and dangerously so in the rear cars, particularly on down grades, or wherever there is little or no "tension." In such cases, even on a perfectly smooth and sound track, the oscillation becomes so rapid and violent—particularly at the rear end of the train—that the swing bolsters thump heavily against the truck-frames, and the flanges of the wheels impinge the rails with such force as to cause a spreading of the rails on unsound ties, or if the ties and rails are sound and strong and all in good order, oscillation will force the wheels upon and over the rails, producing that kind of accident that, in very many instances, has resulted fatally to a large number of passengers, and in one instance caused a loss, to a railroad company, in a few minutes, of a sum greater than the entire value of their passenger equipment. This is the kind of accident that shows no broken rails, wheels, or trucks, and that coroners' and other juries, after many days' investigation, are unable to account for, and are compelled to find an excuse for. Oscillation is increased and its consequences rendered more certain and destructive, by the following conditions of the train: 1st. Great length of train. 2d. Very high speed. 3d. Slack coupling between cars. 4th. Down grade, increasing the 2d and 3d; and, when all these are combined, accidents will surely occur, particu larly if there is, at that moment, a check given to the momentum of the train, by a collision or a "shut-off" of steam, checking the momentum of the train at its forward end, (and by that means increasing the force of the lateral thrusts of the rear car,) instead of at the rear end, by applying the brakes on the rear car, and giving "tension" to the train and checking the oscillations of the cars, and thus diminishing the danger of derailment.

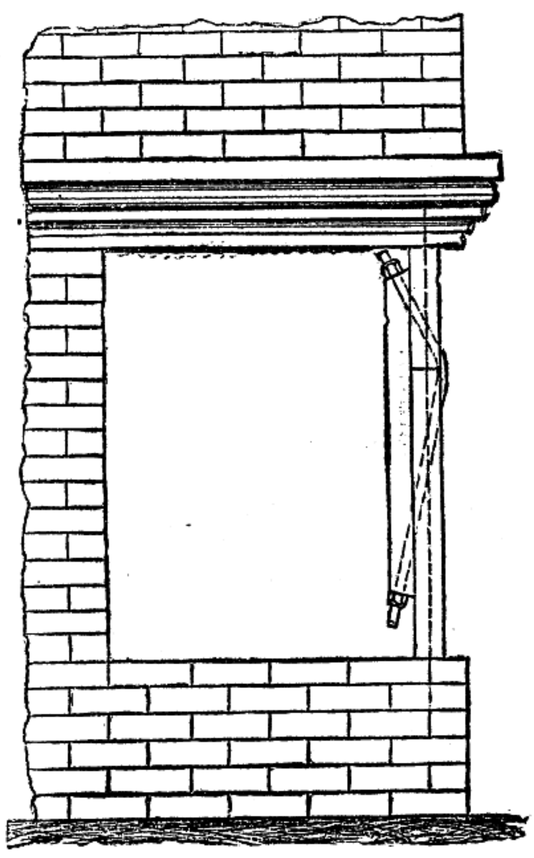
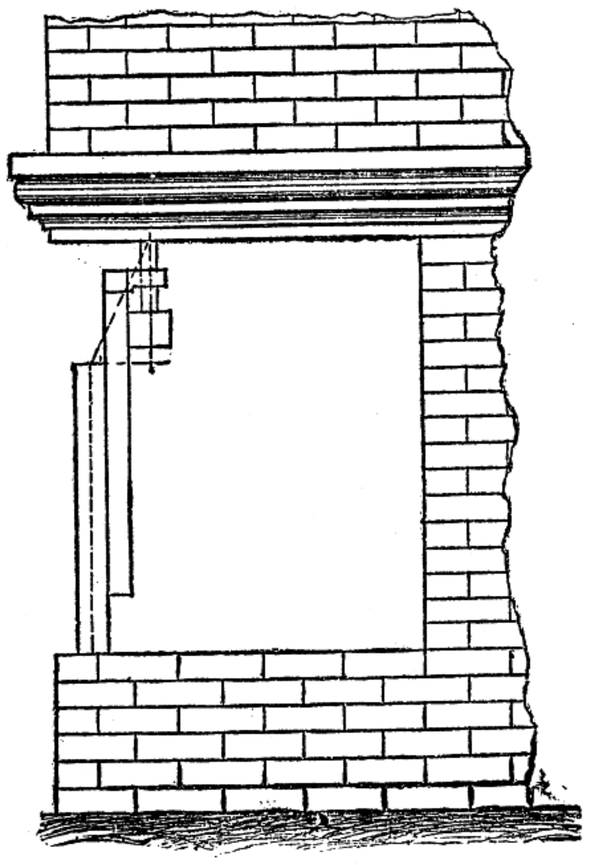


Fig. 4.—Defective Support.



Improved Support.

A long list of frightful accidents are directly traceable to oscillation. Strange that improvement has come so slowly! Strange, indeed, that there are many railroad companies which still need the sharp spur of public opinion to compel them to abandon the old dangerous system of construction! What is the new system of coupling? Simply, the use of separate buffers placed in line with the main sills of the cars, and the joining together of two hooks, as shown in the illustration on a preceding page, each hook being backed by a strong spring, so that, two cars being pushed together, the hooks join, the springs behind them are compressed, and thus coupling and "compression" (as affected by the screw in England) are accomplished automatically, at the same time, and without the use of links and pins. The new platforms differ from the old in being of the level of the floor of the cars, and also in coming closer together in coupling, (within less than three inches of each other,) so that the traveler may pass with ease and safety from one car to another at any time.

The sum of the whole matter is, that under the new system, invented by Colonel E. Miller, of No. 231 Broadway, in this city, such safety and comfort are attained that not only have prudent travelers learned to scrutinize closely the construction of such cars as they may be about to enter, but that leading railroad lines are commended to the public by the careful supplementary statement that the improved couplers and platforms are used on their cars; or by details: "telescoping" is prevented; dangerous "oscillation" is obviated; there is no jamming, from loose coupling, in stopping or starting; cars are coupled automatically and instantaneously; there is no wide gap between the platforms for people to fall through; upon those roads where the improvements have been adopted the percentage of accidents has been reduced to a mere fraction of the former number; no injury can possibly be sustained by the men who make the coupling, as the coupling is automatic. It is a demonstrated fact that the *economy* in their use is apparent, even to the extent of several times their cost!

During eight years past, the new pattern of platform has been tried and adopted upon more than one hundred different railroads, with the result that upon these roads cars are never telescoped. Surely this is progress! More, railroad managers, not thoroughly convinced of the dangerous character of cars built upon the old plan, or, more probable, unwilling to incur the expense of a complete new equipment, and yet persuaded of the value of the improvement, have used in the same trains cars of the old and cars of the new pattern, with the result, in repeated instances, that the former have been entirely crushed, while the latter escaped injury. The writer of this has frequently found, in the course of his travels, such "mixed trains," and, always seating himself in the car whose platform is of new pattern, would no more think of entering an old-patterned car, in a train at high speed, than of standing over a bomb-shell with the fuse lighted.

How Cigars are Made.

THERE is probably no manufacture which has attained such rapid growth within the past year in this country, and particularly in this city, as that of pure Havana cigars. The internal troubles in Cuba have necessarily resulted in the emigration hither of large numbers of natives of that island, who, by trade cigar-makers, possess every requisite of knowledge and skill to establish and continue their industry, and for whose labor there seems to be a constant and growing demand in the many factories on the Cuban plan which are rapidly coming into existence.

We lately visited the well-conducted factory of J. M. Mora & Co., of 62 Water street, in this city, and witnessed with considerable interest the entire process of making cigars. The tobacco is imported in bales, and costs from three dollars to ninety cents per pound, according as it is used for wrappers or fillers. It is first inspected in order to ascertain its quality and also the length of time it can be allowed to remain wet. This is an important fact to ascertain, as the tobacco must always be dampened before it can be made up, and must remain in this condition some time; while, if the material be poor, and it be allowed to remain in a wet state too long, it will decay, and so occasion considerable loss. This question determined, the tobacco is placed in an inclined trough, so that the pure water with which it is wet can readily drain off.

The first process which it then undergoes is stemming the fillers. Each workman has a pile of leaves before him, which he takes up one at a time and removes the stem running through its centre. If he comes to a leaf larger than the generality he puts it to one side for use as a wrapper. Cigars, as our readers are doubtless aware, are composed of two parts—the wrapper and the filler. The former must be a perfect, smooth leaf, while the latter is simply the pieces which are made into a bundle and form the interior of the cigar. Besides these men who stem the fillers only, are four others who perform the same process with the leaves used for wrappers, and with them is the foreman, who examines the latter, selects them according to size, and distributes them to the workmen who make the different varieties of cigars.

A word of explanation is here necessary regarding these different kinds. Every smoker has his pet brand, though not many know the difference between the cigars as indicated by their names. For instance, a "concha" is a short, thick cigar, so called, we presume, from its fancied resemblance to a shell shape, the Spanish word having that meaning. "Española" is another common brand, which takes its name from the ribbons with which the cigars are tied, these being red at the ends of the bundle and yellow in the middle, making the colors of the Spanish (*Español*) flag. "Partagas" are a long cigar, and derive their name from the owner of the manufactory in Havana. "Regalia" speaks for itself, and indicates a large-sized cigar, finely made and usually quite costly in price. There is still another classification of cigars as regards their quality, for instance, "*flor*" signifies "flower," or the best of tobacco; below this are "*bueno*," good, and "*superior*." Then, as regards strength, cigars are "*colorado*," red or light; "*colorado maduro*," red ripe or somewhat stronger and darker, and "*maduro*," ripe and of full strength.

The manual labor (for the cigars manufactured at this factory are made entirely by hand) requires considerable skill and practice. Sitting at separate tables we found twenty-four men; each one had a piece of hard wood before him, which, with a peculiarly-shaped knife and a little pot of paste constituted his stock of tools. By his side were two heaps of tobacco, one composed of wrappers and another of fillers. Taking a leaf in his hand, the workman spreads it out on the slab before him, smoothing it carefully to remove all creases; then with his knife he cuts it into a peculiar nearly semi-circular shape. He then picks up the material for his filling with his left hand, making it into a kind of bundle; of course this requires an accurate judgment as to the amount required to make the cigar of the exact shape and thickness. As soon as he has collected enough leaves, he presses them together and lays them on the wrapper before him. Then, by a peculiar sort of twist, he brings up the edges of the latter and with a quick roll envelops the loose bundle. The form of the cigar is at once apparent. He now finishes off the end for the mouth by carefully trimming the leaf and smoothing it to a point, fastening the extremity with a little paste; the other end he cuts off smooth. A few more rolls between his flat knife and the slab and the cigar is done. The celerity and neatness of the work is incredible, and, of course, evidences a refinement of skill. These workmen are paid according to the number of cigars they manufacture, some completing as many as from 200 to 400 per day.

There was one peculiarity about this establishment which we wish might be introduced into every manufactory in which the machinery is of such a nature as not to drown by its noise the sound of the voice. That is the "reader." Every man pays twenty-five cents per week to this functionary, whose sole duty it is to

read aloud to them during their work. The perusal of newspapers, works of fiction, and histories of different countries, in Spanish, we found constituted their daily literary fare, which continues almost uninterruptedly during the whole day. This is an excellent idea, and if it could be generally adopted where practicable, our workmen would have no cause to complain that they had no time to read either the MANUFACTURER AND BUILDER, or any other periodical from which they might derive useful information.

In another apartment were men engaged in assorting the cigars according to their strength in the classes above referred to. It is in this department that the nicest discrimination is needed. A workman stands before a pile of finished cigars, and with the greatest rapidity holds each one up to the light, glances at it and places it in its proper heap. How he could distinguish the difference we were at a loss to comprehend, for although we could see that the two extreme heaps were not alike in color, in the intermediate ones we were unable to discover any disparity whatever. After being thus sorted the cigars are packed in boxes and subjected to a pressure to pack them tight. The box is then fastened, the government stamp affixed, and it is ready for sale.

Cigars in form are either pressed or cylindrical. As regards their manufacture the method is the same for both, excepting that the pressed cigars undergo one more process than the latter. In order to give them their shape, either triangular or flat as may be desired, the cigars after having been completed by the workman are dampened. They are then packed in bundles and wrapped in strong paper. This forces the cigars closely together, so that when they are taken apart they are found to have taken the shape into which they have been pressed.

The cuttings of the manufactory are generally sold to be used as fillers for cheap, or, as they are termed, "seed and Havana" cigars, using native tobacco for wrappers. The stems of this tobacco are not used.

A German friend of ours recently became impressed with the idea that he could make cigars as well as the operatives. As his method of manufacture was somewhat unique, we mention it. First, he provided himself with some leaf tobacco; next he obtained a pot of paste; he set to work spreading the leaves out before him; he carefully smeared them with paste, and after many trials and much vexation of spirit he succeeded in rolling them up into some sort of bundles. The cigars were made, but the proof was the smoking; he lit one, the taste of the paste gave it a flavor not perceptible in the best regalias, but that was a trifle; he tried to draw on it, but here he failed. This was an unfortunate defect, but a knitting-needle could cure it, so carefully poking the latter into the cigar, he made a hole through its whole length. We believe that only few cigars were the production of the manufactory; but whether any of them found their way into the market and so fell into the hands of some unlucky individual we have yet to learn.

The Morse Twist-Drill.

THERE is no tool that has a more important part to fulfill in the economy of the workshop than the drill.

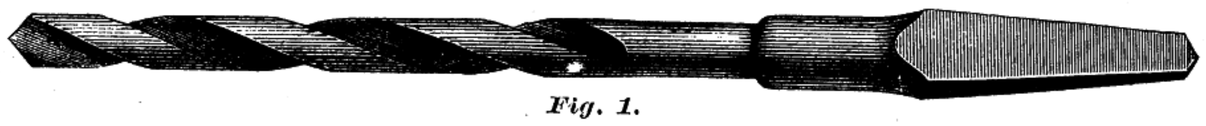


Fig. 1.

Two forms of the instrument are in use, one the old-fashioned flat-drill, and the other the machine-made twist-drill. Of the relative superiority of the two methods there is but little question, for a simple comparison need only be made of the cutting-edge of the flat with the twist-drill, and the great advantage of the latter will be at once evident. In fact the cutting tip of the twist-drill is almost an exact form of a well-made turning tool. In operation it will be observed that instead of the abraded chip of the flat-drill it will be a clean and smooth-cut ribbon of metal that is thrown up the spiral grooves of the drill as it penetrates into the material. The peculiar advantages of the twist-drill are not generally known throughout the country, but where they are once introduced they are soon appreciated, and applied to the exclusion of the flat-drill. Some of the advantages of the twist-drill are that it will always bore a hole that is perfectly cylindrical, which the flat-drill will not always do. The ease with which a twist-drill cuts is another recommendation, and its strength, compared with that of the flat-drill, is still another good quality.

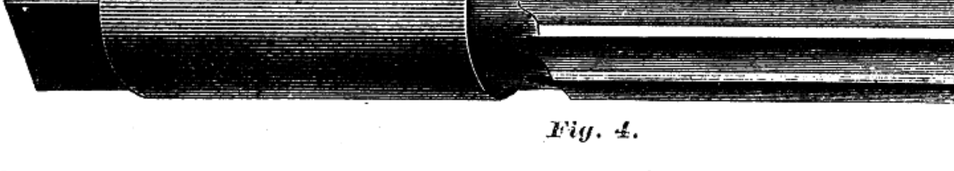


Fig. 2.

The twist-drill, although a recent article of commerce, is not a new form of tool. It has been used by the manufacturing gun-maker and the sewing-machine workmen for the past twenty years; but its application beyond these trades has been very rare until within the past five years. Its use now bids fair to become general, and in order to post our readers where these important auxiliaries to the workshop may be obtained, as well as to inform them as to the best forms extant, we publish accompanying this article cuts of two forms of the instrument as made by the Morse Twist-Drill and Machine Co., of New-Bedford, Mass. No mechanic can examine these tools without being fully impressed by their great superiority in efficacy and utility over the commoner forms now in use.

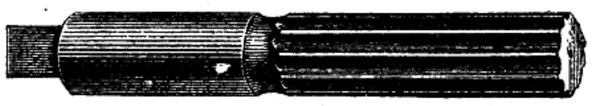
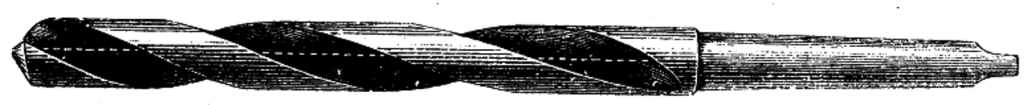


Fig. 1 is the bit-stock-drill, made from $\frac{1}{16}$ to $\frac{1}{2}$ an inch in diameter, and fitting all braces now in the market. It will drill steel, iron, or other metals as readily as wood. For carriage-makers, pattern and model-makers, and, in fact, for all workers in wood, this drill is unsurpassed. An important item in its favor is that it will sustain no injury in boring against screws or nails, and will bore any kind of wood without splitting, with greater rapidity than the ordinary bit or gimlet. Fig. 2 is the patent straight-lip-increase twist-drill, embracing all sizes from 4 inch, costing forty dollars, to size No. 65 Stub's steel wire gauge, being less than one thirty-second of an inch in diameter, costing one and ten one hundredth dollars per dozen. The Stub's wire drills have straight shanks of same diameter as that of the drill. The turned drills are made of the best cast-steel, and finished in a superior manner, with straight or taper shanks fitted to steel sockets. The sockets are not turned taper, but are of uniform diameter at either ends. A centre is left in the solid end, and a plug (having a centre) is fitted in the open end, so that the socket may be turned to fit the machine in which it is to be used. For very exact work where parties require many drills of a particular size, the latter can be readily made if a gauge, plainly marked, be forwarded. The "increase" twist-drill has a special advantage over any regular twist-drill, as the groove is broader and of more capacity than in the regular twist, and so frees the chips more readily.



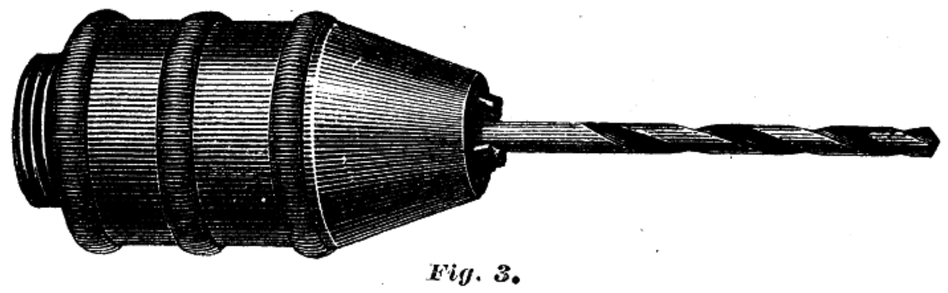
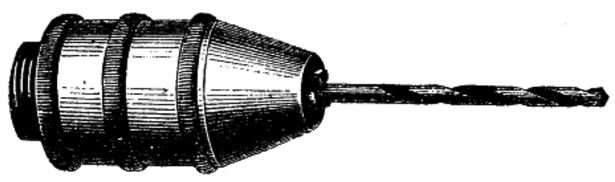


Fig. 3.

The introduction of these drills can not but tend to greater accuracy of work, as well as being a step toward a system of sizes of gauges in forming holes, as the manufacturers make them of the different sizes of steel wire, or increasing by the divisions as marked upon the standard inch, and the mechanic must necessarily form his bolts and turned work to fit these holes with some degree of accuracy.



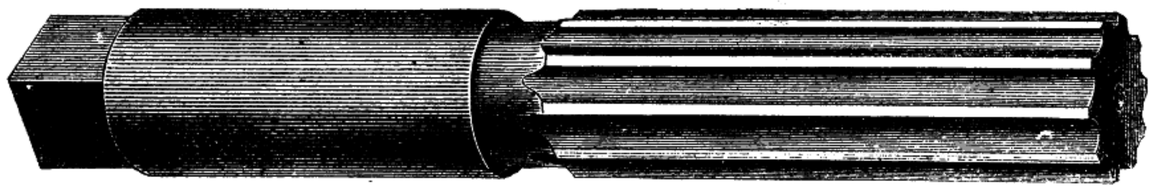


Fig. 4.

Fig. 3 is Beach's patent drill-chuck, another valuable instrument manufactured by the same company. It is an excellent form of this appendage to the lathe, holding the drill firmly and securely. It is self-centering and self-tightening, and in its different sizes respectively holds drills varying in diameter from $\frac{1}{8}$ to $\frac{1}{2}$ inches.

Fig. 4 is the reamer. Its use is so obvious as to need no particular explanation. It is made either "solid" or "shell," and varies for the former from $\frac{1}{4}$ inch to 2 inches, and for the latter $\frac{3}{4}$ inches to 2 inches in diameter. Any size or length can, however, be made to order. The advantages of form possessed by this instrument will be at once apparent to every mechanic. It is accurately finished by Whitworth's English gauges, and ground on centres in the most approved way, and is altogether a highly finished and perfect tool. Our fifth and last figure represents Morse's patent twist-drill grinding machine. Here another advantage of the twist-drill becomes apparent, for in case it becomes broken, it can be easily put in order at the grindstone, if it has been properly made, and will

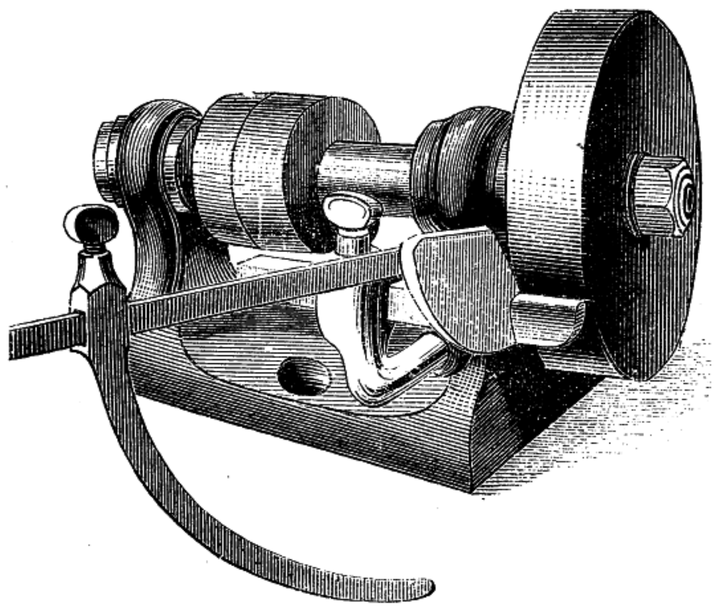


Fig. 5.