Improved Style of Two-Wheeled Velocipedes.

Some time ago we intimated that the perfect velocipede was yet to be built; since then we have secured patents on a number of improvements, not possessed by any of their predecessors, and thus the point of perfection is being attained. The one represented in the accompanying engraving is well worthy the attention of velocipede riders and builders, for its simplicity of construction, cheapness of cost, ease of management, and adjustability for suiting the size and strength of the rider.

The frame is of hollow pipe, the rear being a complete circle in which the steering wheel rotates on its axis, the driving wheel running between the parallel bars of the front portion. The axle of this wheel passes through boxes secured to the parallel bars by set screws, so it may be adjusted forward or back to suit the *physique* of the rider. The axle of the steering wheel runs in boxes secured to sliding bars curved to fit the inner diameter of the circular portion of the frame, thus allowing this wheel with its axle to perform an entire revolution within the frame on a horizontal plane. Its movements are controlled by means of rods attached at one end to the ends of the axle, and at the other brought together to the lower end of a lever directly under the rider's seat, the handle of which comes up in front of the rider, the fulcrum being on a cross piece between the rear portion of the parallel bars, serving not only that purpose but that of a brace. It will be seen from the figure that the guiding of the vehicle may be effected by one hand. The seat need not be so high as represented in the engraving; it may be lowered until nearly to the level of the reach, which is the horizontal line of the axles.

Such a vehicle is easily and cheaply constructed, and will operate with ease. The reach, which in the ordinary bicycle extends in an upward curve from the level of the rear axle to the top of the driving wheel, is easily made, while in others its forging adds greatly to the cost of the vehicle. In mounting the ordinary two-wheeled velocipede the rider must spring from the ground to a hight not easily reached by persons of obesity or of sluggish habits, and the danger of damage to both rider and vehicle is greatly enhanced by hight from the ground. If overturned, this machine cannot fall upon the rider, as the circular formation of the rear portion forbids a complete inversion. The danger of overturning this machine is still further diminished by the weight of the rider being brought nearer the center of suspension, as his seat may be brought very near the horizontal line of the axles without preventing or interfering with the action of his legs. The ease of guiding is sufficiently clear by an examination of the engraving, where the rider is shown as using only one hand for this purpose.

Patent pending through the Scientific American Patent Agency by C. E. McDonald, who may be addressed at Amsterdam, N. Y.

MC'DONALD'S ADJUSTABLE BICYCLE.

CULTIVATION OF THE POPPY AND MANUFACTURE OF OPIUM.

We are in receipt of inquiries in regard to the cultivation of poppies, and the manufacture of opium; it having been suggested by certain agricultural journals that there are various parts of the United States where this industry might be profitably introduced. The failure of several attempts which have hitherto been made to produce this costly drug in America, is justly considered as an insufficient reason for supposing it impossible to succeed in other parts of the country possessing more favorable circumstances of soil and climate.

The opium, which finds its way to European and American markets, is raised principally in India, China, and Persia. The climate of these parts of Asia seems peculiarly adapted to the growth of the species of poppy (*papaver somniferum*), from which opium is obtained; accumulating in the juice of the plant the peculiar substances which form the complex compound called opium. The latter is the dried juice of the plant obtained by tapping the capsules, which allows the juice to flow out and stand in drops upon the surface from which it is scraped with knives when it is dried sufficiently. Another method, that of dissolving out the remainder of the juice after tapping, with water, and evaporating the solution has been also practiced to supplement the former.

Each capsule will yield opium only once by tapping. The tapping should be performed a few days after the flower has fallen, and the incisions should be made horizontally, and not so deep as to cut into the inner portion of the capsule, as should this happen, the juice would flow into the cavity and be lost.

Various experiments have been made in England, France, and Scotland, to produce opium, with encouraging results. So far as our knowledge extends the attempts made here have not given much encouragement of final success.

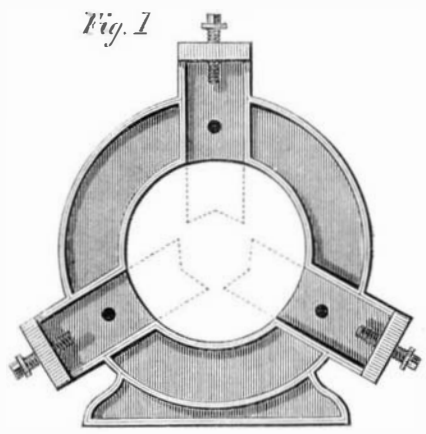
The poppy will grow luxuriantly in almost any fine rich soil. It may be sown in hills sufficiently wide apart to admit of cultivation, and harvesting the opium as the capsules mature. Experiment alone will suffice to determine what soils and what section if any in this country will answer well for its cultivation, and what quantity of seed will do for a given quantity of land.

We see no reason to doubt, that in the very diversified conditions of climate and soil to be found in the United States, there may be some sections well adapted to the culture of opium, and thus another drain upon the resources of the country be cut off by home production.

SHAFTING, PULLEYS, AND BELTS.

No. II.

In our former article directions were given in regard to the preparation of the shaft sections for turning. The shaft having been centered and straightened is now ready for turning. Whatever may be the diameter of the shaft proportioned to its length, it should be supported about midway of its length by a rest secured to the ways of the lathe. Before adjusting this rest, however, the ends of the shaft should be squared up to the center hole with a side tool. If the vise centering was properly done, there is little danger of throwing the center out of true by this process. If so, a hand, half-round, conical-pointed reamer may be used to scrape the edge of the center hole until the shaft turns true. A good form of center rest is shown at Fig. 1, a front view. It is a casting in a circular form, with three equidistant projections for the reception of the bearing slides, shown in dotted lines in Fig. 1, and better in view, Fig. 2. These slides are simply plain castings with a slotted hole through their centers calculated, or filed to fit the recesses in the radial channels.



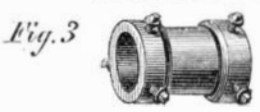


Fig. 3 is a thimble fitted with three set screws at each end, placed equidistant, and set up when the thimble is on the shaft until its turned surface between the collars at either end runs perfectly true. The use of this thimble is much better than hand-tooling or filing a place on the shaft at the middle to receive the bearing slides directly upon the shaft, as it is impossible to get the shaft perfectly round, owing to its springing. In lengths of shafts of small diameter, as one-and-an-eighth, or perhaps even one-and-a-half inches two of these rests may be advantageously employed. Sometimes, also, a follow rest attached to the carriage is used, but in practice we have not found this plan desirable; the friction is very great and the care of the tools, even in the first cut, is considerably enhanced.

The follow rest is simply a modification of the center rest, its main difference being that it is bolted to the carriage and moves with it. Some use, with the follow rest, a hardened steel thimble, bored to the finish diameter of the shaft, and sliding with the carriage. Its use is to be reprehended for its costliness, wear, close attention required, and other reasons apparent to the thinking workman. We prefer to do without the follow rest in turning shafting; the center rest is sufficient and preferable.

When the shaft is turned to a point as near the fixed center rest as the carriage can run, the lathe is stopped, the rest moved to the other side of the carriage, secured, and adjusted, and if the shaft is decently turned the thimble may be dispensed with, and the bearing slides of the rest brought directly against its surface. Some prefer to turn and finish the shaft at one operation by using two tool posts and a diamond point and a square nosed chisel at the same time. It is doubtful if anything is gained by this combination. All rolled bars—excepting the cold rolled shafting mentioned in the former article, which requires no turning whatever—are more or less out of round, and consequently the first chip is an uneven one; so if the finishing cutter is attached to the same carriage as the roughing tool, it will partake of the carriage's vibration, a vibration, however small, necessitated by the unevenness of the shaft's surface, and certain to leave the shaft out of round

Shafting is turned very rapidly by a method practiced in many shops of having a high auxiliary tool post at the back of the shaft, and a little in advance of the front one on the carriage. In this back post is secured a reversed diamond point that acts as the roughing tool. Other workmen discard entirely the use of the diamond point, and employ instead, a side, or squaring-up tool, setting it at an angle of about 20° to the shaft. Neither of these plans do we admire in practice, although employed by many first-class mechanics. Still, each is free to follow his own whim in this respect.

When couplings are turned on, the shoulder should be as light as possible, in order to retain the strength of the shaft. The key-ways should be milled or planed rather than chipped, as blows may spring the shaft. The couplings, bored, reamed, splined, faced, and turned, should be again faced after being seated and keyed on the shaft.

The pulleys should be chucked and trued by their outside perimeter, without regard to the hub or its cored hole. The old-fashioned way of chucking a pulley on an extemporized chuck of hard wood plank, secured to a face-place, has its advantages. In this case the face of the chuck is turned true, having a hole through the center for the reception of the hub and the passage of the drill and reamer, and a number around the circumference of the pulley for the reception of bolts. These bolts should be made hooked, instead of headed, for the embracing of the rim, and should be screwed up on the back with washers and nuts. We must say that this method of chucking pulleys for drilling seems to us more satisfactory than by the use of the scroll, or a universal chuck. The pulley has a bearing against the wood that appears to be superior to that on an iron chuck, and when once secured in place the pulley cannot be moved out of true.

Pulleys are, of course, turned on an arbor. The edges of the hub and the rim are first trued, the former with a side tool and the latter with a narrow edged cutting-off tool. Then the face of the pulley is turned, usually with a bevel from edge to center, but sometimes perfectly flat, according to its proposed use. If to be used by a shifting belt it should be perfectly flat, or straight. The pulley face may be finished by filing, and if considered necessary, polished with emery and oil; but on no account should the shaft be filed; its finish should be given by the square nosed tool and water, clear or soapy. The speed for turning is from 24 to 30 feet per minute, according to the quality of the iron. This may be readily understood by calculating the circumference of the shaft or pulley and the number of feet per minute. By a rough calculation a shaft of four inches diameter (twelve inches circumference), to run 24 feet per minute should have a velocity of 24 revolutions in the same time; one of two inches a velocity 96 or 100 revolutions per minute, etc. The feed for a shaft, in turning it, should be from 30 to 50 to the inch; that is, the shaft should revolve 30 or 50 times while the carriage and tool runs over one linear inch. These proportions may be varied according to circumstances, but the best work will be obtained between these proportions.

Balancing pulleys, calculations for machinery to be driven, and hanging shafting will be next considered.

Fastening Beams in Walls---Rat-proof Buildings.

A correspondent, G. W. Tinsley, of Minneapolis, Minn., says that the method of fastening beams in the walls of buildings illustrated on page 165, current volume, has been practiced in Louisville, Ky., for many years, and he thinks it is exacted by an ordinance of that city. He sends also a sketch and description of a method of rendering frame buildings rat proof. The plan is simply to nail to the sill strips of board between each flooring joist, on the inside, reaching to the under side of the flooring planks or board, and thereby covering the shelf formed by the sill between the joists. His idea is to allow the rats no place to stand upon while they are cutting through the floor.