stand horizontally on the upper part of a frame about 5 feet in height. A crank is to be turned by hand, which gives motion to the necessary wheels and whirls, by means of bands. The claim is to the mode, described in the specification, of hanging and adjusting the spindles; and to the manner of gearing, and giving motion to the whole.

34. For an improved *Thrashing Machine*; John Haws, Hudson, Columbia county, New York, December 31.

Cylinders, beaters, grooved or toothed pieces borne up to the cylinders by springs, feeding rollers, and feeding aprons, form the essential parts of this machine. To us it appears to differ in form only, from several others. The part which, in many thrashing machines, is called a hollow segment, and between which and a revolving cylinder the grain is thrashed, is here made narrower than usual, and is called a grate piece. The claim is to "*the grate piece on springs, and the cylinders and grate piece covered with cast iron plates, cast with teeth.*" In a second cylinder, constructed somewhat differently, "*the grate piece on springs; the moveable frame on hinges; and the beaters running diagonally across the cylinder,*" are claimed.

35. For a *Power Machine, to Drive, or assist in driving, other machinery*; William Hosford, Washington Township, Marion county, Ohio, December 31.

It would be a mere waste of time and paper to offer any description of the machine for which the patent under the above title was obtained. The specification and drawing, however, harmonize with the invention, the three affording but sorry specimens of the progress of science, literature, and the arts.

There is to be some sort of a vibrating, jointed frame, to which is to be attached a pitman, working, or worked, by a crank and a fly wheel; within the frame are to be placed two rollers, which, as they roll backwards and forwards, are to strike against springs, and to become so invigorated by their action, as to drive the machine to which they are attached, and any others which may be placed within their sphere.

FOR THE JOURNAL OF THE FRANKLIN INSTITUTE.

On the mode of laying the Rails, and the adaptation of the Carriages on the Baltimore and Ohio Rail-road. By THOMAS EARLE, Philadelphia.

THE usual mode of keeping the carriages upon rail-roads, is by means of ledges, or flanches, projecting from the inner edges of the rims of the wheels, which flanches must, of course, run against, or within, the inner sides of the rails. Consequently, where the rails are composed of wood and iron combined, the iron is nailed upon

the wooden rail next its inner edge, so that the edge of the iron protects the wood from the action of the flanches.

Upon the Baltimore and Ohio rail-road, a different construction is adopted. The iron is nailed upon the wooden rails next their *outer* sides, or edges, and, consequently, the only wagons which can be used, are those which have flanches projecting from the *outer* edges of the rims of the wheels, and running without the outer sides of the rails.

There are three disadvantages which appear to me to attend this method.

1. The load, in wagons of the usual form, always tends to strain the axles and bend their outer ends *upwards*, the wheel having, to a certain degree, the power of a lever. If the flanch be *without* the rail, whenever it presses against its side, a more powerful leverage is obtained, pressing the bottom of the wheel outward, and, of course, the end of the axle upward, or in the same direction as does the weight of the load. Thus a double force combines to strain the axle. But if the flanch is on the inner edge of the wheel, and runs within the rail, whenever it presses against the side of the rail, it tends to press the bottom of the wheel inwards, and, consequently, the end of the axle downwards, acting against, and neutralizing, the contrary pressure from the load. Hence the axles may safely be made smaller in the latter case, and have less weight and friction than in the former.

This objection, however, will not apply, if Mr. Winans' carriage alone be used, as in them the bearings upon the axles are outside of the wheels.

2. The tendency of the wheels to run off of the rails, which operates to prevent their being made of as large circumference as would be desirable, is greatly increased by the Baltimore method. For whenever there is a curve in the road, the weight of the load, from its previous impetus will be thrown upon the outer wheels, while the inner wheels, or those upon the inside rail of the curve, will tend to rise off of the rail. When the flanches are on the inside of the wheels, it will be the flanches of the outer wheels that will protect the carriage from running off, being the same wheels which are pressed firmly down by the load: but with the Baltimore carriages, the flanches of the *inner* wheels on the curve, will be the only guard against the wagon keeping straight forward, and running off the rails. The tendency of these inner wheels to be lifted up, so that they can pass over the rail, will greatly increase the danger.

3. If by any obstruction, or accident, the carriage should be thrown sideways, and the flanch of one wheel thereby lifted upon the rail, the larger circumference of the flanch would make that wheel travel faster than its opposite. This, if the flanch were on the outside of the wheel, would increase the wrong direction already given, and inevitably carry the wheels off the rails. But if the flanches were on the inner sides, the faster travelling of the raised wheel would restore the proper direction, and carry the wheel back to its

place. Hence we may see why few, or no instances, of the wagons, upon the common construction, running off the road take place.

Any person may try two model wagons, and he will find that one having the flanches on the outer sides of the wheels, will run off the road, if the wheels of either side be raised upon the rail; but if the flanches are on the inner side, though those of one side be raised upon the rail, they will return to their proper place.

For these reasons I would respectfully suggest to the directors of the important public work referred to, the propriety of re-considering their plan, and altering it if they shall see occasion.

Query on the Thermometer.

TO THE EDITOR OF THE JOURNAL OF THE FRANKLIN INSTITUTE.

I SHOULD be obliged, if some of your readers would make known, through this medium, the method by which we can ascertain the true increase or diminution of caloric, in a given quantity of matter, by the thermometer.

If, for example, a quart of water exhibit 40° Fahrenheit—apply heat until the temperature be 80°. It is then usual to consider that the water contains a double portion of caloric. But if we take Reaumur's scale, the quantity of water, at 40° Fahrenheit, would be 3° 55 Reaumur, to which apply heat, until it be raised to double 3° 55, or 7° 10, and the water would be only equal to 48° Fahrenheit.

Suppose Fahrenheit, instead of fixing his zero at the temperature produced by ice and salt, had placed it at the freezing point of nitric acid, say 52° below his present zero, which degree of cold was experienced by Parry, at Melville Island. Then the water, by the existing scale at 40°, would have been $40 + 52 = 92^\circ$, and when at 80°, would have been at $80 + 52 = 132^\circ$, showing a deficiency of 52° towards a double quantum of caloric.

It appears to me, that unless a thermometer scale be graduated from a natural zero (a state containing no caloric) it must even fail to indicate, not only the *absolute*, but the true *relative* degree of heat; supposing it to be sensible to the thermometer *pro rata* with its intensity.

T. W. B.

Cincinnati, February 4, 1830.

Method of Preserving Butter.

TRANSLATED BY A CORRESPONDENT, FOR THE JOURNAL OF THE FRANKLIN INSTITUTE.

COMMON salt is the only substance hitherto employed for the preservation of butter. I have made many experiments on this subject, and the following method appears to me preferable to the old one, as it preserves to the butter a more agreeable flavour, and a better colour, and renders it less liable to become rancid.

Take one part of loaf sugar, one part of saltpetre, and two parts of pure salt; mix and reduce them to a very fine powder. As soon