

## RECENT MECHANICAL INVENTIONS.

Mr. Ludwig Marx, of West Chester, Pa., has patented an improvement in barber's chairs. The back is slotted and pivoted in the frame and hinged to the bottom, the latter being arranged to slide upon rollers. A screw is provided for moving the seat back and forth.

An improved paper pulp screen, patented by Mr. John S. Warren, of Gardiner, Me., consists of a hollow screen box arranged to revolve in a tank, and containing a hollow shaft, upon which there are conical sleeves which agitate the pulp and keep the screen free.

Mr. George Hoag, of New York city, has invented an improved combined scale and coin tester. It may be used for weighing letters and other mail matter, and for testing the weight, size, and thickness of gold and silver coins. The scale pan is slotted to accommodate coins of different sizes, and two extra beams are provided, one for gold and the other for silver coin.

A bit for boring out rifles, to render them smooth and of a uniform caliber, has been patented by Mr. J. O. Martin, of Oak Level, Va. The invention consists in a bit of cylindrical shape formed at the end of the bit rod. The cutters are made by grooving the bit rod at an angle of forty-five degrees to the length of the rod. The cutters thus formed are intersected by grooves cut parallel with the axis of the rod.

An improved momentum brake for spinning mules has been patented by Mr. Jeremiah D. Stanwood, of East Killingly, Conn. It consists in a novel combination of mechanism applied to the Mason mule, which prevents the yarn from drawing out of the rolls by the standing twist, and makes it equal to that spun upon spinning frames by dispensing with twist motion and regulators.

Mr. William M. Dunn, of Graysville, Ga., has devised an improved lumber gauge for saw mills. It consists of a guide in which is placed a bar with an arm projecting from it, and carrying a roller which touches the log, and a pointer extending over a scale on the guide.

An improvement in lithographic printing machines has been patented by Mr. Joseph Krayer, of Johannesburg-on-the-Rhine, Wiesbaden, Germany. It consists in a novel combination of mechanism which cannot be described without illustrations.

An improvement in lock works for clock movements has been patented by Mr. George B. Owen, of Winsted, Conn. It consists in providing the striking cam with a clutch adjustment, so that when the minute hand is turned forward, a pin on the shaft clutches the cam and turns it against the wire lever that actuates the pawl controlling the striking wheel; but when the hand is turned back any distance less than an hour the shaft is disengaged from the cam.

Mr. John Heald, of Chorley, England, has patented an improved machine for grinding and doughing India rubber. It consists of an agitator and rollers having adjustable bearings, and a hollow roller adapted to receive either steam or water, this roller being provided with a clearing knife.

An improved stamp canceler, patented by Mr. Ernest W. Brenner, of Fort Totten, Dakota Territory, has a rotary cutter for defacing the stamp as the marking or printing device is brought into operation. The cutter is mounted upon a spirally grooved rod, which is turned by the descent of the printing stamp. The printing stamp has a novel automatic inker.

Mr. Charles Seymour, of Defiance, Ohio, has patented an improved device for balancing cylinders and cutter heads. The invention consists mainly in a frame provided with centers for holding the cylinder or cutter head. This frame is supported in gimbals or upon a universal joint, so that when the cylinder is rotated the throw due to inequalities of weight or form is made manifest, and furnishes sufficient data for the correction of the difficulty.

## RAILWAY NOTES.

In his report on the railway exhibits at the Paris Exhibition, Assistant Commissioner Anderson says, that as there is no part of the world where railroads have been such an important agency in material development as has been the case in the United States, so it is gratifying to observe that nowhere else has there been greater progress in the art of railway construction, or in the business of railway administration and management. Of the 185,000 miles of completed railways in the world in 1878, nearly one-half were in the United States. Having reference to territorial areas, this preponderance is very great, but as compared with populations, it is enormous. In 1878 there were 15,000 miles of completed railway in France. The gross receipts were \$162,847,105. The average receipts per mile were \$13,132. They employ 183,000 persons, or an average of 12.6-10ths per mile. The mean velocity of passenger trains an hour is 32 miles. In Great Britain there were 17,000 miles of road open in 1877, at an average cost complete of \$174,000 per mile. The net earnings for 18 years have exceeded 4.26-100 per centum per annum upon the whole amount of capital invested. The rate of speed on English railways is greater than on any other railroads in the world, averaging for passenger trains 40 miles an hour, with a maximum of 70 an hour on best trains. The gauge of the trunk lines of Europe is 4 feet 8½ inches between the rails. The narrow gauge, as generally adopted in Europe, is 39.371-1000 inches. The cost of these roads is \$29,000 a mile. In England narrow gauge roads have been reduced to 2 feet 11½ inches.

The preparations for changing the gauge of the St. Louis, Iron Mountain and Southern Railway, which had been in

progress for the past two months, culminated Friday night, June 27. At daybreak Saturday over 3,000 men began the work of shifting the rails, and long before night the entire line, extending from St. Louis to Texarkana—nearly 700 miles—had been changed from five feet to the standard gauge of four feet eight and one-half inches. The locomotives and cars had also been altered to correspond, and traffic under the new order of things will proceed without break or hindrance.

The committee on the best form and material for locomotive wheels and axles, in their report to the American Rail Master Mechanics' Association, at their recent annual convention in Cincinnati, submitted the following mileages of steel-faced and steel-tired wheels. Their authority was Mr. George Richards, of the Boston and Providence Railway:

Four Bochum cast-steel wheels, under a heavy tender, ran 142,260 miles, and were in good condition. They had not been turned, and the wheel was heavy enough on the thread for three turnings.

A pair of paper wheels, under a light tender, making many stops, ran 125,941 miles, and were in a fair condition. A pair of cast-iron wheels, run as mates to the paper wheels, made 91,082 miles, and were worn out.

A pair of steel-faced wheels, in heavy engine truck, made 50,123 miles on the first run, and a total of 121,929 miles, and were condemned.

Another pair of steel-faced wheels, in heavy engine truck, ran 47,034 miles, after first turning, and were condemned.

Two pairs of steel-faced wheels, in heavy engine truck, 79,905 miles first run, and 129,587 miles to date, and were in good condition.

Another pair of steel-faced wheels, in heavy engine truck, made 71,852 miles the first run, and 41,266 miles the second run; total, 113,118 miles, and were condemned.

Another pair of steel-faced wheels, under heavy tender, made only 31,372 miles the first run.

One pair of steel-faced wheels, in engine truck, made 38,932 miles first run.

One pair of steel-faced wheels, in engine truck, made 64,750 miles first run.

The association adopted the standard car-axle which was adopted by the Master Car-Builders' Association at Boston six years ago.

A SYSTEM of handling rails by machinery, to facilitate track-laying, has been used successfully on the Central Pacific and other railroads. A train of flat cars is provided with a system of adjustable ways, by means of which rails and ties are brought forward in a continuous stream and delivered to the trackmen on the part of the road bed where they are to be laid. It is claimed that this method greatly expedites the laying of track, besides saving the cost of teaming and the injury to the road bed by hauling heavy wagons over it, all teams being dispensed with, and more than half the men usually employed.

Dr. P. D. KEYSER, of the Will's Eye Hospital, Philadelphia, has examined for color-blindness the employes of several railways centering at Philadelphia. According to his report to the State Medical Society, 3½ per cent. of the whole number mistook colors, and 8½ per cent. additional were unable to distinguish accurately the shades of colors. The mistaking of colors was doubtless due in large part to defective vision; blunders in shading are probably due to lack of training.

The refraction of the eyes was carefully examined with the ophthalmoscope, and of the number under examination 79 per cent. were found of perfect vision and 21 per cent. defective; of the color-blind, 47 per cent. were of perfect vision and 53 per cent. defective; of those who only shaded badly, 77 per cent. were of perfect vision and 23 per cent. defective. Of those found defective, 50 per cent. were green blind, 44 red, and 6 blue. Of the 8½ per cent. defective in shading, 95 per cent. were so in greens and 5 per cent. in red. Two men who could not distinguish red from green on test, had educated themselves to know that red was an intense color, and thus distinguished bright red signals, but at the same time bright greens and other bright colors were red to them. For these they would stop their trains, and so err on the safe side. On the other hand, dark reds, dark greens, and browns were all one to them, thus making them useless as signals. Another peculiarity in one case was the ability to distinguish bright red close by, but not at a distance. A color correctly recognized as bright red at three feet was invariably called green at ten feet and beyond. The test methods employed were those of Prof. Holmgren, Dr. Stilling, and others.

FROM Mr. C. J. Brydges' last annual report it appears that Canadian railways represent a nominal capital outlay of something over \$360,000,000. There are in operation and under construction 7,905 miles of road. The total train mileage is given at 19,669,447 miles. The number of passengers carried was 6,443,924. The tonnage of freight handled during the year was 7,883,472. The operating expenses for the year amounted to \$16,100,102, against \$16,290,091 in the preceding year; while the receipts increased from \$18,742,053 to \$20,520,078. There were 97 persons killed last year, against 111 the year previous; and 361 injured, against 317.

THERE are now considerably more than 300 miles of railway in operation in South Australia; during the present year a large addition to this mileage is anticipated, and many new lines are projected, such as the Port Augusta and Government Gums, and the Mount Gambia and Rivoli Vale Rail-

ways, while an important project for carrying a trunk line right across the Australian continent has been favorably received. To build such a line would take some twelve or fourteen years, but when once constructed it would have an extraordinary influence in developing the internal resources of South Australia, and Australia generally.

THE Illinois Railroad Commissioners have obtained returns from twenty-six railway companies, which show that the "life" of a locomotive engine varied on these railways from eight years to twenty-four, and that the general average duration was fifteen and a quarter years. Passenger cars endure from eight to twenty years—the average being fifteen and three quarter years; the average life of stock cars being ten years, and that of freight cars eleven and a half years; and railway bridges, of wood, endure from five to twenty years. As to the life of rails, the statistics seem to indicate that those of iron last from three to twelve years—the mean being seven; while steel rails are credited with from nine to twenty years' service—an average of fourteen years is obtained from the returns.

THE excursion car City of Worcester, devised by Mr. Jerome Marble, of Worcester, Mass., has proved to be a profitable as well as novel experiment. The car is divided into three parts, the ends for about ten feet being devoted to kitchen and pantry at one end, and to closets for clothing, lavatories, etc., at the other. The central portion has 12 double berths built after the Pullman pattern, and is fitted with tables, easy chairs, etc. The party carries a small library, an upright piano, and many of the usual accompaniments of a fine drawing room, while suspended from the bottom of the car are bunkers for provisions, fuel, hunting and fishing appliances, etc. The charge of railway companies for hauling this car is simply the regular first class fare for twelve persons. The inventor says that the cost of a trip of over 4,000 miles travel and seven weeks' duration, for a party of a dozen or more, was but a little over \$200 each, this sum including all expenses. Deducting the charges of the railway companies, the expenses of the party living in the car were 57 cents a day each. In this way the disagreeables of ordinary traveling were avoided and the cost was materially reduced.

## Preservative Wrapping and Packing Paper.

Mr. John F. Rodgers, of Philadelphia, claims to have discovered a preservative wrapping and packing paper for protecting cloths, furs, etc., from mildew and the ravages of moths and other insects. The patent bears date January 9, 1878. The paper used is made from woolen and cotton rags and manila rope or manila paper. This paper is saturated with a mixture of seventy parts, by measure, of the oil remaining from the distillation of coal tar naphtha by live steam with five parts crude carbolic acid, containing at least fifty per cent of phenols, twenty parts of thin coal tar heated to about 160° Fah., and five parts of refined petroleum.

After saturating the paper it is passed through squeezers and over hot rollers for the purpose of drying. When cool it is cut into sheets as desired, and the drying completed in the atmosphere. The paper thus treated is used for packing woolen clothing, cloth, furs, carpets, and all material likely to be injured by moths, mice, or vermin, and will also to a great extent, he states, prevent cotton material from mildew.

## Free Labor in the South.

In an official report on Southern labor it is asserted that the number of acres of cotton cultivated had increased between 1871 and 1878 from about 7,500,000 acres to more than 12,000,000 acres. Between 1869 and 1878 there was an increase of more than 3,000,000 in the number of cattle and swine. It is estimated by Representative Whitthorne that more than \$200,000,000 worth of Southern labor products enter into the purchase of merchandise and manufactured goods of New England, New York, New Jersey, and Pennsylvania. The gross earnings of the railroads of Southern States are placed at \$42,927,594 per annum, and it is held that all the principal cities and towns of the South have increased decidedly in population, and that there is a constant and general growth of manufacturing establishments.

## Malleable Nickel and Cobalt.

Th. Fleitmann has succeeded in obtaining the metals nickel and cobalt in malleable condition by fusing them with a very small quantity of metallic magnesium. He suspected that the absorption of carbon monoxide by the metals might be the cause of their want of malleability, and introduced the magnesium for the purpose of destroying the gas, as this metal is known to decompose the oxides of carbon. The success was very surprising. An addition of ¼ per cent. of metallic magnesium changes the structure of the metals entirely. They can now be easily welded when hot. Nickel is malleable even when cold, while cobalt becomes extremely hard when cold, so that it will probably be applicable for cutting instruments.

At the same time the cast metals are very compact, and are almost as solid and tough as cast steel, so that the metallic parts of harness and similar objects may be made from them.

Both metals take a very high polish, and resist the action of the atmosphere very well. The author has also succeeded in welding malleable nickel and cobalt together with steel and iron, so that the pieces of iron and steel that are coated on one or both sides with nickel or cobalt may be beaten out to the thinnest plates without any separation of the metals.