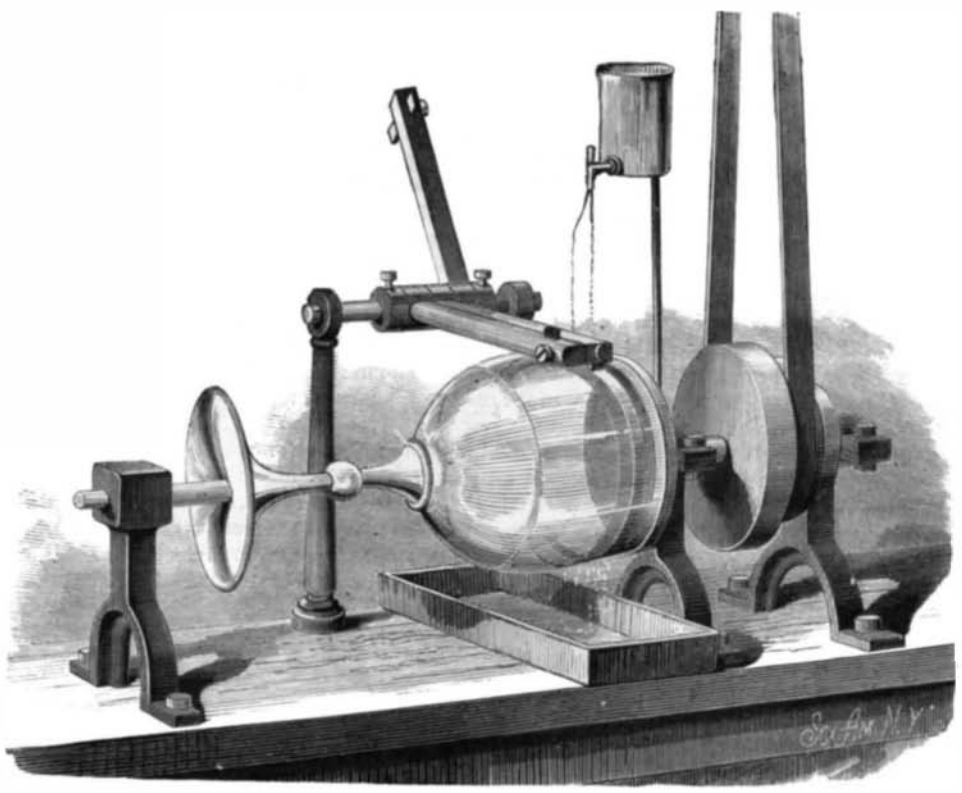
MACHINE FOR GRINDING BANDS ON GOBLETS.

The engraving shows a very simple and effective device for grinding bands on the surfaces of goblets, wineglasses, and other glass vessels of circular form. It will be understood by a glance at the illustration without a great deal of explanation. The larger end of the goblet is carried by a slightly conical chuck revolving on the lathe mandrel. The bottom of the goblet is supported by a tail spindle pressed outward by a spiral spring. A rod, supported by two posts, carries three or more arms having mortises in their free ends for receiving grinding pencils of copper or other suitable metal which are pressed on the glass by the weight of the arms. The pencils are supplied with emery and water or other abrading material, and as the goblet revolves circumferential lines are very quickly formed on the glass. The distance of the lines apart is regulated by moving the arms and fixing them in position on the pivotal rod by means of movable collars fastened to set screws.

This machine was recently patented by Mr. J. B. Higbee, of Pittsburg, Pa.



MACHINE FOR GRINDING BANDS ON GOBLETS.

A Botanist in the Field.

It is announced that the very capable field botanist, Mr. C. G. Pringle, of Charlotte, Vt., has been selected by Prof. Sargent, of Harvard University, to make a tour for botanical exploration and collection during the next one or two years through New Mexico, Arizona, California, Oregon, etc. In addition to work in the forestry department of the census, in which Mr. Pringle has been engaged the past year, and the study and observation in their living state of certain critical genera of plants, Mr. Pringle is to superintend the collection, for the new American Museum of Natural History, New York, of specimens (including trunk sections, flowers, leaves, fruits, etc., as well as the principal commercial and economic products of each) of the more important species of trees found in the regions which he is to visit. Mr. James Kelly is to accompany him as principal assistant.

BURSTING OF FLY-WHEELS.

BY GEO. M. HOPKINS.

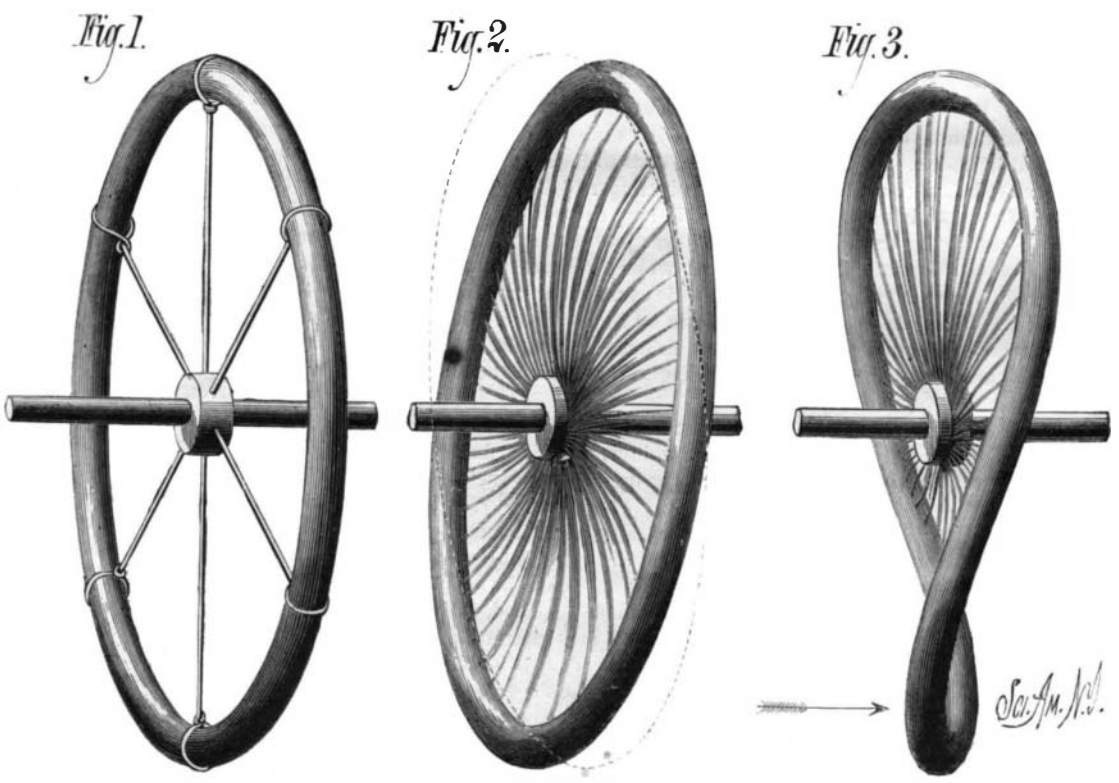
The theory of the bursting of fly-wheels, which has been accepted in the majority of cases, is that the centrifugal force due to a high velocity overcomes the cohesive force of the particles of the material of which the wheel is composed.

Of course this explanation is entirely inadequate when applied to a wheel whose strength is sufficient to resist any tendency to fly to pieces from purely centrifugal action under the conditions of its use; but of the fact that such wheels burst no evidence is needed, and some cause other than centrifugal force must be assigned for the bursting.

Supposing the fly-wheel to be perfectly balanced and without defects in material or design, it may be driven without danger at any velocity usually considered within the limit of safety, so long as it continues to rotate in a plane at right angles to its geometrical axis. And it may be moved in the plane of its rotation or at right angles to it, that is, in the direction of the length of the shaft, without creating any more internal disturbance than would result from moving it in the same way while at rest. But when a force tending to produce rotation at right angles to the plane of the wheel's rotation is applied, the effect will be vastly different, and the result will be a tendency to rotate about a new axis between the other two, and the centrifugal strain upon the wheel is supplemented by a twisting strain, which is an important and generally unnoticed factor in the destructive action.

To bring this idea to a practical application, the shaft and fly wheel of a high speed engine may be taken as an example Let the wheel be correctly designed, well made, and well balanced, and if its shaft is properly lined and supported in rigid journal boxes, the wheel will perform its office without danger of bursting; but support the same wheel and shaft upon weak plummer blocks, and allow one or both of its journals to move laterally at every stroke of the engine, or even less frequently, and a disturbing element will have been introduced which will strain the wheel laterally, and which, together with centrifugal force, will effect molecular changes in the structure of the iron, and the result will be that if the wheel is not immediately broken it finally becomes weakened, so that it will yield to the forces that tend to destroy it.

Any wheel whose axis is swung in a plane at right angles to its plane of rotation, either occasionally and irregularly or frequently and regularly, tends to turn laterally on an axis between that of the normal rotation and that of the extraneous disturbing force. This tendency exists in ordinary wheels, although not visible. The engraving shows a flexible wheel, which clearly exhibits the effects of these disturbing forces. The rim is of rubber, the spokes of spring wire, and when the wheel is revolved very rapidly and moved in a plane parallel with its plane of rotation, no disturbance results, and no effect is produced by moving it at right angles to its plane of rotation; but when the wheel is turned even slightly on an axis at right angles to its geometrical axis by swinging the shaft laterally, the rim, while preserving its circular form, inclines to the plane of the rotation of its shaft, bending the spokes into a concave form on one side of the hub and convex on the other,



FLEXIBLE FLY-WHEEL.

showing the effects of the disturbing force on the figure of the wheel, as in Fig. 2.

When the disturbing force is rhythmical the wheel sets up lateral vibrations and wave motions in the rim, which are out of all proportion to the extraneous force applied.

From this experiment it is evident that the lateral swinging of the shaft of a fly-wheel (for instance when its journal boxes are loose, or when the frame of the machine of which the fly-wheel forms a part is yielding) tends to weaken the wheel even when the lateral movement is slight; and where it is great, as when the shaft is broken, the twisting effect is correspondingly great, and the wheel or its support must yield.

No rotating machines are more subject to bursting than grindstones, and generally no rotating bodies of equal weight are mounted upon such small shafts or on such weak supports. The suspended ones are especially liable to the destructive action above described, as their frames are generally far too weak.

Fig. 3 illustrates the effect of a lateral blow on the rim of a fly-wheel. Of course the effect is much exaggerated in the flexible wheel, but it shows the form taken by the rim under a blow, the blow producing a much greater effect on the wheel while in motion than when at rest.

NEW INVENTIONS.

An improvement in the manufacture of embroidery has been patented by Mr. John Wiget, of Arbon, Switzerland. The object of this invention is to embroider eyelets, spiders, sprigs, dots, or any other figures in such a manner that the figures shall be connected together only by embroidery thread.

Mr. Daniel Aubert, of Sainte Croix, Switzerland, has patented an improved musical box. This invention relates to mechanism for musical boxes to increase the time of working, and admit of their being placed in a clock case in connection with a clock, for example, only to be wound up every eight days. at the same time as the clock is wound,

An improved rotary registering measure for linear measurements has been patented by Mr. Lewis W. Brown, of Osage City, Kan. The invention consists of a circular case or frame containing a unit and a tens wheel of equal diameters, provided with suitable figures on their rims, and holding between them a pinion, which is attached to the handle of the device, and of a larger circumferentially toothed wheel secured upon the hub of the unit wheel that they may revolve together, so that as the device is moved over the face of an object the larger wheel is made to revolve and turn the unit wheel once in each revolution, while at each revolution the unit wheel causes the tens wheel to move through a tenth of a circle, both the unit and tens wheels presenting, as they revolve, figures that indicate the measurements of the object over which they have been moved.

Mr. George W. Healey, of Jackson, Mo., has patented an improved horse detacher. The invention consists of a forward curved stud inserted in each end of a singletree to receive the rear ends of the traces, of springs secured on the face of a singletree and bending down in contact with the studs to prevent the traces from accidentally slipping off, and of a wire or rod connecting the springs, by which the springs are raised from the studs so that the traces may become disengaged.

An improved mosquito-netting frame for bedsteads, which is simple, light, durable, and convenient, has been patented by Mr. Alfred H. Bailey, of Palestine, Texas. The invention consists of a mosquito netting frame formed of two longitudinal rods fastened to uprights attached to the bedposts, and held by cords or wires passing from the outer ends of each of the rods to the top of each upright.

An improved toy pistol which is to contain a certain quantity of ammunition, fed every time the trigger is pulled, thus permitting repeated firing without reloading, has been patented by Mr. Henry Klassert, of Buffalo, N. Y. The invention consists of a pistol frame with a removable side, in which frame the trigger and hammer are mounted on the same pintle, the hammer having a forked lever pivoted to it in such a manner that when the pistol is cocked the forked lever rotates a friction wheel around which a percussion tape passes.

An improvement in that class of devices that are designed for opening, closing, and locking blinds and shutters, has been patented by Mr. Joseph S. O'Brien, of North Wilbraham, Mass. It consists of the combination of an improved spring hinge for throwing the blind out of a locked position, a spring catch, and attached cord for pulling the blind fully open or closed, and locking it in both positions.