dents with gunpowder and steam have proved; but gunpowder, steam, and phosphorus, may all be used, in suitable appliances and with ordinary care, with a very small amount of fear of any mischance.—*British Journal of Photography.*

Correspondence.

The Editors are not responsible for the opinions expressed by their Correspondents.

Condition of the Models at the Patent Office.

To the Editor of the Scientific American:

Permit me to call your attention to the condition of the models in the Patent Office. For want of room to properly store them, these models, in many instances, are left around on the floors, piled on the tops of the cabinets and on each other on the shelves, so that it is almost impossible to make an examination of them; many are also broken from this cause. In some cases, there are bushels of broken pieces of models, the uses of which can only be guessed at.

The present efficient head of the model room is doing all that he can in properly arranging and classifying the constantly accumulating models; but with the limited amount of space at his disposal it is impossible to do all that should be done. Some space has been made by disposing of parts of the rejected models, and also by placing small shelves between those already in the cabinets, but in many instances these shelves hide the models and interfere with their proper examination, thus necessitating a frequent handling where sight alone would be sufficient but for the second set of of shelves. Even with the most careful handling, models are frequently broken.

To remedy this, two things must be done immediately. More room must be provided, and the models dispensed with in all new applications not absolutely requiring them to explain the invention sought to be patented. To continue the present system, a new set of model halls as large as those now used would be required every seven years at the present rate of accumulation, which amounts to about twenty thousand annually. At this rate, without counting any increase in the number of patents granted, the number of models now in the office would be doubled in the period mentioned. You can thus see the necessity of some immediate change.

Some additional space might be obtained by building more galleries on the top of the cases in the north and west halls, which could be lighted through the roof. This would help for a year or two, but sooner or later the present system will have to be abandoned—useful as it is to point out what has already been done—and so prevent inventors from wasting their time, money and talents on machines that are already patented by others.

In every case where the model is dispensed with, as proposed, the applicant should be required to furnish drawings in perspective, where the case could be properly illustrated in this manner, a copy of which, at the patentee's expense, should be mounted on card board and varnished, and placed with its appropriate class in the model cabinets. Such a drawing would last a long time, and should it be defaced or worn by handling, it could be easily replaced by one of the photo-lithographs issued with the patents. The necessity for perspective exists in the fact that a majority of non-professional people cannot readily understand a mechanical drawing.

If some such system as this is adopted at once, it will be comparatively easy to find room for the models of such applications as absolutely require them for the proper illustration of the invention; but under the present style of proceeding, the halls are being filled with a large number of models of devices that drawings would show just as well, without taking up a tithe of the room, and at the same time save inventors the difference between the cost of the drawings and models.

The present Commissioner has been too short a time in his office, or too busily employed in his other duties, to appreciate the difficulties caused by the present limited space in the model halls; and I, therefore, appeal to you, as "the power behind the throne" and the special guardian of the rights of inventors, to see that some remedy is applied immediately.

There are now about seven hundred and fifty thousand dollars in the Treasury belonging to the Patent Office, nearly all of which has been taken from poor inventors who could ill spare it; and the least that should be done is to provide sufficient room, for the models that applicants are compelled to furnish, and to so arrange them that they shall be readily accessible for examination; and if space cannot be found, then the inventor should not be required to go to the expense of a model which the Patent Office cannot find room properly to exhibit.

Washington, D. C. INVENTOR.

Expose of the Tricks of the Davenport Brothers.

To the Editor of the Scientific American:

As Dr. Vander Weyde has finished what he considers to be an expose of the Davenport Brothers, I submit for the consideration of your readers a totally different view of the matter: they can judge who is right.

The Davenport Brothers do not depend on their ability to untie the cords with which they are bound; in almost every case, this would be impossible for them to accomplish in time to satisfy the spectators. A statement of what I have witnessed will serve to illustrate and prove what I assert. I have seen the brothers tied by experts, with such a number of ropes and complexity of knots, all drawn as forcibly as a strong man could pull them, that it would have taken at least thirty minutes for the most dexterous manipulator to have loosened one hand, the knots of the ropes on the wrists and legs being sealed with wax. In five seconds by the watch, after the doors were closed, a naked arm and hand were projected from the hole in the middle door, grasping a large bell and ringing it. The doors were opened upon the indrawing of the hand, and the fastenings on both wrists and legs examined critically and found to be secure, and the seals unbroken. The fact is they perform all of their tricks with free hands and at the same time do not untie a single knot. Dr. Vander Weyde says that the smallness of their hands aids them to undo the fastenings; this is true, but not in the way the Doctor understands it. They have false hands and wrists these are made of gum, and so closely resemble nature, both in form and color, as to mislead all who are not expecting deception in that way; the feeble light in which they perform their tricks assists to secure them from detection. The wrists of these counterfeit coverings extend up the arm a sufficient distance to be covered by the sleeve of the shirt, and have flat hoops or rings of thin sheet metal embedded in the substance of which are composed, so as to keep them open and prevent a collapse under the pressure of the cords. These counterfeit hands and wrists are of ordinary size, and yet are large enough to permit of the ready insertion, or removal of the hands of the Davenports, owing to the remarkable slimness of their natural members. The position in which the hands are placed, and the tying of the ropes on the under side of the seat after they are passed through the holes made for their reception, aid greatly in keeping them in proper position for the easy insertion of the hands. The coat sleeves above the wrists are padded to make the arm of a relative size in proportion to the hands. In the trick of exhibiting five arms and hands at one time extending out of the window in the cabinet, they employ four counterfeits made of thin gum, capable of being inflated, the fifth and smaller one being one of their own arms. They do not open the door after this performance until they have had time to exhaust the air out of the frauds, and roll up and deposit them in their coat pockets. In regard to freeing themselves of the fastenings, they simply cut the cords off; others of a proper length are produced from their capacious pockets to throw on the floor; the cut fragments are put safely away in those same pockets. A moment's reflection will convince any one that it is simply impossible for the Davenports to endure, for three fourths of an hour, the torture of tightly knotted cords upon their naked wrists; try it for five minutes and see if it will not convince you of the truth of my demonstration.

Harrisburg, Penn. WM. P. PATTON.

C. W. Williams on Coal and Smoke.

To the Editor of the Scientific American:

Is Mr. Charles Wye Williams the latest and best authority upon the consumption of coals and the prevention of smoke? I have read his book, and he seems to make these remarkable points:

1st. That the prevention of smoke is impossible. He enters into very learned statements and calculations, which, as he leaves them, condemns us poor inhabitants of bituminous regions to the unrelieved prospect of endless carbonization—in being lined inside and outside with smoke.

2d. He learnedly thinks he shows that smoke isn't worth much, and that its prevention wouldn't be much of a saving.

3d. He states that Mr. Charles Wye Williams has invented the only useful mode of approximating the prevention of smoke; and that any other invention shows either that the inventor deceived himself, or intended to deceive others, that is, is either a knave or a fool.

The arguments of the book do not seem, to the present writer, satisfactory; and its tone savors more of magisterial self conceit, than of that humility which science, like every other great subject, ought to engender in minds above mediocrity.

Is there not a better book on the subject? B. F.

[The criticisms of our correspondent upon C. W. Williams' works are not without foundation, whether relating to matter or manner. That author's views contain, in our opinion, so much admixture of error, that he is hardly entitled to be styled an authority in the strictest sense of the term. As our old readers are well aware, we have had occasion to differ from Mr. Williams in many points besides the ones enumerated.—ED.

Mississippi Bridge at Rock Island.

To the Editor of the Scientific American:

The new iron bridge over the Mississippi river, from Rock island to the city of Davenport, is being hastened to completion, and will be ready for travel in about six weeks. It is a Whipple truss bridge, and is built to accommodate wagons, with a foot way below and a railroad overhead.

The bridge consists of five spans and a draw; the spans vary from 200 to 210 feet in length, and weigh six tuns to the linear foot. The draw span is the longest on the Mississippi river, and the heaviest in America; it is 366 feet in length, and weighs 871,784 pounds. The draw is built in reverse way of the fixed spans, that is, the Whipple truss is inverted, bringing the top chord into tension, and the bottom chord into compression, and carrying the entire strain from the ends to the center or main posts. In the fixed spans, the strain is transmitted from the bottom of the posts to the top chords by means of the tie bars. This throws the top chord into compression.

The turntable, on which the draw span rests, is indeed a novel affair, and is the invention of C. Shaler Smith, President and Chief Engineer of the Baltimore Bridge Company. The bed circle, which is 32 feet in diameter, with a 12 inch upper surface, and weighs 36 tuns, rests on the pivot pier. The top surface is beveled, the inner side being the highest. The rotary table, five feet in depth, and resting on 36 cast iron wheels 30 inches in diameter, is placed on the bed circle, the 36 wheels resting on the beveled face of the circle. Each wheel, which has a 12 inch face, is beveled, the outer side having the greatest diameter. Thus each wheel, from its formation, tends to travel in a segment of a circle, and avoids the tendency, which square faced wheels have, to travel on a tangent. From the center of each of the above wheels runs a rod to the center pin, which is 32 inches high, with a base four feet in diameter, which pin is mounted on the radial center of the masonry. The rotary power is not yet finished, but will consist of an iron reservoir containing about three barrels of pure glycerin, which will flow into four hydraulic pumps worked by a steam engine. The glycerin will be forced by the pumps into two large rams on each side of the center of the draw span. An iron cable will be led from the plunger of each ram one quarter around the circle, and there made fast to an iron eye let into the masonry. The machinery is so arranged that, while one ram winds in on its cable, the other will be laying out its cable, ready to pull in, or when it is desired, to reverse the motion of the draw.

This huge draw was recently swung into position for the first time, the united muscular power of twelve or fifteen men being amply sufficient therefor. Three persons only had the honor of being on the draw while it was making its first swing, one of whom was your correspondent,

Davenport, Iowa. LUKE COPPERTON.

[For the Scientific American.]

VARIANCE BETWEEN HYDROSTATIC AND STEAM PRESSURE IN BOILERS.

The hydrostatic force is the only force present in applying the water test to ascertain the strength of steam boilers. But, if heat be applied to a boiler to generate steam, two constant forces are present:

1st, the expansive force of steam, and 2d, differential expansion.

Besides these, two inconstant forces: 1st, repulsion of the water from the metal, and 2d, dissociation of the water arising from expulsion of the air by continual ebullition, sometimes make their appearance.

If the drift pin has been used, the damage it has done will be increased by heat.

One or more of these forces, combined with the expansive force of steam, becomes irresistible; and when in operation to that extent detracts from the possibility of working steam at the pressure of the previous hydrostatic test. The presence of these additional forces in a steam boiler is clearly attributable to extraneous causes, and not to any destructive but hidden agency inherent in steam. For, while no force will rebel at a violation of its laws sooner than steam, yet its controllability in conformity with its laws is not exceeded by that of any other active force. In proof of this, we find that when steam has been generated in one boiler and forced into a second one, it requires a greater steam pressure than water pressure to rupture the one containing steam only, owing to its greater fluidity and elasticity.

Further proof, of its controllability and even harmlessness when isolated, is seen in its easy confinement in every variety of vessel and under varying circumstances, extending even to rubber hose at high pressure. The thinness of a plate capable of confining isolated steam is surprising.

On comparison of two boilers tested, the one by water pressure and the other by steam forced into it, their conditions will be found to be the same in kind, and different only in degree of temperature. Every part of each being of uniform temperature, the force of differential expansion is absent from both. The plates not being heated above 600°, the point of maximum vaporization, the force of repulsion is absent from both; therefore the only remaining force left is the steam pressure in the one case and the water pressure in the other. The behavior of steam, isolated in one boiler, being identical, then, with that of water isolated in another, and the two being convertible, the one into the other, according to temperature, it is presumable that there can be no antagonisms due to their contact and union in the same boiler engendering other and additional forces besides those above enumerated.

This inference is fortified by the fact that there is not known an instance where the forms, in which the elements of water present themselves, whether in that of gas, vapor, liquid or solid, manifest any antagonisms, the one to the other, in any possible combination. To assume therefore that the contact and union of steam and water in the same boiler can possibly engender a dangerous force, is not only an assumption without foundation, but is contrary both to reason and analogy. It appears, therefore, that there are known to exist in some boilers, besides the expansive force of steam, other illegitimate forces which are not resistible by any strength of material, and are consequently capable of producing all the phenomena of explosions; and it further appears that these illegitimate forces cannot be present in those boilers possessing uniformity of temperature not exceeding 600°, and containing water from which the air has not been expelled.

The question now arises: Can these conditions be permanently maintained in boilers generating steam?

No problem in mechanics is more simple. By an application of the law of gravity, the water will flow from the cold end of a boiler (in a properly adjusted pipe) to the hot end, and the water in the hot end will flow in the barrel of the boiler to the cold end, thus interchanging places with such rapidity as to insure a temperature substantially, if not theo retically, uniform. The greater the heat, the greater the speed of flow. The constant force of differential expansion being thus practically obviated, it remains to dispose of the inconstant force, repulsion. But there can be no repulsion of the water until the plates are heated above 600°, the point of maximum vaporization, an excess of which degree of heat it is well known metal cannot receive while a current of water is flowing over it.

It follows, therefore, that neither differential expansion nor repulsion can be present in a boiler having rapid and perfect longitudinal circulation.

The salutary consequences of this action of water in steam boilers are not limited to their immediate safety only, but extend to their cleanliness, economy, and efficiency and regularity in generating steam.

The flow of water from the fire box to the cold end of the boiler will produce a current adequate to sweep into the mud drum all deposit on the sides and bottom. This mud drum may be so constructed as to form an eddy, retaining the sediment while passing the clarified water again to the fire box.

The efficiency of the steam will be increased by freedom from priming, which is occasioned by the throw of the water into the steam pipe, in consequence of the conflict between the descending water to take the place of that water which is ascending with the steam from the bottom. But if this conflict is avoided by the return of the water to the bottom of the boiler through a different channel, a more quiet separation and delivery is made of the steam into its pipe leading to the engines, lessening by that much its tendency to prime. The violence of this conflict may be ascertained by measuring the temperature of ebullition at various pressures. In a vacuum it occurs at 98°, at great elevations, as the top of Mont Blanc, at less than 200°, and, at ordinary levels of atmospheric pressure, at 212°. But in a steam boiler with a pressure equal to eight or nine atmospheres, the automatic separation of the steam from the water is not only more difficult, but the difficulty is magnified by the multitude of tubes and narrow water ways through which both the ascending and descending columns of water must travel at the same instant. Hence, when sudden relief from pressure is given by a supply of steam to the engine, the violence of the ascending column must occupy the water spaces to the exclusion of the descending one, with resulting damage, sometimes greater than that of priming.

The economy is promoted by the maintenance of that temperature most productive of the greatest amount of steam. This point fluctuates slightly above or below 600°, according to circumstances. As an increase in the temperature of the plates, slightly in excess of that figure, say to 800°, will render them nearly eight times less efficient in the generation of steam than a temperature of 600°, and as the circulation of the water will prevent the possibility of their rise in temperature above that of maximum vaporization, it follows that, in so far as this is effected, the circulation of water in a boiler, longitudinally, contributes to its economy by utilizing a heat which otherwise may become a source of disaster.

Again: Regularity of steam cannot be maintained in a boiler, while a part of the water contained in it (that around the fire box) is heated excessively, and another part (that in the lower legs and lower part of the barrel) has not attained a temperature above that of fever heat. But, by longitudinal circulation, all the water having been brought nearly to one temperature, it is in a condition to yield steam with the greatest regularity.

It is, moreover, maintained that groovings and corrosions are impossible in a boiler with longitudinal circulation of the water sweeping among the superheated steam, which is their cause.

But the weakest place of a locomotive, and that which firs gives way, is the point of union between the flue sheet and the flues. The difference in the thickness of their materials exposes them to the greatest strains of contraction from the chill occasioned by opening the furnace doors. The effect is visible in the varying shades of color, like that passing over steel in the act of tempering. But if the heat on the inside is made constant by the rapid circulation of water of uniform temperature, the strain of contraction is in a measure counteracted by diminishing the chill.

There being therefore no force inherent in steam itself, so far unmanageable as to destroy by sudden violence a boiler containing aërated water, nor to affect its integrity by gradual deterioration, it appears that the variance between the pressures of water and steam in producing these ruptures is dueto other disturbing forces, whose presence is wholly prevented by the rapid and perfect longitudinal circulation of the water. ONSLOW.

Lecture at Sea by Agassiz.

During the recent outward passage of Professor Agassiz' exploring ship to St. Thomas, the venerable chief made a sensation one day by delivering a scientific lecture on the deck of the vessel. A correspondent of the New York *Herald* says that a blackboard was improvised, a portion of the ship's crew was invited to be present, and a most attentive audience listened to the Professor's descriptions of the animals which they had found living in, on, or about the Gulf weed.

"On examining a fresh specimen carefully, it is found to be a floating colony of animal life. It has inhabitants which are bound up with it, and depend on continual contact with it for their very existence. Others, which use it for shelter and protection, are still free to make occasional excursions beyond its limits; and still others—suburban residents —independent in disposition and predatory in character, cruise around its borders and descend upon unwary "carpet baggers." Among the lower classes, the acalephs are represented by the hydroids, animals living in a community, having a common stem, with a central cavity communicating with numerous branches. These branches support little cup like projections, in each of which resides an individual of the species.

Each has a mouth in the center, a digestive cavity extending into the common canal, and a number of radiating tentacles. There are two varieties of the Gulf weed, the narrow and the broad leaved, and it was noticed that one species of these hydroids was found only on the narrow variety. It was the campanularia; and even where, in large masses of the weed, the two varieties were intermingled and in direct contact, this species was never found in the other.

The crustacea were well represented by crabs, shrimps, and lobsters, a great number of species being found, about half of which are entirely new. It was found that the crabs were represented by members of the highest order—the decapods furnished with five pairs of legs, the anterior being better developed than the others, showing that tendency to differentiation of structure which is characteristic of the higher groups and reaches its perfection in man. The earlier stages of life correspond to the similar stage of society; and, as in savage tribes, each man is his own lawyer and physician, builder and architect, so in the lowest animals, each portion digests and assimilates, respires and contracts. It is not until we ascend in the scale of creation that we find separate organs with distinct functions.

In one of our hauls, we captured a curious instance of the physical inferiority of the male sex, which generally increases as you descend. It was in the person of the male of a pipe fish, belonging to a curious genus in which the jaws are prolonged and surrounded by the integument, forming a tubular mouth. He was encumbered with a mass of eggs, which he was compelled to carry around in a sort of abdominal pocket until they were hatched.

It seems to some so called "practical" minds that there is no utility in such investigations, and that such lives can have no important connection with our vastly superior human existence. A single, rather trite, but very applicable instance to the contrary may be adduced.

There is a little mollusk—the *teredo navalis*—which was at one time the terror of all ship owners. It would quietly and unsuspectedly pierce with thousands of holes the hardest timbers. Ships were rendered valueless, docks destroyed, and at one time all Holland was in consternation at the discovery that the piles of her embankments were bored through and the country in imminent danger. A distinguished naturalist discovered that at certain seasons the female of this species carries her eggs in the folds of her respiratory organs. They remain there until they are fecundated by the milt of the male floating in the water. He also found that a weak solution of mercury thrown into the water destroyed the milt and so prevented the fecundation; and thus, in a few seasons, ship owners were enabled to clear their docks of this hitherto unconquered marauder.

This is but one of hundreds of cases; but it serves to show that size is no criterion of importance in the study of zoölogy.

Lasche's Improvement in Decorative Oil Painting.

Jean Marie Laschè, of Paris, France, has invented and patented, through the Scientific American Patent Agency, certain improvements in decorative oil painting, the object being to replace the painting in oil executed directly on surfaces for buildings, ships, carriages, carpenter's work, cabinet work, furniture, ornaments, etc., and also the gilding by a portable oil painting or gilding already executed, finished, and dry, which is applied by sheets, strips, or pieces upon said surfaces by the aid of a sticky varnish or waterproof cement. The invention consists in executing, or in other words, to execute, such painting in oil, either in plain tones, imitations of wood, marbles, in ornamental subjects, or the gilding on tin foil, whereby the work may be performed in special workshops by skilled workmen, either by hand or by machinery, in a manufacturing and commercial manner, and afterward be transported, so as to be used and applied where it is required, thereby preventing delays, dirt, smell, and all the annoyances occasioned by the presence of painters in a dwelling.

The invention also includes the applying of tin foil upon which oil painting has been executed, or tin foil which has been gilded, upon surfaces by the aid of a sticky varnish or waterproof cement, to replace the gilding or the oil painting of such surfaces. The invention then, is to oil painting and oil gilding what paper hanging is to fresco painting, with the great difference and advantage that, while paper hanging interposes paper (a hygrometric substance) between the surface and the painting, this system of interposing tin foil and a waterproof cement between the surfaces and the painting will protect said surfaces with greater efficacy than ordinary oil painting. The process is as follows:

Tin foil of the greatest thickness—that is to say, foil of tin or composite metals therewith, which are rolled very thin and known as tin foil in the trade—is spread evenly upon a hard and smooth surface, which, by preference, is slightly moistened to assist in the process of spreading the tin foil. Upon this tin foil any desired effect of oil painting is executed, from the plain oil painting in flat tone, to the most elaborate ornamentation in all its branches; and this can be done either by hand or by processes of printing, stenciling, through the aid of machinery, in whole or in part, imitation of costly woods, stones and marbles, subjects in flowers, birds, shells, landscapes, subjects of interior, imitation of carving as well as plain gilded, ornamental gilding, and a combination of gilding and oil painting. In short, anything which is executed in oil paint may, it is claimed, be executed upon this tin foil.

The work, when finished, is varnished; and when thoroughly dry is removed from the hard surface upon which it was sheathed. It is then ready to be transported from the shop, and for that purpose it may be rolled like wall paper.

To apply this portable paint, the surface or object upon which it is to be placed is coated with a sticky varnish or hydraulic cement; the portable paint is cut of the suitable size and applied, carefully pressing in against the surface or object, so as to drive away all intervening air. The sheets may be applied to irregular surfaces, carving, sculpture, moldings, etc., as the tin foil and the oil paint and gold thereon are each very pliable.

New Railway Bridge at Albany.

The new railway bridge over the Hudson at Albany, N. Y., begun in June, 1870, has lately been completed. The main bridge is 1,525 feet long from Quay street to Van Rensselaer island, and the whole length, including approaches, 2,250 feet. It is 30 feet in the clear above low water mark of 1857. There are two bridges above Van Rensselaer creek, (the first comprising three spans 62 feet 6 inches each) one connecting with the New York and Boston railways, and the other for Troy local trains. The portion of the bridge across the basin descends three feet from the pier to Quay street. The trusses in the superstructure are 26 feet apart. All the tension bars of the bridge are of double refined iron, and it is calculated that the bridge will stand a load of 6,000 pounds per lineal foot, exclusive of the weight of the structure, the strain of which will not exceed one sixth of the breaking weight. The draw weighs 350 tuns, and is to be worked by a ten horse power engine placed beneath the roadway. Clark, Reeves & Co., of the Phœnixville Bridge Works, Phœnixville, Pa., were the contractors for the superstructure.

Housatonic River Bridge.

The new iron bridge over the Housatonic river at Stratford, Conn., on the New York and New Haven Railroad, is completed. This bridge is one of the handsomest in the State. It was commenced in March, 1871, and has been pushed, in spite of the cold weather of the early winter, to completion in a wonderfully brief time. The bridge is 1,091 feet long, 27 feet wide, with two tracks, and the hight of the iron work is 24 feet. It has five spans. three on the east side of the draw and two on the west, and the draw is 206 feet feet long. Five piers and two abutments of solid masonry support the iron work of the spans; and the hight of the piers, except the draw pier, is 36 feet 8 inches, they being 7 feet wide at the top and at the bottom. The draw pier is 30 feet wide at the top and 35 at the bottom, and rests upon 427 piles, sawed off by divers, level with the river bottom. Total cost, about $300,000. The contractors were F. C. Lowthorp, of Trenton, N. J., patentee; John Beattie, of Stony Creek, stone work; S. A. Hammond, of Bridgeport, piling and timber work, and George Everett, of Allentown, Pa., superintendent of the iron work. The frame work of cast iron came from Birmingham, Conn., and the tension rods from Trenton, N. J.

Patenting Small Articles---The Result to Manufacturers.

The advantage of patenting small articles is forcibly illustrated in the success of the Meriden Malleable Iron Co., whose works are located at West Meriden, Conn.

They are constantly obtaining patents on small articles of utility and ornamentation in their line of manufacture and, however small the improvement, they consider it a paying investment to incur the trivial expense attending a patent.

Among the last novelties of their production is a very ornamental drawer pull, made of gilt and ebony or other hard wood, so constructed that the knob drops down out of the way when not in use. To the knob or handle, which is hinged to an ornamental gilt base, is inserted a piece of india rubber, which prevents the pull knob from defacing the bureau or furniture, to which it is attached, by constantly dropping against it. Such handles are more convenient than ordinary knobs, and their application renders an ordinary piece of furniture very attractive.

If manufacturers of all kinds of small wares would devote more study and ingenuity in getting up new and original designs, like trimmings for harness, wagons, furniture, household implements, and articles of every kind where it is possible to display taste, they would be astonished at the increase of their business and profits.

What one Firm has Done, others may Do.

We will not occupy the space of a page, which we might fill, with complimentary letters received from our friends and patrons since the new year. But the following, from the manufacturers of the fire extinguishing apparatus illustrated in the last volume, we beg space for. How many other manufacturers will take our subscription list and go among their employees and get subscribers? We pause for a reply.

MESSRS. MUNN & Co.

Gentlemen: We take pleasure in enclosing you a small list of subscribers to your valuable paper, with check for the same. We have ourselves received so much benefit from the articles published by you, on our system of sprinklers that we feel it our duty to at least canvass our building in your behalf. We shall endeavor, as opportunities occur in the future, to extend our limits and help swell the list of your subscribers.

Tendering to you the compliments of the season, we are,
Yours truly, HALL BROTHERS.
Boston, Mass.