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(Illustrated articles are marked with an asterisk.)

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HAND-TOOLING--ITS ADVANTAGES TO THE MACHINIST.

With the improvement in automatic or self-acting tools the acquirement of skill in manipulation has not preserved the importance to which it is justly entitled. The hand tool for turning does not preserve the high position which it formerly occupied, yet its use is exceeding valuable, and even necessary, in many instances.

Curved and irregular forms, which must be turned, may be finished much more readily by the hand tool, if judiciously and properly used, than by the fixed lathe tool. For instance, common iron washers, which are placed under the head of a screw or a nut, may be turned and water polished by the hand tool very rapidly.

The formers for brass musical instruments, which taper for much of their length and then expand by a gradual but varying curve into the "bell" can be more easily and rapidly finished to the gage by the hand tool than by any automatic lathe however perfect and complicated.

The heads of steam engine cylinders are often beaded and ornamented by projecting rings. No ordinary engine lathe with its fixed tool, however handy the operator, can so rapidly and elegantly finish these ornaments as the hand tooler with his simple implements.

Sometimes it is necessary to "chase" a screw thread instead of finishing it with the ordinary tool in a screw lathe. By the use of the chaser—which is but a modification or another application of the common hand tool—a screw thread can be finely finished and all its irregularities and roughness removed.

Skill in the use of the hand tool can be easily acquired; judgment and discretion are as necessary to its successful use as practice. The tools required are cheaply and easily made; the small tools being formed either from old files or bars of steel, and the shoulder tool being merely a stock of wood with a handle transversely attached, and carrying in a groove a straight steel bar properly shaped at the point and held by a screw.

ECONOMY IN COKE MAKING--THE UTILIZATION OF THE WASTE GASES.

The only use that has heretofore been made of the gases driven off from bituminous coal during the process of coking has been to supply the heat necessary to make the coke. It will require but a glance to show that even with a coal with but a small proportion of gaseous matter in its composition, only a portion of its gas is really necessary to give the heat required to completely perform the operation of coking.

This company estimate that the profit they net from these substances is 2 1/2 francs for each tun of coal coked. And to give an accurate estimate of the profits which accrue from this source it is only necessary to say that the coking ovens of the company, and which have been in operation for over nine years, use annually upward of 80,000 tons of coal in making coke. The pamphlet of Messrs. Carver & Co. contains a calculation that some three and a half million tons of coke are made annually in France; this amount corresponds to some four millions of tons of coal, a large portion of the volatile constituents of which are wasted and from this it is estimated that between twelve and thirteen million of francs are lost annually by the ordinary wasteful method.

THE PETROLEUM FUEL--WILL IT SUPERSEDE COAL?

The petroleum excitement reached its climax immediately after the trials with the retort apparatus on the U. S. S. Palos, in Boston Harbor. The results after these experiments were proclaimed on all sides as eminently successful; "the days of coal were numbered," so said one of the experts at a Babylonian banquet given in Boston in honor of "the great event of the age."

Since this event in the petroleum world the excitement has been gradually subsiding and the dying embers are only kept at a dull-red heat by skillful letter-writing by the correspondents of the New York press, in other cities. The Cunard line have not adopted it, neither is it used on railroads and it would seem that if the petroleum companies themselves have any confidence in the wares they are trying to persuade the public to buy, they would be introduced practically so that there might be a fair comparison with coal, particularly as it is claimed by them that the apparatus can be put in any furnace with very little labor.

The Dental Vulcanite Question.

We recently published a judicial decision in the vulcanite question which was adverse to the dentists. A meeting of dentists was held at Cincinnati, on the 7th inst., to take into consideration the dental vulcanite question, and the following resolution was adopted:

Resolved, That we approve of the action of the executive committee and all they who have been active for the dental

profession of the West, in contesting the claims of the Good-year Dental Vulcanic Company against the profession, and that we request them to continue the defense to the ultimatum, believing, notwithstanding the decision of Judge Wilson, of New York, that the importance of the subject demands full and final investigation by the best tribunal in the country.

ANTI-FRICTION METAL FOR RAILWAY AXLES.

Nothing interferes more with the success of mechanical inventors than the element of friction. Not even the law of gravitation offers such obstacles to the intentions of inventors. To overcome the resistance of friction, especially on shaft journals, there have been devised several combinations of different metals which together should give the greatest resistance to pressure and heat.

But, it is claimed that there are compositions which far surpass this in the points which are sought to be obtained. There is reason for this claim in the case of one, at least, and we are doing but an act of simple justice to call the attention of our railway men to the advantages of the "Star Metal," which is manufactured largely by the Star Metal Company at their establishment in Brooklyn, N. Y., and Chicago, Ill.

We lately visited the former concern and witnessed the various processes of manufacture, except the actual mixing of the metals, which is preserved a profound secret. The basis, however, of the Star metal is spelter or zinc. In this foundry are employed, at present, seventeen furnaces, in constant operation. The patterns are molded in ordinary furnace sand in iron flasks. The metal box is held in a shell of brass, as by experience it was found preferable to a box made entirely of the Star metal. The metal is run into the brass shell, with which it is united by partial fusion. The box is then cleaned and dressed to exact size by the file. The bearing is trued and polished by vulcanite emery rollers which form the half circle to a gage so that the bearings are as perfect as they could be made by boring or turning.

These boxes are in use on a large number of our most extensive railroads in the country, and have received in all cases the most unqualified commendation. The company say in their circular that "in the examination of the actual comparative wear between Star metal and other (solid brass or Babbitt) bearings, upon the roads in this country testing Star metal, we find, taking the difference in wear and in weight into the calculation, that those roads should pay but 14 1/2 cents per pound for their (solid brass or Babbitt lined) bearings, to compete in price with Star metal bearings. We therefore claim that those roads lose, per pound, in using brass or Babbitt lined bearings, the amount they pay for same over 14 1/2 cents per pound; that it is more economical to use Star metal bearings costing 37 cents per pound than others, even at 14 1/2 cents, on account of less wear upon the journal by the Star metal, and for the reason of its not cutting the same when hot; that it requires less power to draw a train running with Star metal bearings from the fact that where the journal and bearing wear least, there is less friction."

When tested against the brass or Babbitt lined boxes the Star metal bearings have invariably proved superior in the relation of from 40 to 75 per cent. The test have been made by placing equal numbers of the Star metal boxes and of others under the same car, so that each should have the same amount of wear, and travel the same distance.

New Facts in Spectrum Analysis.

A very curious observation, on the spectrum of a terrestrial flame closely resembling that of certain yellow and red stars, has been communicated to the Italian society—called the Forty—of Modena, by M. Secchi. This flame is that which proceeds from a converter in which Bessemer steel is being made and at the time when the iron is completely decarbonized. The spectrum presents a series of very fine and very numerous lines, similar to those of a Orionis and a Herculis only reversed. This results from the great number of metals burning in the flame, and is the only flame comparable with the colored stars. There is nothing improbable in this fact when we consider the composition of aërolites in which as is well known, iron predominates.

M. Secchi had formerly ascertained that the spectrum of the color of sea water is deprived successively of its red, yellow and green as its depth increased, and at the greatest depths it appears of a violet blue. He tried to ascertain if the same fact held true in the case of glaciers, and has made experiments in an artificial grotto some three hundred feet deep, in the Grindenvald glacier. The ice wall was nearly fifty feet thick, the solar light that penetrated through was of a fine blue tint, so that human countenances had a cadaverous aspect almost alarming. On looking toward the entry at a certain distance, the cavern appeared to be lit up with a

red light, undoubtedly the effect of contrast. The thickness of the superposed mass was not enough to show a greater effect than the almost complete absence of the red, and a great diminution of the yellow. The ice was perfectly compact, limpid, and with few air bubbles.

Origin of the Connecticut Clock Business.

Bishop, in his "History of American Manufactures," says that the wooden clock manufacture was commenced in Waterbury, Conn., by James Harrison, in 1790, on whose books the first is charged January 1, 1791, at £3 12s. 8d. In East Windsor the brass clock manufacture was carried on by Daniel Barnap. Specimens which are still preserved are said to be nowise inferior in workmanship to the best English clocks of that or any later period. Clocks were also made in East Hartford by a Mr. Cheeny. In 1793, Eli Terry who had been instructed by Barnap in the business as practiced by him and Cheeny, removed from East Windsor, where he had carried on clock-making, to Plymouth, in Litchfield County. His subsequent enterprise and improvements in the art in that place entitle him to be considered the parent of the manufacture in Connecticut. At that time, Thomas Barnes, of Litchfield, and Gideon Roberts, of Bristol, were also known as clock-makers. The kinds of clocks made by these were brass and wooden clocks, with long pendulums, and their price was, for a wooden clock and case, from \$18 to \$48, the higher priced ones having a brass dial and dial for seconds, and the moon's age, and a more costly case. Brass clocks with a case, cost from \$38 to \$60. So limited was the sale at those prices, that three or four hundred constituted a stock in trade, and they were carried out for sale by the maker on horseback, the case being procured by the purchaser at from \$5 to \$30, according to his taste. Terry made both kinds, using a hand engine for cutting the teeth of the wheels and pinions, and a foot lathe for the turned work. In November, 1797, he patented an improvement in clocks, watches, and time-pieces, covering a new construction of an equation clock, showing the difference between apparent and mean time. In 1803, in which year Willard of Boston took a patent for his time-pieces, Terry began the business on a larger scale by water power, and, five or six years after, his success in making them by the thousand, which had been ridiculed as chimerical, enabled him greatly to extend the manufacture, which others now commenced on the wholesale system. In 1814 he introduced a new era in the business by commencing on the Naugatuck river the manufacture of the shelf or mantel clock, which he patented in 1816. The cheapness of these created a wide demand. Several improvements made by him in the mechanism, and the later progress in machinery generally, have increased the annual production in that State to hundreds of thousands, and given to every household a clock, equal to the old ones, at a cost of \$2 and upward. His descendants have been engaged in the business to the present time, and his pupil, Chauncey Jerome, since 1821.

Apart from the importance of horological machines in every department of life, and especially in relation to science and business, there are few of the mechanic arts which have furnished more numerous and striking examples of great and useful inventions among its members than the clock and watchmaking business. Many, both in Europe and America, have first exercised in this way their ingenuity, which has afterward conducted to discoveries of universal utility. Rittenhouse, Fitch (also a native of Connecticut), Whittemore, who, before any of the above, also constructed without a model, an efficient wooden clock, Dr. Franklin, and others, might be named. Clock-makers are said to have been the first who employed special machines for their manufactures, the wheel-cutting engine having been invented by Dr. Hooke about 1655, and the screw-cutting lathe by Hindley, a clock-maker of York, England, in 1741. The fusee engine and slide rest, the value of which are known to all mechanics who use metal, are of later introduction, although the latter, in an imperfect form, was used at Rome in 1648, and attained its present form in 1772.

The Assembly of Connecticut, in October, 1783, awarded a patent for fourteen years to Benjamin Hanks, of Litchfield, for a self-winding clock. It was to wind itself by the help of the air, and to keep more regular time than other machines. The principle was made use of in New York and elsewhere.

Practical Application of the Transparency of Metals.

Metals have generally been considered as opaque bodies, not permitting the passage of light through their substance. It is, however, very easy to show, by the use of an extremely thin film, as of gold or silver deposited upon glass, that light passes quite freely through it, and this property has latterly been turned to very good advantage. One of the earliest applications was as a substitute for the ordinary soot-blackened or colored glass, used in observing the sun during an eclipse, or at other times; and the silvering of the objective glass of the great telescope of the Paris Observatory has permitted an investigation of the sun's disk such as could not otherwise be prosecuted. Viewed through a lens, or even a plane glass thus silvered, the sun appears of a soft, blueish color, very sharply defined against a black background, formed of the sky. All the peculiarities of the solar image, the different spots and foci in their variations of intensity, and the less luminous marginal regions, are shown with the greatest clearness, and even the filmiest clouds and vapors which seem to sweep over the disk can be readily perceived. The examination can be kept up any length of time without strain to the eyes. The physiological influence is very different from that of colored glasses, the use of which is sometimes very objectionable. Since all the different rays of light pass through the metal (although greatly tempered) except the outermost

red rays, which are excluded, together with the dark heat rays, the silver must be deposited in the usual galvanoplastic or chemical manner, so as to form a very delicate film. Gold and platinum may also be used, but silver possesses several advantages.

This property, in the part of metals, of greatly subduing the rays of light without extinguishing them to any extent, and of excluding almost entirely the rays of heat, is now applied to other practical purposes. Weak eyes can use spectacles thus prepared to the greatest advantage, where colored glasses are not to be thought of. For persons whose business keeps them before a glowing fire, such glasses are invaluable, since the sight is not strained by the light, nor the eye-ball injured by the heat, which is measurably excluded. Screens of glass, to be placed before fires, have also been made on the same principle.

By inserting plates of glass thus treated in the panels of doors, or using them as window panes, it will be easy to observe from within all that is going on outside, while it will be impossible to see into the room unless there be another window on the opposite side, so as to show through. The application of the silver to the glass converts it into a mirror, which reflects the light, and to the observer is as opaque as mirrors are generally. The use of such windows wherever an observer within has occasion to notice persons outside without being seen, will be readily understood in the case of prisons, workshops, stores, etc., where, however, as already remarked, there must be but the one opening. The platinized glass has been found most convenient for this purpose.

These few illustrations of a general principle, capable of a great variety of practical applications, show, at the same time, how often the man of science, seeking for the solution of some problem in his theoretical investigations, reaches a result capable of a thousand uses in every day life, which are eagerly caught up and turned to profitable account.—*Phil. Ledger.*

Brunel's Mishaps.

Although Brunel died at the comparatively early age of fifty-three, it is even matter of surprise that he lived so long. He had more perilous escapes from violent death than fall to the lot of most men. We have seen that at the outset of his career, when acting as assistant engineer to his father, in the Thames Tunnel, he had two narrow escapes from drowning by the river suddenly bursting in upon the works. Some time after, when inspecting the shafts of the railway tunnel under Box Hill, he was one day riding a shaggy pony at a rapid pace down the hill, when the animal stumbled and fell, pitching the engineer on his head with great violence; he was taken up for dead, but eventually recovered. When the Great Western line was finished and at work, he used frequently to ride upon the engine with the driver, and occasionally he drove it himself. One day, when passing through the Box Tunnel upon the engine at considerable speed, Brunel thought he discerned between him and the light some object standing on the same line of road along which his engine was traveling. He instantly turned on the full steam and dashed at the object, which was driven into a thousand pieces. It afterwards turned out to be a contractor's truck, which had broken loose from a ballast train on its way through the tunnel. Another narrow escape which he had was on board the *Great Western* steamship, where he fell down a hatchway into the hold, and was nearly killed. But the most extraordinary accident which befell him was that which occurred while one day playing with his children. Like his father, Sir Marc, he was fond of astonishing them with sleight-of-hand tricks, in which he displayed considerable dexterity; and the feat which he proposed to them on this occasion was the passing of a half-sovereign through his mouth out at his ear. Unfortunately, he swallowed the coin, which dropped into his windpipe. The accident occurred on the 3d of April, 1843, and it was followed by frequent fits of coughing, and occasional uneasiness in the right side of the chest; but so slight was the disturbance of breathing that it was for some time doubted whether the coin had really fallen into the windpipe. After the lapse of fifteen days, Sir B. Brodie met Mr. Key in consultation, and they concurred in the opinion that most probably the half-sovereign was lodged at the bottom of the right bronchus. The day after, Mr. Brunel placed himself in a prone position on his face upon some chairs, and bending his head and neck downwards, he distinctly felt the coin drop towards the glottis. A violent cough ensued, and on resuming the erect posture he felt as if the object again moved downward into the chest. Here was an engineering difficulty, the like of which Mr. Brunel had never before encountered. The mischief was purely mechanical; a foreign body had gone into his breathing apparatus, and must be removed, if at all, by some mechanical expedient. Mr. Brunel was, however, equal to the occasion. He had an apparatus constructed, consisting of a platform which moved upon a hinge in the center. Upon this he had himself strapped, and his body was then inverted, in order that the coin might drop downward by its own weight, and so be expelled. At the first experiment the coin again slipped towards the glottis, but it caused such an alarming fit of convulsive coughing and appearance of choking that danger was apprehended, and the experiment was discontinued. Two days after, on the 25th, the operation of tracheotomy was performed by Sir Benjamin Brodie, assisted by Mr. Key, with the intention of extracting the coin by forceps, if possible. Two attempts to do so were made without success. The introduction of the forceps into the windpipe, on the second occasion, was attended with so excessive a degree of irritation that it was felt the experiment could not be continued without imminent danger to life. The incision in the windpipe was, however, kept open

by means of a quill or tube, until May 13, by which time Mr. Brunel's strength had sufficiently recovered to enable the original experiment to be repeated. He was again strapped to his apparatus; his body was inverted; his back was struck gently, and he distinctly felt the coin quit its place on the right side of his chest. The opening in the windpipe allowed him to breathe while the throat was stopped by the coin, and it thus had the effect to prevent the spasmodic action of the glottis. After a few coughs the coin dropped into his mouth. Mr. Brunel used afterwards to say that the moment when he heard the gold piece strike against his upper front teeth, was perhaps the most exquisite in his whole life. The half-sovereign had been in his windpipe for not less than six weeks!

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING NOVEMBER 12, 1867.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

On filing each caveat.....	\$10
On filing each application for a Patent, except for a design.....	\$15
On issuing each original Patent.....	\$20
On appeal to Commissioner of Patents.....	\$20
On application for Reissue.....	\$30
On application for Extension of Patent.....	\$30
On granting the Extension.....	\$50
On filing a Disclaimer.....	\$10
On filing application for Design (three and a half years).....	\$10
On filing application for Design (seven years).....	\$15
On filing application for Design (fourteen years).....	\$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay \$500 on application.

Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.

70,675.—MEAT MANGLE.—A. T. Adams, Indianapolis, Ind. I claim the combination of the two jaws with the plates, I, I', bars, m, m', and springs, n, n', all arranged and operating as and for the purposes specified.

70,676.—MOTH-PROOF CASE.—James W. Aikin and John H. Stone, Philadelphia, Pa. We claim a sheet metal moth-proof case for a lady's furs, having the perforated central cylinder A, and the recess, b', in combination with the cylinder B and the elastic band ring, b'', the said parts being constructed, arranged, and combined to operate together substantially as and for the purpose described.

70,677.—NEEDLE MACHINE.—Walter Aiken, Franklin, N. H. I claim the machine or combination, substantially as described, for the purpose set forth, that is, as composed of the rotary cutter, A, the grooved rest, E, the series of rotary arbors, K, their carrier or wheel, L, and operative mechanism, the shaft, F, and the mechanism for revolving and moving it longitudinally, and the bolt, s, and mechanism for operating such bolt, substantially as explained.

70,678.—MACHINE FOR MAKING THE TONGUES OF MACHINE KNITTING NEEDLES.—Walter Aiken, Franklin, N. H. I claim the combination of the carriage, C, the feeder, G, the bowl-forming dies, w, v, and the flattening dies, d', e', all provided with mechanism for operating them, substantially as described.

I also claim the combination of the carriage, C, the feeder, G, the nicking and bowl-forming dies, n', o', w', v', and the flattening dies, d', e', all provided with mechanism for operating them, substantially as set forth.

I also claim the combination of the carriage, C, the bowl-forming dies (or the latter and the nicking dies), and the punch, f', and punch die, g', all provided with mechanism for operating them, substantially as set forth.

I also claim the combination of the carriage, the feeders, the bowl-forming dies (or the latter and the nicking dies), the punch and punch dies, and the rounding dies, h', i', all provided with mechanism for operating them, substantially as specified.

I also claim the combination of the carriage, the feeder, the bowl, the punching dies (or the latter and the nicking dies), the punch and punch die, the rounding dies, and the separating dies, k', l', all provided with mechanism for operating them, substantially as explained.

70,679.—HOT AIR FURNACE.—Biddle Arthurs, Pittsburgh, Pa. I claim the drum or heater of sheet or plate iron, with an opening in its bottom and front, connecting with a fire space, c, of brick, the edges of the heater or drum around such opening having flanges, l, built into the furnace walls, constructed and arranged substantially as described for the purposes specified.

70,680.—SAW.—James E. Atwood, Trenton, N. J., assignor to himself and Cyrus H. McCormick, New York city. I claim the tooth, A, when held in its position by ratchet, c, c', for the purpose herein described.

70,681.—CARRIAGE WHEEL.—Charles C. Ayers, Chelsea, assignor to himself and Henry A. Breed, Lynn, Mass. I claim the combination as well as the arrangement of the metallic annulus or inner tire, D, with the wooden felly and the spokes and hub, as explained.

I also claim the combination as well as the arrangement of the metallic annulus or inner tire, D, with the wooden felly, the hub, spokes, and outer tire as described.

I also claim the combination as well as the arrangement of the metallic annulus, D, the wooden felly, the springs and chambers thereon, the spokes and the hub, as described, the hub, under such a combination of the spokes with it and the felly being suspended from the upper half of the felly and on which the wheel may be in revolution and use.

70,682.—CONSTRUCTION OF SALVERS.—Seth C. Babbitt, Meriden, Conn., assignor to the Meriden Britannia Company. I claim the mode or process of salvering the inner or outer edge of a soft-metal or Britannia salver, substantially as described.

I claim a Britannia or soft-metal salver constructed substantially as described.

70,683.—TRUSS.—Charles A. Baker, Auburn, N. Y. I claim the front pad or plate, E, provided with the rod, A, auxiliary pad, B, and straps, D, G and H, all constructed and arranged substantially as and for the purpose set forth.

70,684.—CHALK-LINE REELS.—James Bathgate, Cincinnati, O. I claim the combined arrangement of the reel, C, C', chalk receptacle, D, cap, E, apertures, F, G, and line, H, all constructed and employed as and for the purposes specified.

70,685.—MACHINE FOR LAYING AND TWISTING ROPE.—Stephen Bazin and James A. Bazin, Canton, Mass. We claim the sliding guide, p, q, r, N, in combination with the crane, M, and the winding reel, O, operating substantially as described for the purpose set forth.

We also claim the rolls, v, so arranged as to revolve simultaneously, in combination with the feeders, b', and the guide pieces, a', or their equivalents, for the purpose of insuring the equal delivery of the strands, substantially as described.

70,686.—TAPERING DRILL.—Jason A. Bidwell, East Boston, Mass. I claim, 1st, A twisted reamer, c, which is adapted to serve, in conjunction with a spirally grooved drill, a, for making tapering holes in metal, substantially as described.

2d, The construction of a cutting shoulder, e, upon the shank c', of a twisted reamer, c, substantially as described and for the purpose specified.

70,687.—BED BOTTOM.—Albert Bingham (assignor to Wm. T. Mudgett), Newtonville, Mass. What I claim as my invention in a spring bed bottom is as follows, that is to say, having its bolster piece, D, its series of pins, e, and slats, g, supported by springs, f, so as to be movable vertically together thereon, and so that each slat may move independently of the bolster piece and its guide pins, the whole being substantially as described.

I also claim the improved spring bed bottom as constructed, not only with each of its slats, supported at its foot or lower end on a stationary cross bar, but as having a bolster piece, D, series of pins, e, and slats, g, supported by springs, f, so as to be movable vertically together thereon, and so that each slat may move independently of the bolster piece and its guide pins, the whole being substantially as specified and represented.

70,688.—MACHINE FOR FINISHING WOOLEN CLOTH.—Edwin Birkenshaw, Ashuelot, N. H. I claim my improved arrangement of the two teasing cylinders, the shearing mechanism, and their two sets of feed rollers, one teasing cylinder under such arrangement being disposed over the other, as described.

I also claim the combination and arrangement of the series of rollers, D, D', etc., with the shearing mechanism, the feed rollers, and the two teasing cylinders, arranged in manner as described and represented.

I also claim the combination, as well as the arrangement of the bridge, F, the series of rollers, D, D', etc., the shearing mechanism, the feed rollers, and the two teasing cylinders, arranged as described, the said feeding cylinders and feed rollers being provided with a series of guide rollers arranged with the n, as described, and the rotary shearer brush and the teasing cylinders, all provided with mechanism for operating them, substantially as hereinbefore explained.

70,689.—CAR COUPLING.—Luther Boyd and Philip Kriegerbaum, Springfield, Ohio. We claim the movable head, B, as constructed in combination with stationary head, C, slides, e, e', and springs, d, d', all arranged and operating in the manner and for the purpose herein set forth and described.