The Inventor's Department

Simple Patent Law; Patent Office News;
Inventions New and Interesting

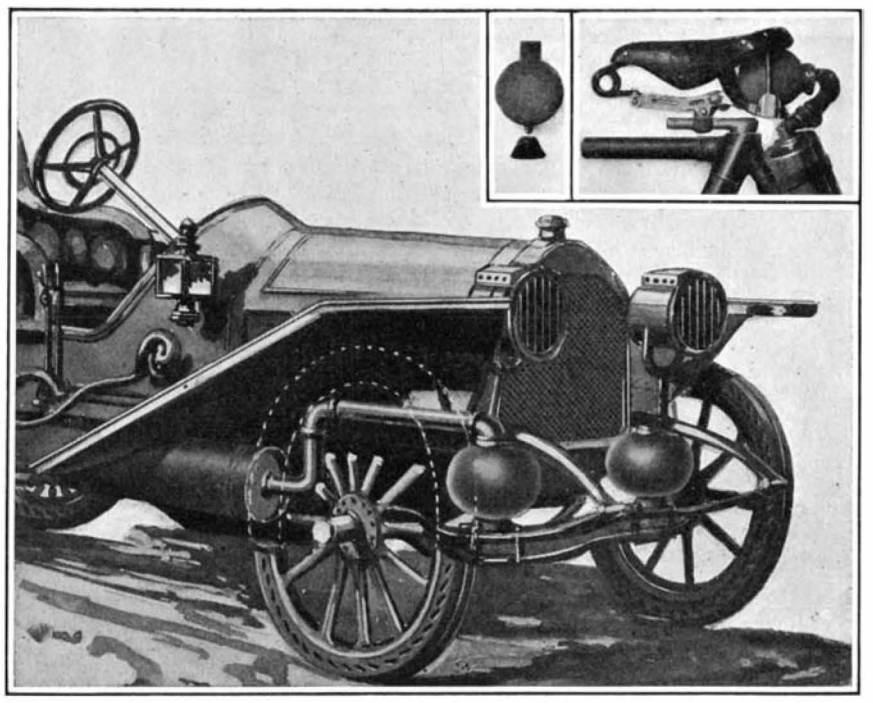
A Pneumatic Cushion Substitute for an Automobile Spring

THERE has recently been invented by a California mining engineer a novel substitute for springs and shock absorbers on automobiles. This is a pneumatic cushion which appears to have advantages, because it permits the use of solid tires.

The inventor of this new device has found it possible not only to construct a pneumatic shock absorber, but so to arrange this that it takes the place of the spring itself, while at the same time preventing any rebound.

In its present state this pneumatic cushion consists simply of a round rubber bulb six or eight inches in diameter, having an open neck at its upper end, and a small projection at its lower. This projection fits into a hole in a conical wood block that is secured to the axle of the automobile, while the neck of the bulb is set into a pipe fitting attached to the body of the machine. This pipe, of about 1½ inches diameter, connects to a tank having a capacity of 2,000 cubic inches. Four such bulbs replace the springs of an automobile. In fitting them to a car, the leaves of the springs are removed with the exception of the outer heavy leaf, which is used for steadying purposes. All four tubes are connected by separate pipes to the tank.

The action of the bulb is as follows: When a wheel of the car passes over an obstruction, the bottom of the bulb resting upon the cone-shaped block is pushed inward, and the surface of contact of the bulb with the block is increased. The heavier the blow, the more the block sinks in; consequently, there is a continuously increasing supporting area within the bulb upon which the air acts, the air being under a compression of about 20 pounds to the square inch in the bulb, the pipe line, and the tank. As a result of the increasing flattened area in the bottom of the bulb under a heavy shock, there is a cushioning effect that increases with the blow, and when the initial shock has been absorbed, there is no rebound, since the air in the bulb, piping, and tank has not been appreciably compressed. The cushion acts upon the same principle as the pneumatic tire, since the supporting area is increased when the bulb is flattened, in much the same way as it is with the tire; but in this case there is no increase in air pressure, owing to heating of the air, and consequently no liability of bursting.



A pneumatic cushion substitute for an automobile spring.

The air cushion makes it possible to use solid tires upon all commercial vehicles no matter what the size, as well as upon pleasure cars where it is desired to dispense with the costly pneumatic. The life of a good solid tire is easily double that of a pneumatic. For heavy work eight 12-inch bulbs, using an air pressure of 80 pounds and deformed to 8 inches vertical diameter, will sustain a weight of 15 tons and have a maximum carrying capacity of 24 tons, while 16-inch cushions will carry minimum and maximum loads of 30 and 48 tons, respectively. The rubber bulbs that have been tested in actual use are 8 inches in diameter with a 1¾-inch orifice at the neck. They are made up of six layers of canvas imbedded in a ⅜-inch thick rubber wall. They have shown no signs of wear in a 5,000-mile test.

The minimum load that is placed upon four 8-inch cushions is 1,400 pounds, with an air pressure of 30 pounds per square inch and a total contact area of 48 square inches at the bottom of the bulbs. The maximum load these 8-inch bulbs will stand with the same air pressure, is 4,320 pounds. This would increase the contact area to 144 square inches, and flatten out the bulbs to about 5 inches vertical diameter, but there would still be two or three inches for further vertical movement in case of a sudden shock or blow. The air pressure in the bulb determines the strain upon the walls, and as this air pressure never increases perceptibly, it can be seen that the strain is not very great.

That this pneumatic cushion can be applied to any vehicle can be readily seen. One of our illustrations shows it in use on a motorcycle saddle in place of springs.

"Uncle Sam's" Automatic Dampening Machine

By Thomas D. Gannaway

YOUR "Uncle Sam" is the possessor of the first and only automatic dampening machine for dampening paper for plate printing in existence today. Although plate printing was invented in Italy nearly four hundred years ago, but little change has been made in it since. The plate printer has had many of the same difficulties to contend with all these years in his effort to produce the best results from the engraved plate. As time has passed, great progress has been made in the art of engraving plates from which to print. The engraver has become more skillful in producing smaller and more artistic lines in his plate, thus making it still more difficult for the printer to reproduce the engravings upon paper. The greatest obstacle he has met with in all his career has been to get his paper in the proper condition for printing from an engraved plate. Plate printing is of such difficult nature that all work of a particular character (such as the printing of paper currency) has to be done by hand.

The printer, after inking his plate, takes a cloth and wipes it until the ink is all apparently wiped off; then he polishes it with his naked hand, thus seeming to remove every particle of ink he put upon it. But down in the hundreds of very fine depressions the ink still remains, and it is this ink that the printer must get on his paper. In order to do this satisfactorily, the paper must be wet and mellowed to a certain condition. If the printing is to be quite uniform, which is very essential in the case of paper money, all the sheets of paper must be moistened exactly alike. Here is where the plate printer's real difficulty lies. If the sheet is mellowed down to the right condition, it will pick up the proper amount of ink, and the print will be perfect; but should it be too soft, it will get too much ink, and the results are usually disastrous. On the other hand, if it is too dry, it will not take up

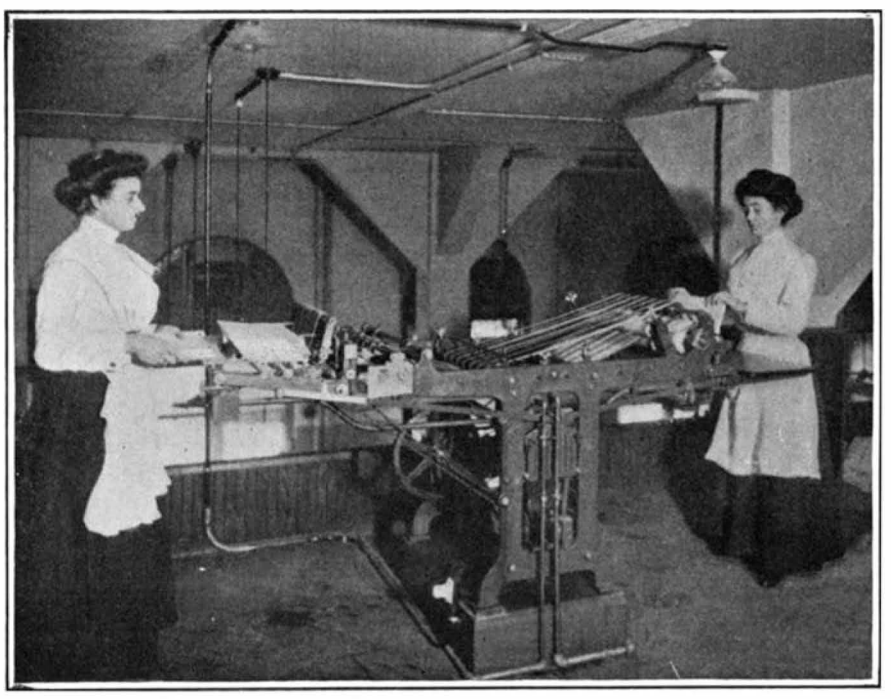


Fig. 1.—View showing the feeder of the dampening machine and how paper is passed up through the wringer.

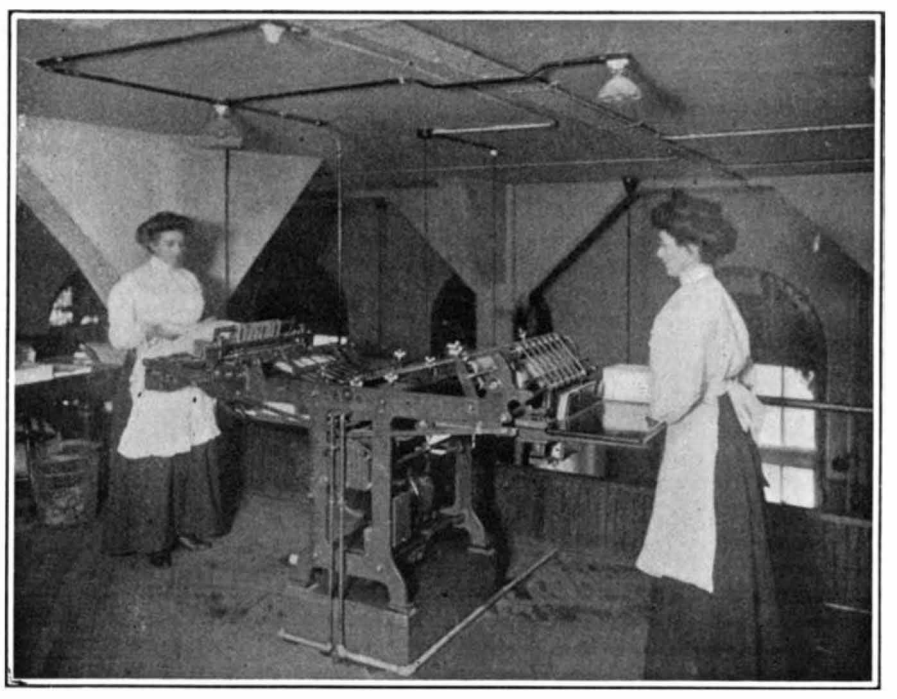


Fig. 2.—How the paper passes from the feeder of the dampening machine down into the water and how it is automatically stacked on edge.

enough ink, and the print will be too pale, and hence useless.

Hundreds of thousands of dollars have been spent by private concerns in trying to overcome this seemingly unsurmountable obstacle. Some of the most skilled mechanical minds and the greatest geniuses in the world have tried to overcome this difficulty and failed. It remained for Mr. Joseph E. Ralph, Director of the Bureau of Engraving and Printing, and Mr. Benjamin Stickney, his mechanical expert and designer, to be the first men to reach this goal. Mr. Ralph, after reaching the conclusion that the paper could be wet by machinery, and at the same time more perfect results obtained in that way, called in Mr. Stickney and discussed the plan with him. The latter, under the direction of Mr. Ralph, set his mind to the task about one and a half years ago to work out the mechanical features of a machine by means of which all sheets of paper to be used in making money could be wet every one alike, and then put in exactly similar condition for the plate printer. He could not devote his whole time to this one idea, as there were other mechanical features of his work which had to be looked after. Finally, having completed his designs, he submitted them to Mr. Ralph, who ordered the machine built; and consequently in the government's big plate-printing plant to-day, stands one of the greatest machines known to this industry, and yet one of remarkable simplicity.

In order to convey a better idea of the many extraordinary qualities of this wonderful machine, I shall first describe the best approved method of wetting paper for plate printing at the time of the advent of the automatic dampening machine.

In what is known as the wetting division of the Bureau of Engraving and Printing, a large number of men are employed to dampen about 400,000 sheets of paper per day. They use boards a little larger than the sheets of paper for a starting base. On this base is placed a wet cloth; then twenty sheets of paper are placed on the cloth, and another wet cloth is laid on top of these. Next comes another twenty sheets and another cloth, and so on until the stack contains 1,000 sheets of paper and a corresponding number of cloths. After being stacked the sheets are taken away and put under a slight pressure for 24 hours.

When taken out of the press, naturally those sheets which were closest to the cloths contain more water than those in the center of each bunch of twenty sheets. Each such bunch has to be taken out and split in the middle, and the two wet sides turned together and repacked with a new set of wet rags. The sheets are then put back into the press for another twenty-four hours. The cloths after use must be washed before they can be used again. They take up a great deal of the animal matter contained in the sizing which was put on the paper by the manufacturer, and unless they are taken out at the proper time and well washed, they will sour, thereby injuring the quality of the paper. The men who moisten this paper must, before entering the work room, don some old clothing, as it is impossible to escape being soiled. Notwithstanding all of this care and the trouble of handling the paper twice, the wetting is not thoroughly uniform, as will be readily understood.

When a sheet has received the proper amount of moisture, it has expanded ½ inch. Now suppose the printer gets three sheets of paper. One of them has the proper amount of moisture in it, and has expanded ½ inch; the second is too wet, and has expanded, say, ⅝ inch; the third one has not received enough moisture, and consequently has expanded only about 3/16 inch. They are all printed from the same plate, and when they are thoroughly dried they will have contracted to their natural width; therefore there will be a variation of 7/16 inch in the size of the notes printed on these three sheets. Also, the ones which were too wet are now too dark in color, and the ones which were not wet enough are too light in color. Thus it can be seen that the printing is not perfect, and cannot be made so under these circumstances.

With the automatic machine it is altogether different. As will be seen from the illustrations, this machine is quite compact. It requires but one attendant, with one assistant giving one-half her time.

The automatic feeder, which feeds from the bottom of the stack, will operate successfully under a stack of three thousand sheets, thus enabling the attendant who looks after the feeder to care for two machines at once. This feeder, which is a remarkable mechanism itself, is one of Mr. Stickney's inventions. In Fig. 1, to the left, you can get a good view of it. It slightly raises the stack of paper, and at the same time slips the bottom sheet (and only one at a time) just far enough for it to be caught between two rollers. These two rollers pass it onto a set of canvas belts and under a corrugated roller (Fig. 2, to the left) to the point where it is caught between two sets of canvas belts (Fig. 1, near the center). By these it is carried down through running water contained in a shallow basin in the center of the machine. They also carry it out of the water up to two squeezing rollers made of rubber. (Fig. 1, to the right of the center of the machine.) These rollers are adjusted by means of set-screws (which may be seen in either illustration) so as to leave the required amount of water in each sheet. The paper then passes over the large cylinder just to the right of the wringer, and is automatically caught and placed on its edge, as shown in Fig. 2. If for any reason a sheet is not properly placed on its edge, it is at once removed by the attendant and placed in the stack to her right. Otherwise she lets them remain in the machine until the pack contains about one hundred sheets, then she removes them to the stack.

The attendant at the other end of the machine receives the paper in packages of 1,000 sheets each. When she has placed 1,000 sheets upon the feeder, she puts in a sheet of another kind of paper as a marker for the one receiving it at the other end of the machine; thus the sheets are kept in packages of 1,000 each.

It has been ascertained that the required amount of water to properly mellow 1,000 sheets of paper is 5 pounds. A thousand sheets of dry paper weigh, on an average, 12 pounds and 6 ounces. By weighing the paper before it is put into the machine and again afterward, it is easy to ascertain just how much water is left in it. This is controlled by the adjustment of the wringer. With this method all the sheets are wet exactly alike, each individual one containing 35 grains, or 2/25 of an ounce, of water when it leaves the machine.

The paper is carried from here in packages of 1,000 and placed in a humidor for twenty-four hours or longer if desired, or it may remain there even for a week without injury. The "humidor" is merely an air-tight case, where the paper is put to properly mellow it for printing.

The dampening machine, after being properly adjusted, will run indefinitely, automatically feeding, dampening, and packing the sheets. It has a capacity of 48,000 sheets in seven hours. Three attendants can operate two machines, and the work is quite clean, in contrast with the old process.

Another very important feature about this machine, and one which will interest every taxpayer, is the saving which it effects. Under the old method it cost the government 52 cents per thousand sheets to dampen the paper, while with this machine it can be done for 14 cents per thousand. This makes a saving of $18.24 per day on each machine turning out 48,000 sheets, making a total of about $42,000 per year.

Changes in the Patent Office Staff

EDWIN LYON CHAPMAN, Examiner of Trade Marks and Designs in the United States Patent Office, died at his residence in Washington, D. C., January 18th, 1911.

Mr. Chapman's term as Examiner of Trade Marks was undoubtedly the most remarkable in the history of the Patent Office. He was examiner in charge at the time of the passage of the Trade Mark Act now in force, and was the presiding genius in organizing, not only the business methods incident to the inauguration of the registration of trade marks under the new law, but was also responsible in large part for the procedure and practice found necessary in carrying out the purpose of such law.

He was a man of much force, had a strong intellectual grasp of the legal problems involved, was untiring in his energy, was possessed of great creative faculty and won the admiration of all who appreciated his sterling worth as an official.

Personally Mr. Chapman had many lovable qualities, and strong attachments were formed between him and his intimates.

He was a native of Ohio, but lived most of his early life in Monroe, Michigan. As a young man he entered Cornell University, from which he was graduated in 1881. After studying law and practising for a short time at Monroe, his Michigan home, he accepted a position in the Patent Office, where his real life work was done, and where his strong individuality has left an enduring mark among the records of the office.

Mr. Chapman is succeeded by Mr. John H. Carnes, who has been promoted from first Assistant Examiner to Principal Examiner, and assigned to take charge of the division of trade marks and designs.

Mr. Carnes was born at Jersey City, entered Rutgers College, New Brunswick, N. J., in 1891, and was graduated from the civil engineering course in 1895. He practised civil engineering for several years, and entered the Patent Office in December, 1900. For a period of five years he served in various examining divisions, and for the past five years has been in the Interference Division, of which he was ranking assistant at the time of his recent promotion. During his term of service in the Interference Division, he handled most of the trade mark interferences, and thus became familiar with the substantive law of trade marks and *inter partes* procedure in trade mark contests. He is a trained lawyer, a member of the bar of the Court of Appeals of the District of Columbia, and comes to his new office with an experience that eminently fits him for his responsible duties.

The Patent Office and trade mark public are equally to be congratulated on his acceptance of the appointment.

Safety Devices.—In no way can invention be more profitably employed than in providing means for the protection of life and limb in the operation of power-driven machinery. The liability of an employer for injuries to an employee in certain cases is such as to cause him to be diligent in seeking all safety devices that can be used to advantage on his machines; and invariably if the choice is to be made between two machines, otherwise equal, the safe machine will be given the preference, and manufacturers should pay more and more attention to this feature of their products.

Brief Notes on Inventions

An Inventor in Congress.—The Hon. Gustav Küsterman of Wisconsin is thought to be the only member of the House Committee on Patents who has been granted patents for inventions. He, because of being a patentee, had a special claim to a position on the committee. He has served on the committee through the 61st Congress and his term, together with those of a number of his associates on the committee, will expire March 4th, 1911.

Principal Examiner A. G. Wilkinson.—Mr. A. George Wilkinson, Principal Examiner of Division 20, of the United States Patent Office, was appointed July 1st, 1864, entering as an assistant examiner. He is the dean of the Examining Corps, having been promoted to the office of Principal Examiner on May 15th, 1868. Mr. Wilkinson has seen many Commissioners come and go, and has been familiar with the progress of the Patent Office during the past half century. Mr. Wilkinson hopes to round out a full fifty years of service, when he trusts a grateful government will be operating a retirement measure for faithful employees.

The Division of Interferences.—Prior to 1870 interference proceedings in the United States Patent Office to determine which one of two or more rival inventors claiming the same patentable invention was the first inventor, were instituted, heard, and decided by the primary examiner of the division having charge of the particular case. The office of Examiner of Interferences was created by act of Congress July 8th, 1870, and Joseph Adams was the first Examiner of Interferences. With the development of the patent system and the enormous increase in the applications for patents, many conflicts arise and the interference division is among the busiest and most important departments in the Patent Office.

The Date of Conception of an Invention.—The inventor is the poet of things, the realistic rhymster who reaches out into the realms of fancy and brings back, not a new verbal expression, but nevertheless a distinctly new idea. Just as the poet's idea is as nothing until fittingly expressed, so the inventor's idea is vain until he has embodied it in some physical form. This is the foundation of the legal limitation of the inventor's conception of his invention to the time when he first puts it into tangible shape. As one decision says, "It is therefore the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention as it is thereafter to be applied in practice, that constitutes an available conception within the meaning of the patent law." The date of conception of the invention, completed as above indicated, is, when followed by diligence to a practical completion of invention, of paramount importance in case of a contest.

The Board of Examiners-in-Chief: A Suggestion.—The Board of Examiners-in-Chief of the Patent Office, consisting of but three members, is placed in a peculiarly embarrassing position in case one or more of its members becomes incapacitated by sickness or otherwise. This is likely to occur at any time, and provision should be made whereby some Primary Examiner or other Patent Office official might be designated by the Commissioner to sit temporarily as a member of the Board. This would doubtless require legislation, but necessary authority should readily be granted by Congress. This would not only facilitate the work of the Board in case of absence of some of its members, but would give the official so called upon a new experience and a new point of view which should prove beneficial, and would also permit the assignment of some official, expert in the specialty of the absent member of the Board.