball, in homely language a wooden ball with a rubber string fastened to it, was certainly simple enough; also the metal toe cap formerly extensively used on children's shoes to prolong their wear.

The little wheels on the end of the pole on the trolley cars would have been a bonanza were it not that the introduction of the trolley system was so slow. The seventeen years for which patents are granted passed by before the system became in general use. This slowness to become general has ruined many grand opportunities. It is a fact to be reckoned with.

Many successful inventors have had their hopes blasted at times by the apathy of the people in adopting their inventions in time for them to reap their just reward. While the inventor naturally and perforce must lead, he should be discreet, and not go so far ahead that he cannot get the people to follow. Some matters must be approached gradually.

The little ball fastening so common on our money purses is a gem. It would be rare indeed to provide any other device to take its place, it is so convenient, simple and practical. A fastener, to be a success, must make a noise in closing; it becomes the signal to the mind that the work is properly done.

The hook and eye "see that hump" was simple enough, but I fancy it required a splendid campaign of advertising and business push to get it to the front and make it pay.

Many inventions are virtually lost because they are not properly pushed. My advice is, if you have an invention and are not situated properly to push it, sell it. Experience leads me to observe that we constantly change our views or see things differently. Some things look good to-day and later we do not think well of them, and vice versa, other things improve and grow in our estimation. When an idea of a device occurs, study it; think how it can best be made; make a drawing of it; take up every detail and material best suited. Try to get it in the most simple form. When, after careful consideration, you feel that you have perfected it in your mind, have a model made and see that it meets every requirement. If you do not sell the invention you can contract the manufacturing and go into the business of selling, or you can put it out on a royalty basis.

All inventors use certain mechanical principles. The same principle is often found in many different inventions; hence, it is well to study these principles, as the knowledge of them will help you to perfect and bring forth your invention. In this connection I would advise that you possess all the little novelties you can; study them; examine them closely and ask yourself why did he this and that. Take up each one and try to get a clear understanding of it; practice explaining it to others and impress the points on your mind; they may be of great service to you some day. Many times a good idea is poorly carried out, the mechanical arrangements are not well adapted either for performing the work or to effect lowest cost in construction. These defects give rise to improvements. It certainly would be a provoking experience to obtain a grand idea and get it up in a defective mechanical way and have someone make a simple improvement and reap the reward. If I could control the matter I would change the patent laws in this respect. I would foster improvement, but I would not allow the original inventor to be robbed of his just reward. I would not permit him to become arrogant and dictate impossible terms, but I would see to it that he at least got a part of his dues. If he came forward with an original invention he would get a patent; if another man made an improvement on his method I would give him a patent, subject to a small royalty to the original inventor, and to continue until the original patent expired. The matter could be judged just as well as law cases are judged. You must duly consider the subjects you attempt. Don't bother with perpetual motion; it would only be a toy at best. I have no faith in a non-refillable bottle: in all probability it would fill if it were submerged, and particularly if a hole were drilled in it. An idea in this line is to have a nickel or a dime blown in the glass of the bottle; the goods would be sold for the amount more, and the buyer would break the bottle to get his money back. The idea seems practical, at least so far as the fact that the broken bottle would be a true non-refillable one. Ordinarily I do not interest in those inventions that require to be demonstrated, as they are too expensive to introduce. The people are generally skeptical, and they have been so for ages. The poets of the early centuries voiced public doubt in verse, referring to a gun, gotten up and promoted by a stock company, thus:

"A rare invention to destroy the crowd
Of fools at home, instead of foes abroad;
Fear not my friends, this terrible machine,
They're only wounded who have shares therein."

Financial advices are all good before ten and after three. As a rule, don't buy stocks that are glaringly advertised; they are working hard to sell. Don't go in by the front door: stocks of such companies can generally be bought on the outside for less than the advertised price and are most always too high at that. Many, indeed, would be high at the price in counterfeit money. Vast sums and much time have been lost on various patents connected with railroads, etc. Once in a great while one may succeed.

You should have a book and record your ideas as they occur; write out enough about them to make the whole thought on the subject clear, and preserve it for future reference. It would be a splendid idea to write out descriptions of any little novelty you see. State all the particulars; make your notes so that you will clearly understand every detail at any time you refer to them: get all the patent papers of small or simple novelties, etc., that you can and read carefully what they say about the construction; note what the inventor claims. I would recommend the Patent Office Gazette. This, I am sure, will prove the most valuable exercise you can take. They will prove practical lessons of worth and you will gain many helpful ideas. I recently met a gentleman from the South, who had taken out a patent on a hoe that was used extensively in the cotton fields. The blade was extra large and the handle was secured to the middle or central portion in a way that when the edge of the blade in use became worn and battered it could be turned and virtually

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form a new hoe.

In the early days of the linotype or printing machines there were several machines being made and developed. One of the parties took out a patent on what they called an adjuster. It was simply a wedge, which was operated to spread the type and space the words; and though a very simple matter, it became a most important feature and compelled the other companies to pay a royalty for its use.

I think it will be found a very valuable point to carefully consider the subject before you rush into developing an invention. Many things can be done, viewed as a mere mechanical possibility, but circumstances may preclude their use. A party labored on the idea of a device to perforate postage stamps in the operation of canceling them. The thought finally occurred to him to use sand in the mucilage, so that when the stamp was struck in the usual canceling operation the sand would cut through it. I am informed that he wrote to the Postoffice Department at Washington. In their reply they stated that the sand would also cut the envelope. If I desired to work on that idea I would first aim to print the stamps with a color that would turn after it was canceled in the usual way, using, perhaps, some acid in the canceling ink, or I would work on the lines of a cancel to tear an embossed stamp, but I don't think the subject worth while. I prefer articles that sell to the many. "Little and often fills the purse."

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All inventions originate in thought, which is often due to casual observance. We see a man stoop on the street, pick up a straw or splint and run it in the pipe stem. We begin to think. His pipe became clogged; it did not draw freely; he was lucky to find the straw; he might not always find one so readily. It is an idea to provide for such emergency so that he will not have to depend on the chance straw—something convenient; let me see—suppose we take a fine wire, double and twist it, leaving a small ring at one end. He could put it in the pipe-stem and leave it there; it would not be large enough to close the draft. If the stem became stopped he could pull the wire out, clean and replace it. Now, we observed, thought obtained an idea and constructed a device; can we improve it? We should study, ask ourselves the questions, Does it this? Will it that? Make a sample and test it, see that it meets the requirements, and you have an invention. Obtain a patent, have them manufactured, and put them on the market.

I do not smoke at present, and certainly do not recommend cigarettes, but simply as an illustration of an idea: we could gather up tobacco stems, etc., and make them into a paper to be used as a wrapper in making the cigarette. It would come pretty near being an all-tobacco cigarette. Why not fit the inside of the watch case with a thin sheet revolving calendar?

A hollow rubber ball or spring might be fitted in the heel of the shoe to make walking more comfortable.

An instrument to write with, fitted so that a ball passing over the paper would leave the mark or ink. It would not scratch and would wear longer than a gross of pens.

Bicycles may have seen their day; I often thought an automatic pump could be arranged to keep them in prime condition.

Possibly a leather paint could be made to paint the soles of one's shoes, to make them wear longer.

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The governor on an engine is a simple idea; its function is to control—by its use the engine is regulated. If the latter is operating a dozen machines it is exerting a certain power; if, suddenly, ten of the machines were stopped, the power would run the engine at a terrific rate of speed; the governor rises and shuts off the power, and thus controls the engine.

The safety valve on the boiler is also very simple; it controls the steam pressure, allowing it to escape when it becomes too great.

The wood or cold handle sad iron is exceedingly simple and astonishingly profitable.

The Morse alphabet, used in telegraphing, was rather on the puzzle order, and quite easy at that.

Argand had gotten up his lamp with a circular wick, in a tube, the air thus supplying oxygen from within and without. It was a success; his child brother playfully set a broken flask over the flame, which was greatly improved thereby. The practical eye of the elder Argand enabled him to note the birth of lamp chimneys.

The four wire prongs to hold chimneys on lamps were crude, simple, and very profitable.

A good fender for trolley cars should be made so that it could be projected in front of the car, or drawn in within the line of the car, bow-shaped in front and governed by springs, so that it would yield when striking a person.

A mechanism might be arranged to show the next station or street on a sign in the car. It could be operated by power taken from the axle, though the slipping of the wheels would be bothersome.

The flying machine is a little too much of a wild fancy for me; it would do for some fellow who wants to get off the earth. "It's me for the simple life."

Men chew their cigars so much in smoking; it don't look a bit neat; an oiled paper end might

be worked on under the wrapper to help the matter.

For cheap, machine made cigars, a toothpick might be worked in, to be pulled out before lighting, to improve the draft.

"Please shut the door" became a very common saying; finally it attracted the inventor's attention. A rope, pulley and weight may have been first; then springs ordinarily applied came, finally the spring was placed in the hinge and later still the spring and air cushion were combined. It closes the door and prevents it from slamming.

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I believe in keeping fairly quiet about ideas I am working on. But don't spend your money for a patent too quickly. Many times patents are taken out, and instead of any danger of someone stealing them, they can't be coaxed to buy at mere cost. Unless it is really an important idea, it pays to get them made and see if they will sell before you take out a patent.

In your notebook where you keep a record of novelties and your ideas, from time to time, don't fail to record all costs you can learn of and where different things can be made—the more particular you are about these matters, the more you will improve your ideas and ability to properly promote them. Much vexation and lost time can be avoided in getting up inventions by being exact. "Slipshod" won't do. It defeats many perfectly practical ideas. The parts of a machine must be shaped and fitted to a nicety; "whatever is worth doing at all is worth doing well."

It seems to me there is no end to improvement. I heard of a Yankee who was traveling in England. He was somewhat of a blower; no matter what he saw or heard of he claimed they had the same thing in America much more improved. The Englishmen could not stand it, so they thought they would get the best of the Yankee. They told him of a wonderful machine, the most complete ever built. A hog was driven in at one end and came out a cooked sausage at the other. The Yankee took it calmly and said yes, they had it in America, but it was a failure until a fellow-Yankee improved it. "Improve it? a complete machine like that? why, impossible." "Well," said the Yankee, "he put an attachment on so that if you did not like the sausage you simply reversed the machine and the hog walked out again."

Next to the simple or single idea patents: I think the improvements follow, and indeed many of them are exceedingly simple. It is all right to improve old patents and new ones, when the improvement has real merit. I want to take you over an improvement I had patented. I secured an old trick, in the form of a tin box three inches long, having a cap at each end. A cent would be dropped in through an opening in the top. The central portion was double, the outer sleeve was loose and could be pushed up and down; a slot in its side hid by the cap would register, when pushed up, with a slot in the inner part; by tilting the box the cent would drop through these slots into the hand. Then the loose sleeve had to be worked back into position so that the cap hid the slot. The operation was slow and somewhat difficult. It occurred to me to make the box of wood and provide it with a slanting bottom on the inside. This would lead the cent right up to the slot, and it would come out without tilting the box; also by using a spring it became automatic, i. e., the spring would push it back into position.

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The trick can be done at least five times while it is done once with the tin box. It made an A1 trick box. It would be a good seller on the street, but in stores they would forget how to work it, and stores can't spare the time to demonstrate, so it did not go well in stores. The boxes were made complete for \$4.50 per gross, sold to jobbers at \$7 and to retailers at \$9. They retailed at 10 cents. They were made on a lathe and nicely polished, packed one dozen in a box. I think in nine cases out of ten it is best to contract with some good firm to make the device. You will have plenty to do selling it. You can easily get some one to make the goods, but it is not so easy to get one who can sell them and push them properly. I tried manufacturing and don't like it.

Ideas are common and belong to all,
The methods to the first should fall.

As a matter of fact, you can't patent an idea. You patent the method, or device. Some patents may perforce virtually cover the idea as a consequence of there being no alternative. A needle for machines with the eye in the point, the wedge adjuster in the linotype machines. Patents of that class, when good, are extra valuable, because they can't be improved. We also can sometimes make an article in common use by a patented machine and have a very secure thing. I think wire nails come under this head. Speaking of wire calls to mind the key ring; many millions have been sold.

Possibly a brake could be made in the form of a wedge suspended in front of the wheel by a chain in a way that it could be moved so that the wheel would run on it and thus stop the vehicle.

I don't know the particulars, and so I only speak in a general way. A patent was procured on a knife with an irregular or sawlike edge. It was recommended to cut bread, cake, etc.; could cut without much downward pressure, which made the bread, etc., soggy. Probably a good thing. A party patented an improvement, making his knife with a wave edge for the same purpose. Well, I would have compelled No. 2 to pay No. 1 a small royalty.

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Have you ever seen the little tugboats doing their work, taking the big ships into dock? Do you know how they steer? They have a propeller close up to the stern; just beyond is the rudder. Both are in line with the centre. The turning of the propeller throws a strong current past both sides of the rudder and away from the tug. By turning the rudder so that the current strikes it the vessel is forced around; it acts as though pivoted in the centre, the ends going in opposite directions. In

the early days they tried to move the vessel by blowing wind against the sails with a bellows stationed on the vessel. They overlooked the reaction, and were surprised that the vessel did not move.

Can you construct a box having a drawer so arranged that you could put an object in it, close and open it and have the object disappear?

I frequently meet the gentleman who got up the "Donkey Party." It certainly was amusing. The fifteen puzzle took the country by storm. Pigs in Clover was great, but too many imitations. The idea of printing animals on calico, so that they could be cut, sewed and stuffed at home was no doubt profitable.

It was clever to shape the crackers like the oysters. An Elephant or Teddy Bears brand of popcorn might take. The old sand box toys took well. They operated mechanical figures on the hour glass principle. Millions of little wire hooks have been sold to hang things on Christmas trees. A simple device to revolve the tree should sell well. A small generative battery could electric light the tree. It injures the showcase to drop the money on it, and at times it is difficult to pick up the change. The little porcupine-like rubber mat is handy. The cigar cutter is all right. A revolving needle might be used to improve the draft of the improperly made cigars; it would be more practical than the porous plasters frequently recommended on the back of the head for the same purpose.

I guess the hen, in her quill, has us all beat on toothpicks. A man who built a large stack at his mill to get a better draft for the fire had an eight-inch pipe leading from the fireplace. It met an obstruction and was divided into two four-inch pipes, one going on either side of the obstruction and thence to the stack. When the work was completed the fire did no better than before. The builder was much disappointed and puzzled. He could not understand it. Can you observe what was the matter? It should be apparent at a glance. He shut off half of the draft. An eight-inch pipe is equal to four four-inch pipes. To observe you must observe. Why do people read fiction? A lady was annoyed by her hair coming down. She finally bent the hairpin. Her husband patented the idea and they made a fortune. The idea of a paragon frame for umbrellas proved a mint. Rubber dress shields, lined, made thousands. It is said wooden shoepegs paid millions. "Truth is stranger than fiction."

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Toy guns are pretty old, and mama had always been nervous over the arrows, caps, etc. I patented the harmless gun in 1883—had it fire a hollow rubber ball. I supplied the trade for twelve years, and then sold the patent for \$1,200. The invention has paid in all probably \$50,000, and the guns are for sale in the stores as usual. In fact, all that my patent covered was the idea of a string made fast to the rear of the plunger and extending back to the outside, on the bottom edge of the stock, so that the spring or plunger could be pulled back into position, instead of using a ramrod to push it back, as in other toy guns. Perfecting the details of this gun called for much more study than did taking out the patent. At first the end of the plunger rod would wedge in the barrel on striking the hollow ball. The end of the plunger was flat, a very small portion of the ball touched it, and hence would naturally dent and wedge. It was remedied by making the end of the plunger concave, so that in striking the ball it would come in contact with a greater surface and not dent. The point where the string, which was pulled to set the spring, came out of the stock, would split out, and we could not satisfactorily fasten on a brass plate with an eyeletted hole. This was overcome by boring the hole large and gluing in a round piece with a hole through the centre. It was then cut down in the sandpapering, and was quite unnoticeable. It worked like a charm. It was difficult to get the hollow rubber balls at a low cost: two cents each was quoted. They took a square piece of thin rubber, pinched it up with the fingers, put some water in, then put cement on the edges, placed it in an iron mold and put it in the furnace. The water turned to steam and forced the rubber in the shape of the mould; the vulcanizing would cause it to stay in position, but many would leak and not shape right. The process was improved by using tubing cut proper length and pieces punched out of a flat sheet to fit over the ends. It was a success, and few ever failed to properly shape. One gross was made at a time. They cost less than one cent each. For a while \$15 per thousand was the best price quoted for the brass eagles used on the stock for ornament. These were finally secured at \$6, and a number of hundred thousand were used. Seven small wood turnings were used in each gun. The first lot of one thousand of these turnings cost \$7.50. They were made on a lathe by hand. Then they were secured at \$2.50 per thousand, done by machine, and finally they were contracted at 70 cents per thousand. A paper tube, painted and silver bronzed, made a good barrel. I thought these details might interest. They are "all wool and a yard wide." "One fact is worth a book full of theories."

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Toys present a good field for inventors. They pay well usually, and are easy to handle. You must hold your prices firmly; treat all jobbers alike, no matter whether they buy one or one hundred gross. If you favor one you offend all the rest. Be impartial. Cities are growing so large, rents are soaring so high and store space seems to be getting so crowded, possibly a fixture of store shelves could be arranged on the Ferris Wheel plan and put into position above the counter to help the situation.

Mucilage evaporates so fast. They have fountain pens. Can any of you get up a fountain mucilage pen or brush? I guess we are a little late for ink bottles and spittoons that won't spill the contents upon upsetting. A thought in mind seems to constantly annoy. Readers, no doubt, if they have the patience to read the whole of this pamphlet, will possibly wonder what it is all about. Well, they need not ponder. The student who is alive to the subject will understand; he will take the time and allow his thoughts to dwell on each little subject mentioned. I believe in as

much original gray matter "horse sense" and facts as circumstances permit, that every time you bump up against it you find something out. "Sabe."

Have you ever studied the philosophy of trains going around curves. The wheels have a flange on one side and taper to the other side. They stand on the track with the flange on the inside. When they come to the curve, in which the outside rail is always set higher than the inside one, and is necessarily longer, the flange presses against it, and that wheel is running on its largest diameter while the opposite wheel is on its smallest diameter. This fact, together with the slipping, enables the outside wheel to go over a greater length of rail than the inside wheel, though both are secured rigidly to the same axle. The train has a tendency to go straight ahead; the outside rail being higher causes it to constantly slip a little. The bent rail keeps prying the flange over, as it were, and the train is brought around the curve safely.

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Sometimes it pays to learn some things not generally considered as being immediately connected with one's regular calling. I heard of a noted Chinese doctor who had a very bright son who was studying medicine at college. An epidemic set in, the doctor was sent for and went from one case to another. He was quite an athlete and a good swimmer. Soon the village people concluded the doctor was the cause of all the sickness and decided to thrash him. The doctor ran for his life, the crowd close on his heels. Finally he came to a river, plunged in and swam to the opposite side. No one in the crowd could swim—the doctor was safe. He went home and the bright young son answered the door and said, "Father, I need the money for some books at college the teacher recommends." The father's mind was full of thought of the experience he had just gone through, and he said, "My son, with due respect to your teacher, I advise that you first learn to swim; it may some day be more important than any of your studies."

Don't be an idle spectator of life,
Create splendor for others' view.

Do I think ladies could invent? Well, at the present moment I feel like saying most decidedly yes. Why, you yourself made a splendid observation. Don't you recall saying the horses lost a great portion of their food by tossing their heads about while eating? Well, yes, the flies are annoying, but I think there is another reason. Well, you see they strap the full feed bag to the horse's head. At first the adjustment is good enough, but as the horse eats the surface of the food recedes and soon the adjustment becomes bad. The horse can no longer reach the food, and tosses his head about in an effort to get it. Well, we observed, thought, and as a consequence have a problem to work out. Yes, I think we might overcome the difficulty. Why, exactly, splendid; we can properly adjust the springs and fasten them in the handle or hanging straps that hold the feed bag to the horse. Then, as he eats and the weight becomes less, the springs will cause the bag to rise and the adjustment will be proper throughout. Yes, that is a real invention. We are inventors. We will use a perforated bag. Why, I think we might call it "The Automatic Ventilated Feed Bag." The horse will thank us, and we will become so rich. Salt cellars don't work good in damp weather—the salt cakes. You should work out that problem by the "Think a little" rule. A flagpole to operate the flag on the principle of the spring roller window curtain; make the political banner collapsible. Pass tops by, too many already; besides I have been sore on them since youth, when I tried to make one to wind up with a key and run all day. It was a long time before I replaced my watch, the works of which I used in that top. Did it spin? "Nope." Postage stamp affixer. No, pass it. It may do later on when you are more experienced. I had some dealings with a simple kind: it looked and worked like a rubber stamp, but the moisture from the sponge soon got in among the stamps—impractical. It should be quite easy to make a chute wagon that would unload coal while standing lengthwise along the curb, so as not to block the cars.

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Suppose you wish to cause a toy man to pass around a six-inch circle and at the same time constantly revolve, could you contrive to make it work by turning a crank? It is good practice to work all puzzles and problems you find. It cultivates reasoning and gives you splendid practice on concentrating your thought. It makes you a close observer and becomes a valuable asset for use in any walk of life. Some people don't seem to notice anything—or, at least, very few things. I one time had an amusing debate with a man. He insisted he moved his upper jaw in eating. He proved it conclusively to himself by biting on his finger. How many of you know the difference between a horse and a cow in getting up? I hope a half dozen dozen and six dozen dozen don't look alike to you. You must get things exactly as they are in your mind; then only will you have a true basis to reason from. Don't go through life with the idea that everything is "about the size of a piece of chalk."

Many people will say to those who invent, "How did you come to think of it? I could never think of anything." The main trouble is they don't think at all. If they would take an interest in things and examine them closely, study them until they can clearly explain every detail, it would be a reasonably short time until they would think of other things and invent. The inventor should be sanguine and hopeful. It spurs him on and helps him to wade through discouragement. Possibly as like produces like, like thoughts produce like thoughts, fear thoughts produce fear thoughts. You must have a little of the big I in you.

"He who dares assert the I
May calmly wait, while hurrying fate
Meets his demands with sure supply."

I don't mean that you should sit down and expect to invent by mere weight of thought. That would be like watching the clock to see the hour pass by. I mean you should make the start. Begin by noticing how things are done. Interest your thoughts on the subject. Keep the matter in

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mind. Time will pass by pleasantly and some morning you will find your mind engrossed with an idea of an invention or an improvement on one, and that day will appear the brightest in your life. The more you study over what others have done, the sooner you will do something yourself. I fear you won't study. Now let me see; take that trick box. In No. 1 they tilted the box to get the cent out. Well, by tilting the box they simply put the flat bottom on a slant and the cent slid out. That could be improved in working by making a slanting bottom. Again, in No. 1, after they worked the outer sleeve up so that the openings registered and allowed the cent to slide out, they then worked the outer sleeve back into position, so that the side of the cap hid the slot. That work could be saved by inserting a spring, and so you should take up each feature, learn the reason why, and impress it on your mind. Confine yourself to the very simple things. Later on you will take interest in the larger ones, but at first they would likely discourage you, though the large inventions are only a combination of simple ideas. The telegraph sounds big. In the first place, it was simply a discovery. The electric current magnetized the wire so that it attracted metal, and would do so no matter how long the wire (within reason). Now, they could not well arrange to move the magnet over the paper to do the writing, so they thought to make it stationary and move the paper. The machine to do this was the biggest part of the invention. The code or Morse alphabet followed, by arranging the dots and dashes to represent the letters. If a massive structure were built of bricks, broad, high walls, square and round towers, high, commanding, arched doorway, facades, ledges, etc., you would stand and gaze in bewildering admiration at the grand, colossal structure. Yet it is only a combination of bricks. And what are bricks, pray? Only clay molded into shape and baked in an oven. No man ever invented a great machine unless he was an adept in the line of simple things, or he engaged assistance from those who were. Don't underrate the importance of these simple ideas. Take each one up, consider and go over it as carefully as though it were new—your own thought—and as though you were going to apply for a patent on it. If you can't enthuse and work or study in earnest on these matters you are surely on the wrong line for you. Get off and devote your time to some other pursuit. You must be in earnest and willing to persevere. Keep everlastingly at it. Dabblers rarely ever succeed at anything. I saw a patented churn. It was a plain tank and a long round handle with propeller blades set on the end. The propeller was pushed down through the cream. It did not revolve, and hence agitated the cream very much. Then, when it was pulled up to the top, the propeller revolved and the cream was scarcely moved. In going down the propeller would move up about one inch and lock. In pulling up it would move back and unlock. I remember the man who patented an iron ore washer. It was a large tank affair, say eight feet long, three feet at one end and six feet at the other. Inside it was lined with iron plates having a flange projecting upward. These were fastened so that the flanges formed a spiral from the large to the small end. An axle was placed in the centre by braces. The large end almost touched the ground; the small end was, say, two feet above the ground. The ore dirt was shoveled in the big end. A stream of water entered the small end. The washer was revolved. The dirt ran out with the water. The ore was worked by the flanges up to and fell out of the small end. I met a party who had a patented bung for barrels. It looked like a straight piece of round wood. I inquired, what is the patent. He said, bungs blow out of barrels, but his would not, because it was first made larger at one end than the other, then by driving it through a tube it was forced equal at each end. The original big end was marked and put in the bung hole. The liquid would cause it to swell to its former size. It could not blow out, and to tap the barrel it was driven in. The shores of Lake Superior are full of fine iron ore, probably millions of dollars worth. A party got up an electrical separator. To reclaim the iron sounds big. Let us see. An iron cylinder, an electrical battery or dynamo to charge and magnetize it, a long trough with a moving belt in the bottom. The sand and fine iron were shoveled on the belt and carried up to and fell on one side of the revolving magnetized cylinder. The iron adhered, and as the separator revolved it was scraped off on the other side. Some ten years ago I wrote to a number of chewing gum firms and proposed they make sugar-coated tablets. They did not enthuse and I dropped the matter. To-day it forms quite a business. About twenty-five years ago I proposed to put India-rubber along the water line of war ships, so that when struck the hole would close and prevent the water going in. To-day every war ship is equipped with that idea, using cellulose instead of rubber. So, don't give up your ideas too quickly. Become well convinced before you drop them. During the past month I read an article stating that the railroads required a heavier rail. I thought the added weight might be used to make the rail alike top and bottom—a double rail—so that when one side wore out the rail could be turned and virtually have a new one, and it being on the ground would save the handling in the second case. A special shoe would secure it to the tie. First costs are often increased to get economic results. I simply advance the idea. Any one interested can put it in their pipe and smoke it. If any of you use a rubber ball in the heel of the shoe to make walking comfortable you may be able to fit a small tube and have it arranged to ventilate the toe of the shoe. A party made a horseshoe having a toe piece of three parts. The centre was very hard steel; the outsides were soft. They wore down and the hard centre stuck up. It was always sharp. He said the blacksmiths would not handle them because it hurt their business.

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It always seemed a good idea to make a wheel so that the spokes formed a hub at the centre. If all the people were alive to their needs all hats would be ventilated. The corrugated band is a good idea, as far as it goes. It should be supplemented with vents in sides or top. Do you know they paint ships without brushes? Simply spray it on with an atomizer and sweep with a suction hose. I hope it will be after my day when some of you get up a machine to do the eating. A cannon was mounted with mechanism to absorb the recoil and other service. A hole was drilled through the side of the cannon about one foot from the end or muzzle. A tube was fitted and extended rearward to the mechanism. When the cannon was fired the pressure became very great in the chamber, and the instant the projectile passed the drilled hole, and until it left the gun, this high

pressure or power went through the tube and worked the mechanism at the rear of the gun. I know hoopskirts are long out of style. Could a flexible metal band be arranged at the bottom of pants and end of coat sleeves, so that they need not be sewed and could be worked to shorten or lengthen them, as desired?

I saw a funnel that had a wire rod running down to the small end. A ball on the end of the rod was used to close or open the funnel. When the bottle was full you could close the funnel, and no more would run out of it. I don't think there is a good nutmeg grater on the market. The price at retail should not be above 10 cents. It should have a good appearance, convenient and practical. It should all be enclosed, fly proof and dust proof—a sanitary grater. There is a chance to improve a match box to hang on the wall, something that won't show the marks. You should be alive to the difference between goods being on sale at stores and taking hold of a specialty and pushing it.

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Sometimes the horses are driven with slack lines, and shy or scare suddenly. Often the driver is bothered to take up the slack. Could you invent handles to put on the lines that could be moved forward easily, have them grip so not to slip back until a spring or catch released them? I don't understand why they don't connect the shafts to the vehicle so that they could be instantly disconnected in case the horse ran away.

They sell a number of popcorn roasters. One to revolve should prove a good seller. The shaking plan is very tiresome. Some arrangement should be put on the bootblack boy's box to prevent the foot from slipping off. A propeller rocket could be made to go very high. Could you make a metal frame that any one, by using a strong manila paper, could make a pocketbook to hold notes, bills, etc.? How do you like a wire device to be put on rolls of ribbon to keep them from unwinding in the retail stores? A watch might be made so that the opening and closing of the lid would keep it wound up. I have not been inside a school for a long time. Perhaps they have holders to prevent the chalk crayons from breaking.

Did you ever cut a round piece of cardboard in a strip, say one-half inch wide, cutting round and round to the centre, then set it on a knitting needle, place it over the stove and see it turn? The heat from a small wax candle should turn a Christmas tree lamp on the same principle. Now they make wood lead pencils that require no sharpening. The lead is loose. A slot down the side of the pencil enables one to advance the lead as required. Elections call forth many ideas as to the best form of balloting. I think a very safe form of voting would be to have two large iron boxes with mechanism and a long roll of paper, proper width, with the ballots printed on it; a flat space or table between the boxes; the long paper tape of ballots would be wound up on a roller in one box and unwound into the other, the ballots to be numbered consecutively. A voter steps up and proves his right to vote; then he marks his vote on ballot No. 1, which shows on the flat place between the boxes. The judges then turn a crank. That ballot moves into the other box and the next adjoining ballot appears on the flat place. Such a plan would be free from stuffing, and ought to give reasonable satisfaction. The various styles of folding boxes are good illustrations of the single idea inventions. Many flourishing concerns are based on same. To be an inventor one should be a close observer. They should make sure of just what they see. I heard of a business man who had a very valuable horse. He left particular orders that great care should be taken and see that the horse did not get loose and go in the new clover field. He went off to his business, some distance away, and soon a neighbor came at top speed and said, "Your horse is in the clover field." The business man left his office in great haste and ran home, where he found the horse in the stable where he had left him. The cow had been put in the clover field. The neighbor said he did not look so very close. He saw an animal in the field. It seemed to have four corners, with a leg from each corner to the ground, and thought it might be the horse. He wouldn't make an inventor—"A left-over in the process of nature's selection." A device to turn the sheets of music for piano players should be worthy of study. Some one ought to get up a paste that could be put in a tooth and adhere. It should become hard and be lasting. Most anything to obviate the barbarous riveting process.

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Has it ever occurred to you the vast amount of waste going on in putting up goods in tin packages? It presents a great field for invention of the simple "lucky" kind. The person who hits the right thing will become vastly wealthy. Try to devise a shape of package that will answer and be useful after it is emptied. Now, simply to illustrate the idea, say we put tomatoes up in a tin cup with a lid that would serve as a cake cutter. Nice little buckets might answer. Smoking tobacco packages ought to answer for match boxes to hang on the wall. Come, now, there is a fortune waiting. Who among the students will be first to claim it? Nothing would please me more than to hear of some one or more of you making a hit. Think. "He who would eat the nut must crack it."

Some people think there have been so many patents taken out already there is no chance to get up any more. The truth is, no doubt, the chances are on the increase. New sciences are being developed, as for instance, electricity, and each new machine turns out work that enables the inventor to do something he could not well do before. Machinery now will shape wire to any required form; castings are greatly improved; wood turnings are cheap and in almost every imaginable shape. The inventor of to-day has almost every possible detail want at hand, and so he can undertake things heretofore out of reach. Naturally, as the country grows things come into demand that were not worth while before. Indeed, from every point of view the field seems to broaden.

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Suppose a two-inch tube has a one-inch hole through the side. It is desired to cover the hole with a band, so arranged that when the band is turned it will revolve a rod inside of the tube. Can

you reason how to do it? Grates used under boilers for steam purposes expand when heated. When cast in one piece the bars warp and soon wear out. A grate was patented made in pieces; each single bar was loose; due allowance was made for expansion. They are oval on top, broad and tapering. They do not warp. The space between the bars widened towards the bottom, hence the ashes would not clog. Draw an end view of such bars; the idea will show plainly. I favor drawing to impress thought. The matter rests with yourself. "You can lead a horse to water, but you cannot make him drink."

Since so simple a device as an air cushion will render the fall of an elevator harmless, there should be something doing with trains of cars. No telescoping. Who will quiet the awful noise of the trolley car, particularly in cities? Overhead they might slide the cars to advantage, using a cog motor on third rail. Method is a species of invention. It lends force to action.

What day of the week was March 20, 1886?

1. 86—The last two figures of the date.
2. 21—Take one-fourth; don't use fractions.
3. 20—The day of the month.
4. 6—Ratio; see table below.

5. $7/133$ —Divide by 7.

19 and no rem.; Sat., 1 rem.; Sun., 2 rem.; Mon., etc.

Table of ratio, 366240251361, being a figure for each month, beginning January 3, etc.

Now, I wish you to practice this method to memorize the table of ratio:

1. Please remember 3.
2. Think double double, and you have 6 6 366
3. It is 240,000 miles to the moon 240
4. Add 11 to the unit side 251
5. Add 11 to the hundred side 361

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You should get that in a minute.

For dates in the 20th century add 5 before dividing by 7.

For leap years make the ratio for January and February one less than in the table.

Try this for the Presidents

Washington	Jackson							
Adams	Adams							
Jefferson	Monroe							
Madison								
W	A	J	-	M	-	M	A	J
Van Buren and Harrison								
Tyler	Polk	and	Taylor					
Fillmore	Pierce			Buchanan				
Lincoln	Johnson			Grant				
Hayes	Garfield	and	Arthur					
Cleveland	Harrison			Cleveland				
McKinley and Roosevelt								

Read across the page. Begin with the seven large initials, they will soon impress on the mind, then get the names they stand for. Then simply remember Van Buren and Harrison, the remainder in the form given across the page have a sort of a sing song that soon grows fast.

Incidentally learn the given names.

When we look at the watch we must make a mental calculation to state the time. I heard of a watch that had three circular openings in the front case, one on each side and one on the bottom; the latter showed the second hand. The one on the left showed the hour, and on the right the number of minutes past the hour were shown. If it were twenty minutes past ten we would see ten and twenty. There was no mental calculation required.

No doubt you have all seen the little egg separator, a circular piece of sheet metal having a concave centre with little slots near the top of the concave portion. It is placed on a cup. The egg broken and contents placed in the separator, the white runs through the slots into the cup and the yolk remains in the separator.

A good ink tablet should be a good thing. They certainly would be a great convenience, and should do for fountain pens too. I have often thought that chairs are not made right. When you lean back the front part of the seat rises and it tends to stop circulation in the limbs. Could the seat part be so hinged or arranged that the front portion would not rise, or would it answer to simply have the back hinged?

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The stem wind on the watch was a very simple thought, and should have been forced on the mind every time the key was lost. "Necessity is the mother of invention."

I advise all who have any idea of inventing to practice drawing. It is an excellent practice and makes one a close observer. In thinking of subjects combining several movements or features the drawing clinches them; oftentimes the idea will slip the mind, and puzzle as we will we can't recall it at the desired time. "Now you shall wish, but wish in vain to call the fleeting words again." When you draw it it is there. You can leave it and take up any part you wish to consider. There is a lot of studying to do to equip yourself well for inventing. The better you are equipped the better your chances. But you should look upon the work as a pleasure. Then each thing you learn will please. I don't believe in scolding the learning into people. We should aim to make learning pleasant and agreeable. I know the subject is dry to many. I don't wish to weary, remember.

"It's pennies for labor and dollars for thought."

A contractor was building a pier at the seashore. When he tried to drive the piles down into the sand they would continually bounce up. He became very much discouraged; he was completely puzzled. It baffled his wits. A gentleman from the West was visiting at the resort. He became very deeply interested in the little clams. He was amused to see how quickly they could go down in the sand. He visited the pier and learned of the contractor's troubles. He sought him and advised that a hose be attached to the pile and force a stream of water ahead of it as it was driven down. The idea worked very satisfactorily. Observation. Yes, ideas are good things. A cow had fallen in a well that was being dug. The neighbors gathered about the well, which was ten feet deep. No one could suggest a means to rescue the cow. An old darkey passing by was attracted by the crowd. He looked down into the well and saw the cow apparently unhurt. He said, "Let's git her out." "How?" they sang in chorus. "Why, jist shovel de sand back inter de well; she'll keep on top."

During the siege of Paris they wrote letters and reduced them in size until they looked like mere dots to the naked eye. They were then sent out on pigeons and magnified to the original size. That is possibly the basis of a freak thought. Suppose a \$1 bill was placed on a hillside; we go a distance away and take a photograph of one mile square of the hillside, having the bill exactly in the centre. Say the photograph is one foot square. Now we cut off one and three-quarter inches all the way around the picture, leaving say one-half of the same. Then we enlarge this to one foot square and repeat until the foot square picture shows say ten feet square of hillside with the bill in plain view in the centre. If that could be done we could examine the moon and planets too, very closely.

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"One science only can one genius fit,
So vast is art, so narrow human wit."

Probably the most uncertain feature of a majority of patents is, will the people buy them? The theory of most patents is plausible enough. But often the practice or fact is very doubtful. The public seem to be whimsical and act as the spirit moves them, oftentimes without rhyme or reason; things become a fad or are turned down. They spring up and die like a flower. There is no rule. You must take your chance. It is a natural stumbling block. You must be sanguine to invent and cautious to keep off of wrong leads. Take the matter philosophically. Don't allow it to irritate. You can counsel with practical people and those whom you expect to use your device. Feel your way the best you can. When ready, take your plunge, and be satisfied to settle the matter, either as a success or failure. If the latter, make your bow, "Nor with weight of words offend the ear."

There seems to be no rule; they come and go. The first time I saw a match with the handle end fire proofed, so not to burn the finger, it looked good. I thought all matches would be made that way. Now I scarcely ever see one.

The little brass-like boxes with a spring lid and about sixty matches, all for one cent at retail, tells the story of cheap labor by machinery. I saw a match box in the form of a house. The low chimney in the centre of the roof was as long as a match and very narrow; a flat piece with a gutter in the top edge filled the inside of the chimney. The house would be pulled up and then pushed down; always a match would be in the guttered end of the piece in the chimney. I did not examine it, but it no doubt had a slanting bottom on the inside. The piece in the chimney was stationary. The house would rise high enough so that the top of the guttered piece would be at the bottom of the slanting sides. The matches would roll over it, and one would lodge in the guttered top. When the house was pushed back it was at the top of the chimney, ready for use. It embodies an idea, and so I will give it. Some houses become infested with active insects, to the very great annoyance of the occupants. If you ever happen to have the occasion, put a few sheets of sticky fly paper on the floor at night; place a small piece of raw meat in the centre of each. They will all be there in the morning. They hop for the meat and linger on the paper. Stop laughing and think. Suppose you had no sticky fly paper nor molasses, would you think to try a plate with water on it and the meat in the centre? Thinking how to substitute one plan for another is good exercise. Look out when you do it, or you will invent. The gyroscope top is certainly very peculiar in its movements. It is an enigma to science. It is proposed to run a car on a single rail by having two gyroscopes mounted within the car. In rowing a boat the position is such that the power does not continue in full to the extreme end of the stroke. Possibly the blade could be pivoted to the oar, so that at the best point in the stroke for the purpose it would press a spring, which would release itself at the end of the stroke to advantage.

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The elbow for stove pipes was a fine idea, also the spring rollers for window curtains. The mail

box in use is good. Indeed, it should be quite natural for a person to enthuse. I patented a child's riding stick, hollow wheels at one end, horse head with moveable jaw at other. Can you reason how to make the jaw work? No doubt you rode on summer trolley cars and pushed up and pulled down the curtains. But do you know how they are constructed? The curtain is attached to a spring roller, and has an iron tube on the end. Two wire cords, one on either side of the frame, are fastened at the top. Each passes through the tube and is fastened again at the bottom. Thus the cords cross in the tube, which can be pushed up, the spring roller taking up the slack curtain; or it can be pulled down, the curtain unwinding. If you will only observe closely you will see ideas carried out on every hand. When you come to invent the knowledge of them will give you confidence and help you very much. But it will not suffice to simply read of them. You must study, learn and impress the principle on your mind. It is learning, not reading, that counts. It has always seemed queer to me that so many ideas spring up and flourish for a while, then die and are forgotten. Many good ideas for the personal benefit of the buyer don't seem to go at all. If an article pleased one generation, why not the next? It is so in many things and not so in many others. Judgment is required to distinguish standard from transient. A life preserver, say of oiled goods, with a spring inside, flat, the size of a plate when operated, three feet long and able to float a person. Convenient fasteners for room doors with poor locks, burglar alarms and portable fire escapes, all worth their weight in gold when required. A few poles and strands of wire, an electrically controlled carriage and an operator would drop a life preserver every few feet of the bathing surface. They are all good subjects for the people in the troubles, but you would go to bed hungry trying to sell the goods. Two wire cables across the street from the big hotels, to operate a draw bridge, at times would save hundreds, as would a tunnel from amusement places. Steel cars would prevent the terrible fires when wrecked, and save many lives. It seems the people want something to eat, wear or to amuse for their money. It has been a much mooted question, and as it involves an idea it may not be amiss. How to make fire from wood: You would get very tired rubbing two pieces of rotten wood together. Select a dry, well-seasoned block; nick or deeply dent the surface with a sharp stone. Provide an arrow-like stick, and a bow and string much like the bow and arrow. Stand the arrow-like stick in the dented surface of the block. The bow has the string fast at each end. Make one wrap of the string around the arrow, which you steady with one hand and work the bow back and forth with the other. Mechanics would call it a fiddle drill. The arrow-like stick will turn rapidly. The friction will create a dust-like, fibrous mess, which will soon burn. Then blow and have a flame.

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Make a currycomb with wire teeth: Have a sheet of metal proper shape perforated to receive the wire teeth, and rest at the bottom of the brush. After cleaning the horse pull the metal sheet up, thus cleaning the comb. For a window sash without weights follow the trolley curtain. If a stirrup had an open bottom, save a small cleat on each side to rest the foot on, in case the rider was thrown the foot would turn and come out.

I don't believe in the strenuous life. It is the "happy medium" that appeals to me. We must have time to think. I don't mean to hesitate. We should think in advance as far as possible. Think, so that you will know better what to do. Try not to become confused; act with good judgment. A doctor was expecting a load of hay. On returning home at noon he noticed a load upset in front of his gate. A boy with a fork in his hands looked bewildered. The doctor inquired and was told the hay was for him. "Ah, well," he said to the boy, "come in and have some dinner." "Oh, indeed, sir, I can't; my father would not like it. I must move the hay." "Oh, yes," said the doctor, "come." The boy was hungry and willing, but insisted his father would not like it. Finally he reluctantly yielded. But he ate so fast the doctor cautioned him in vain. He would reply, "I am sure father won't like it." Finally the doctor asked, "Where is your father?" "Why," said the boy, "he's under that load of hay."

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I noticed in a paper that the Government desired a device to secure packages of letters in transit from one place to another. They use string, and it costs over \$200,000 per year. A billion of packages are tied up annually. At first glance, considering security, etc., I rather think a telescopic box would be best. But the cost, wear and tear, extra weight in freight all act to make the box impracticable. Indeed, if the matter is to be governed by cost, I advise our dear old Uncle Sam to stick to his string. The common shipping tag which has the washer-like piece of cardboard to reinforce the tie hole is simple and good. It is cheap and stronger, indeed, than the metal eyelets.

The ball and socket fastener used on gloves, suspenders and many other things is very good. It fell in the lap of a Frenchman.

A great variety of fasteners to hold sheets of paper together have a large sale. In most all cases they aim to hold the paper without puncturing it.

The name Uneeda was coined, tied fast to a biscuit and became famous.

S. T. 1860 X was an oldtimer. I believe it meant "sure thing in ten years from 1860."

I think a good ash sifter could be made with a box, say two by three feet, and a cylindrical sieve on an axle with a crank handle. The sieve to be provided with a door or lid, the ashes put in and the sieve revolved. The operation should be easy. It was a good idea to make circular zinc pieces to put under stoves; also the circular pieces used in pipe holes to close them in summer. The little bell-shaped guards hung from the ceiling to protect it from the gas jets was good, very simple and quite natural. The little burners on the gas fixtures are fine.

I met a gentleman who was blind. He took out a patent for a handle for a scrub brush. It could

be attached and detached at will. The barn doors hung on wheels on a track was a good job; also the gates that open when the team approaches. The lawn mower was not slow. Games are a very uncertain field to work in, though some of the standard games have been very profitable. They must be gotten up in elaborate manner, and as a rule must be well advertised. Many little puzzles have paid well, but they are invariably greatly exaggerated. The matters that come under the head of copyright are, I think, a good field to work in. The money success of these things depends principally on how well they are handled. There are many ways to make sales, many channels to work in. I am of the opinion that a large per cent. of inventors would do better to put their inventions out on royalty or sell. I am sure those who have invented will do so again and again if they are not too busily engaged otherwise. Hence I claim it best, generally speaking, to sell or place on royalty, and then invent something else. Inventing is really a profession—so is manufacturing.

[30]

"Let the cobbler stick to his last."

The strenuous life, like baby's suit, is soon outgrown. Then what to do becomes important. I think every city of fair size in the country should have a trades exchange. A man or woman opens a store and announces they will receive goods of all descriptions to sell or exchange, give a descriptive receipt for the goods, charging, say ten per cent. for services, when sold or exchanged. You can make a good white soap for say two cents per pound; put it up in one and a quarter pound cakes and sell direct to the consumer for five cents—give premiums for your wrappers. Take a contract to increase the circulation of your country or town paper; then visit the people, prepare an article on the city or town, and write up sketches of those who subscribe. Mail order business will pay fairly well from any point if you deal right. Never sell anything unless it is worth the money, and don't introduce any fake schemes. Get some good novelties, household articles, books, etc.; select good leaders to advertise, and when you make a sale enclose circulars of the other goods; soon you can have a catalogue. Study the papers you advertise in; there are many quacks—you can tell them by the character of their advertising. Public catalogues soon become too common; also you should handle the goods you sell. Then you can control the matter better. Lists of names are generally drummed too much before you get them. Once you begin to advertise you will get informed of live papers and live goods to push.

For personal canvassing a clothes bar made of half-inch round pieces, fastened to ends in the form of an X with an inverted V on top; they open and close, and will form a dryer, a basket and a sort of table to air a bed on. They should weigh six pounds and sell for \$1.25; cost, say forty to fifty cents. Say a country weekly, single sheet, one fold, wants to boom the subscription list. Reserve suitable space, say at the double corner, for four pages of any book chosen. In a year they have a 208 page book.

[31]

"Full many a gem of purest ray serene,
The dark, unfathomed caves of ocean bear.
Full many a flower is born to blush unseen
And waste its sweetness on the desert air."

Yes, the woods are full of them. The future inventions will rival those of the past. You should prepare and cast your net. If you choose "luck" may come your way, opportunity may faintly knock. You should be alert, comprehend and intelligently pursue. You must know the form and touch, lest its presence be unknown.

"Of all sad words of tongue or pen,
The saddest are these: it might have been."

Those who would be inventors should take up the helpful studies to that end, viz.: Mathematics in all its branches, philosophy, physics, all mechanical works and drawing. Interest yourself in all kinds of puzzles, observe closely. Begin early in life to study.

"Children, like tender osiers, take the bow,
And as they first are fashioned always grow."

Finished! Don't say you do not like it. We can find reasons to like anything. It all depends on the way we view it. I heard of an Irishman who imbibed too freely in a Western town and was ridden through the place on a rail. The people lined the streets and cheered lustily. After it was all over some one asked him what he thought of it. "Be gorra," says he, "if it wasn't fur the honor of the thing I'd about as lave walk."

If this little pamphlet turns out to be a cue which directs new thought into the vast unlimited field of invention, its mission will be filled. Possibly some day the subject will be taught in the schools; possibly those scholars will be the most practical people on the earth; possibly their influence in the land will wield a mighty Niagara of power.

THE END.

Mental Nuts
Can you Crack 'em?

[32]

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Transcriber's Note:

- Page 4, "treasuse" changed to "treasure" (solid treasure to the)
- Page 5, "maters" changed to "matters" (are about these matters)
- Page 5, "geting" changed to "getting" (getting up inventions)
- Page 11, period changed to a comma (pushed up, with a slot)
- Page 15, "porus" changed to "porous" (the porous plasters)
- Page 15, "shelvs" changed to "shelves" (of store shelves)
- Page 18, period added to abbreviation (No. 1 they)
- Page 19, "willing" changed to "willing" (and willing to persevere)
- Page 20, "corrigated" changed to "corrugated" (The corrugated band)

*** END OF THE PROJECT GUTENBERG EBOOK LEARN TO INVENT, FIRST STEPS FOR
BEGINNERS YOUNG AND OLD ***

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