HOUSEHOLD INVENTIONS.

An improvement in curtain fixtures has been patented by Mr. J. S. Henry, of North Belle Vernon, Pa. It consists of a suspended ratchet hook pivoted in front of the roller, and extended below the ratchet, to form an eye or loop for the cord.

An improved child's chair, constructed so that it may be readily adjusted as a high chair or carriage chair, has been patented by Mr. C. H. Barnes, of Poughkeepsie, N. Y.

A flower stand, provided with one or more trays, supported by a single central standard, has been patented by Mr. Thomas Murgatroyd, of Clarinda, Iowa. By slightly modifying the construction the stand may be used as a workstand.

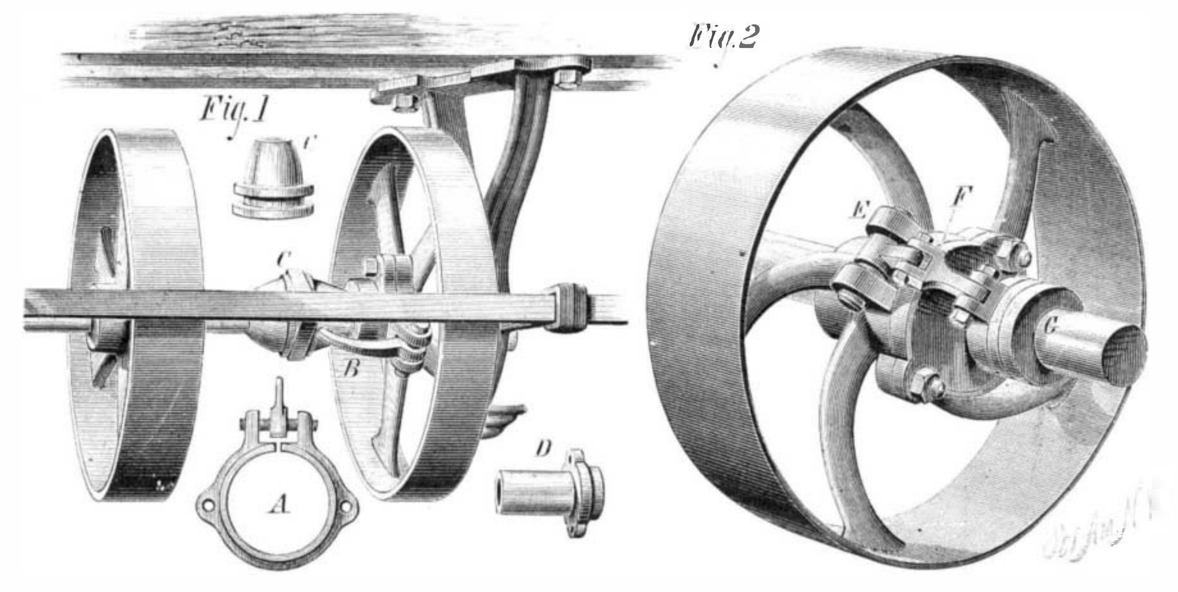
An improved candlestick, which will hold the candle firmly, and yet admit of burning the whole of it, has been patented by Mr. A. J. Smith, of Ukiah City, Cal. It consists of a standard fixed to the usual bottom, and having a thimble with fingers or prongs, which slides over it and holds the candle.

A NEW CLUTCH PULLEY.

We present engravings of two forms of clutch pulley manufactured by Messrs. James Hunter & Son, of North Adams, Mass. In these pulleys a friction band is employed to clutch the boss of the wheel, and the means for operating the bands are both simple and efficient. In the form shown in Fig. 1, the pulley is placed on a sleeve, D, which is secured to the shaft, and is provided with a flange for receiving screws which enter the friction band, A. The latter surrounds an enlarged hub or boss of the wheel, and is split and provided with two ears, through which passes a bolt having a cam formed on its head that engages a similar cam formed on one of the ears. A lever, B, is secured to this bolt, and is curved so as to be engaged by a cone, C, on the shaft The cone is grooved circumferentially to receive the fork of the shifting lever. It requires very little effort and only a slight movement of the shifting lever to operate the clutch. This device is so simple that no special description of its operation will be required.

By moving the cone, C, toward the pulley the free end of the lever, B, is thrown outward, the ring, A, is contracted, and the boss of the pulley is clamped so that it is carried around with the shaft.

The clutch shown in Fig. 2 is similar to the one just described, the difference being that a right and left hand screw passes through the ears, E, and is turned so as to contract the split ring by the action of the toggle, F, when the sleeve, G, is moved toward the pulley. Of course it will be understood that moving either the cone, C, or the sleeve, G, away from the pulley releases it. The device is applicable to both driving and driven pulleys.



HUNTER'S CLUTCH PULLEY.

Pumping Money.

The above may appear to be a somewhat singular title for a paper, but, according to the *Foreman Engineer and Draughtsman*, it is literally true that a vast number of sovereigns, and, indeed, of other coins, are annually pumped into existence at the Royal Mint. Without entering into a detailed account of the numerous processes and manipulations by means of which ingots of gold are transformed into small circular disks of metal, of the exact size and standards of weight and of fineness for the reception of impressions, it may be said that those impressions are finally due to the action of the air pump. A very large proportion of the sovereigns, therefore, issued from the mint presses since the erection in 1810 of steam machinery for the purpose of coining, have undoubtedly been pumped, as it were, into the channels of circulation. Let us, then, proceed to explain the contrivances and means by which the operation of pumping sovereigns is performed at the Tower Hill money manufactory. We will commence with the prime mover. This is a steam engine of twenty horse power, on the combined high and low pressure principle, and which was erected in 1846 by the justly celebrated firm of George & Sir John Rennie. Originally this engine was intended only for pumping water from a deep artesian well on the premises for the supply of the coining department, but in 1851 Mr. J. Newton advised that the engine in question should be made to pump money as well as water, and showed how it could be done. The merit of entertaining the proposition and of ordering it to be carried into effect certainly belongs to Captain (now General) Harness, R.E., who was Deputy-Master of the Mint in the year named. This highly talented officer gave instructions to the Messrs. Rennie for the construction, under the eye of the inventor, of the necessary apparatus and appliances for the purpose.

An air pump of considerable dimensions constituted the main feature of the scheme, and this was formed on a perfectly novel plan. It consisted of a cast iron cylinder, closely resembling in exterior appearance that of an ordinary land steam engine. but very different in its internal arrangement. The piston of the pump was made up of a series of cast iron rings, and these were pressed out against the sides of the accurately bored cylinder by springs of steel. The effect was to make the piston perfectly air-tight, and yet capable of being easily moved upward and downward in the cylinder. There were no valves in the piston, as there are in those of almost all air pumps employed in manufacturing processes. The base of the cylinder was a hollow casting of iron, and so was its cover. In these hollow castings the inlet and outlet valves were placed. The upper casting contained sixty-four small apertures, which were covered by small pieces of steel saw-plate, each about two inches long by one inch wide, and fastened by a screw at one end. These delicate springs were, in fact, the valves. Thirty-two of them were made to open to the atmosphere, and thirty-two to the exhaust or vacuum pipe. The hollow base or bed plate of the cylinder was furnished in a precisely similar manner. The diameter of the cylinder was three feet six inches, and the length of stroke of the piston three feet. The pump was placed vertically, and immediately below the working beam of the engine to which the piston rod was attached.

By this method of construction the air pump became double-acting, and whether the piston was ascending or descending, it constantly exhausted air from the vacuum tube through the inlet valves, and discharged it through the outlet series. Nothing in the shape of machinery could work more smoothly than did this pump, and this arose mainly from the peculiar character of the valves. The cost of the whole apparatus, with cast iron exhaust tube, two hundred feet in length, ten inches in diameter, and face-jointed, was about £400.

It has been said that the exhaust tube was two hundred feet in length. This arose from the fact that the engine house had been erected at that distance from the stamping presses. Instead of being carried underground, as in the pneumatic dispatch system, the tube was in this case carried over the roofs of the coining rooms, and, descending therefrom, was attached to the great vacuum chamber.

The vacuum chamber had existed from the period of the erection of the mint, and was originally devised by Messrs. Boulton & Watt, the well known engineers of Soho. They had supplied a steam engine of ten horse power, and two single-acting air pumps, each of which discharged air only in its downward stroke, for exhausting the chamber. This cumbrous and comparatively costly, though for its day very ingenious and valuable arrangement, was set aside when the new air-pump came into use. It had performed its mission, and was henceforth to be reserved as a duplicate in the event of the derangement, by accident or otherwise, of its modern supplanter. A regulating, or relief valve, and a barometer gauge fitted to the vacuum chamber, enabled the attendant to control and adjust the extent of rarefaction within the latter.

It will now be comprehended that at all times when the engine and pump are in action a vacuum of more or less extent must exist in the chamber. The chamber, it may be explained, moreover, is a horizontal tube of iron about fifty feet long, and two feet six inches in diameter. It runs along the floor of the mint pump room, in a line parallel to that in which the eight coining presses stand. Arranged along the top of the vacuum chamber, and supported by pipes opening into it, are a series of eight cylinders. These are vertical, and fitted with pistons, the rods from which are connected by levers and cranks with the presses. The cylinders are open-topped, and consequently their pistons are exposed to the pressure of the atmosphere once a vacuum exists below them. This is the case when the pneumatic valves within the cylinders are open to the vacuum chamber. The air within the cylinders then rushes down to the exhausted tube, the atmospheric column drives the pistons after it to the bottom of the cylinders, and the pistons drag with them the central screws of the coining presses. The instant that the beautifully engraved dies are thus made to come into contact with the disks of gold the latter receive by the force of impact their impressions. The presses then rebound, carrying with them their pistons. The pneumatic valves again open self-actingly, the dies descend upon new blanks supplied to them by mechanical fingers, another batch of sovereigns is pumped into bright and glorious being, and so long as the great air pump is exhausting the vacuum chamber and the presses are fed with blanks, so long the series of minor pumps will proceed with their work, and streams of gold, silver, or bronze coins will flow down from the presses into reservoirs placed below to catch them.

The Academy of Sciences.

The annual session of the National Academy of Sciences began in Washington, April 15. Vice-President Marsh presided, and delivered the opening address, in which he paid a feeling tribute to the late President of the Academy, Professor Joseph Henry, and gave a review of the work of the body during the past year. The members present were Professor Spencer F. Baird, Professor Charles F. Chandler, of New York; Mr. E. D. Cope, of New Jersey; Mr. Theodore Gill, Professor Julius Hilgard, Mr. George W. Hill, of New York; Professor O. C. Marsh, of Connecticut; Professor Alfred M. Mayer, of New Jersey; General M. C. Meigs, Dr. S. Weir Mitchell, of Philadelphia; Professor Simon Newcomb, Professor H. A. Newton, of Connecticut; Professor E. C. Pickering, of Boston; Mr. Raphael Pumpelly, of New York; Admiral John Rodgers, of San Francisco; Mr. Fairman Rodgers, of Philadelphia; Mr. Charles A. Schott, Professor W. P. Trowbridge, of Connecticut; Dr. J. H. Trumbull, of Connecticut; General G. R. Warren, United States Army; Dr. J. J. Woodward, United States Army; Professor Henry Draper, of New York; Mr. C. S. Pierce, Dr. S. H. Scudder, of Cambridge; Dr. Elliott Coues, Professor Francis S. Walker, and Professor G. F. Barker, of Philadelphia.

April 16, the venerable Professor William B. Rogers, "the Nestor of American Geology," was elected President of the Academy. The other officers were re-elected, as follows: Professor O.C. Marsh, vice-president; Professor J. H. C. Coffin, home secretary; Professor F. A. Barnard, foreign secretary; Mr. Fairman Rogers, treasurer; and Professors Baird, Agassiz, Gibbs, Newcomb, Hall, and General Meigs, the counsel.

The papers read the first day were as follows: "On Ghosts in Diffraction Spectra," and on "Comparisons of Wave Lengths with the Meter," by Professor C. S. Peirce, of Cambridge; on "The Relation of Neuralgic Pain to Storms and the Earth's Magnetism," by Professor S. Weir Mitchell, of Philadelphia; on "Continuation of Researches in Connection with the Discovery of Oxgen in the Sun," by Professor Henry Draper, of New York; on "Vowel Theories Based on Experiments with the Phonograph and Phonautograph," by Professor R. Graham Bell; and on "The Palæozoic Cockroaches," by Dr. S. H. Scudder, of Cambridge.

The programme for the second day's session included papers by Mr. E. C. Pickering, on the "Eclipses of Jupiter's Satellites;" by Mr. C. S. Peirce, on "Errors of Pendulum Experiments," and on "A Method of Swinging Pendulums," proposed by Mr. Faye; by Mr. E. W. Hilgard (read by Mr. Pumpelly), on "The Loess of the Mississippi and the Aoeilian Hypothesis;" by Professor J. Le Conte (read by Mr. S. K. Gilbert), on the "Extinct Volcanoes about Lake Mono and their Relation to Our Glacial Drift;" by Professor J. E. Hilgard, "Report of Progress of the International Bureau of Weights and Measures;" by Mr. G. K. Gilbert, on "Stability and Instability of Drainage Lines;" and by Professor C. F. Chandler, on "Polariscope Methods."

Among other papers announced were "Critical Remarks on Observations Alleged to be of Intramercurial Planets," by C. H. Peters; and on "The Extinct Species of Rhinoceros and Allied Forms of North America," by E. D. Cope.

The New York World's Fair.

At a recent meeting of the Executive Committee of the United States Board of Trade, and the members residing in New York, the decision of the Committee in favor of 1883 was approved. The Board has invited the governors and mayors throughout the country to send delegates or commissioners to a great national convention, with reference to the fair, to be held June 18 next.

Dew.

Mr. George Dines, who has made extensive experiments and observations on the formation of dew, finds that the depth of deposit in England in an evening rarely exceeds a hundredth part of an inch; and that the average annual depth of the dew deposited upon the surface of the earth does not exceed an inch and a half.