

**IMPROVED METAL CUTTING AND PUNCHING MACHINE.**

The novel apparatus which forms the subject of the annexed illustration differs from machines designed or like employment in that, instead of consisting of a single movable jaw (the upper one), which acts in connection with a rigid bed, it is virtually a huge pair of shears, in which both of the blades partake of the motion. In order to communicate power to the arms of the shears, there is an ingenious and quite novel mechanical combination which, together with a solidly built frame, completes the device.

Power is applied to a belt pulley on the opposite end of the shaft which carries the fly wheel, A. Also on said shaft is a pinion, which engages with the large gear wheel, B, and thus, rotating the crank at C, moves back and forth the connecting rod, D. The latter is pivoted in the upper end of a double curved bar, E. The lower extremity of said bar is also pivoted to the lower shear arm, F. The upper shear arm passes through the bar, and within the latter and immediately below the arm is a roller upon which the curved portion of the arm rests. The pivot pin which secures the roller also holds the upper end of the bar, G, the lower extremity of which is pivoted to the frame.

The arms of the shears do not cross, but are provided with projections, which lap, and through which the pin, H, passes. By this arrangement, opening the arms forces the cutting edges together.

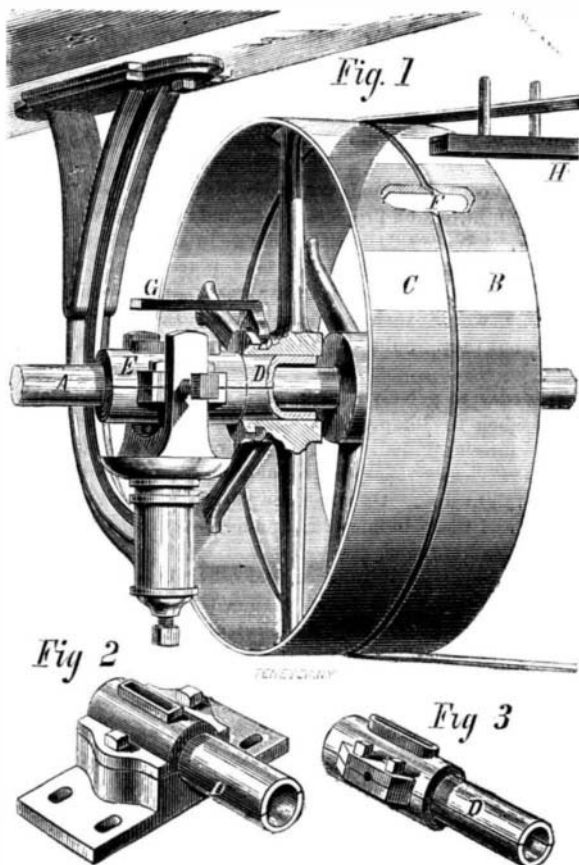
In operation the to-and-fro motion of rod, D, is communicated to curved bar, E. When the latter is thrown outward or to the right, its roller, acting against the curved portion of the upper shear arm, raises the same, while the lower end of the bar necessarily forces downward the lower shear arm, F. It is hardly necessary to explain that the combination of bars, E and G, with the shear arms, is calculated to admit of the application of very strong and uniform force to the jaws of the shears.

But little power is required to operate the machine, and its work is rapidly accomplished. It is stated that an apparatus weighing 1,700 pounds will cut bar iron one inch thick by three inches wide. The jaws, instead of carrying cutter blades, may be constructed to hold a punch and die, thus rendering the machine available for punching, as well as cutting, purposes. The device is also constructed to be operated by hand power, in which case the gearing as described is suitably modified.

For further particulars regarding rights, purchase of machines, etc., address Mr. H. C. Richardson, 59 and 61 Grand street, Brooklyn (E. D.), N. Y. Patent allowed through the Scientific American Patent Agency.

**HOLDEN'S IMPROVED LOOSE PULLEY.**

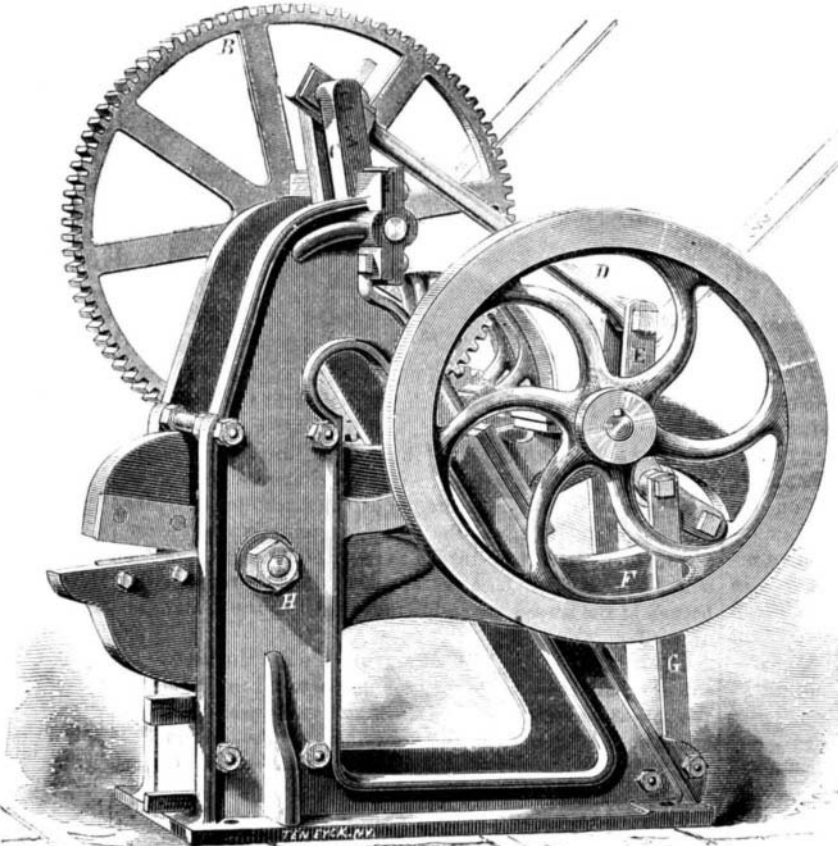
The essential feature of the improved loose pulley represented in the annexed engraving is that it, with the belt, remains in a state of rest except during the few seconds when the belt is shifted from loose to fast pulley. By this arrangement the belt revolves only when actually in use, and hence the wear of the same, together with the expenditure of lubricating material, otherwise required for the bearing, is saved.



A, Fig. 1, is the driving shaft, and B, the fast pulley. The loose pulley, C, is mounted on a bearing, D, projecting from a box, E, supported by the hanger. Through this bearing and box, the driving shaft passes. As shown through the portion broken away at F, the adjacent edges of the periph-

ries of the two pulleys are beveled, so that, when it is desired to shift the belt from loose to fast pulley, both pulleys may be caused to revolve together by forcing the pulley, C, slightly toward the pulley, B, by means of the shipper, G. After the belt is shifted, pulley, C, is drawn back on its bearing, and again comes to a state of rest. In shifting the belt from fast to loose pulley, the latter is not moved, as the belt is carried over by means of the ordinary shipper, H. The bearing and hub of the loose pulley are clearly shown in section in Fig. 1. Fig. 2 is a pillow block with a projection to receive the loose pulley, and Fig. 3 is a box and bearing, the same as in Fig. 1, shown removed from the hanger.

Patented May 5, 1874, by Messrs. W. H. Holden and T.



**REYNOLDS' METAL CUTTING AND PUNCHING MACHINE.**

C. Sheldon. For further particulars address W. H. Holden & Co., Box 327, Fitchburg, Mass.

**The Music Stool Battery.**

*Land and Water* publishes the following item, but declines responsibility for its truth by vaguely ascribing it to "a local paper."

"A valuable invention has just been patented by a post office official. It is an improvement in turret ships, the principal feature being that the battery rises and falls. Like many other inventions and discoveries, this one had its origin in accident. The inventor was out shooting one day, and both barrels of his gun went off simultaneously, the rebound causing him to spin round with considerable velocity. When he turned home he happened to sit on the music stool, and this piece of furniture also spun round in the well known manner. The movement reminded this clever official of his earlier spin. He was a gentleman capable of putting two and two together. Therefore he fastened his double barreled gun to his rotary piano stool, and banged away in his back garden, obtaining eventually a result which places him in the enviable position of being able to treat with two governments for the sale of his patent, for both England and Russia are anxious to become possessed of the rising and falling battery of this sharp post office official."

This invention bears a striking resemblance to the revolving cannon mentioned by Mr. Orpheus C. Kerr. That valuable weapon was pivoted in the middle and loaded at both ends, and, when fired, revolved with astonishing rapidity, causing promiscuous slaughter in both armies. It was intended to test the gun before a congressional committee; but as the individual deputed to fire it mentioned that he had a large family dependent upon him for support, the trial was indefinitely postponed.

**Action of Earth and other Substances on Organic Matter.**

At a recent meeting of the Chemical Society, a paper on the action of earth on organic nitrogen, by E. C. Stanford, was read, in which the author gave details of his experiments on mixtures of earth and decomposing animal matter. From these it appears that the earth is but an indifferent dryer, the mixture continuously losing nitrogen, which is evolved as ammonia principally; the earth also does not act as an oxidizer, and no nitrification takes place. Dr. Frankland stated that when decomposition was in the direction of putrefaction, ammonia was always produced from the nitrogenous matter, but much nitrogen also escapes in the elemental form. The action of charcoal is very different; seaweed charcoal mixed with excrementitious matters and allowed to dry is found to retain almost the whole of the nitrogen. These facts are of interest to sewage economists and the advocates of the dry earth system.

**Four Hundred Miles in a Balloon.**

Professor Donaldson, the aeronaut, recently accomplished a very successful voyage in his new balloon "Barnum."

Starting from the Hippodrome in this city, in the afternoon at 4 o'clock, the final landing was made the next day at 6 P. M., near Saratoga, N. Y. The party consisted of five persons, Donaldson and four reporters of the daily journals. Stops were made at various places on the route. The journey lasted 26 hours, during which time about 400 miles was traveled. The highest altitude reached was 9,000 feet.

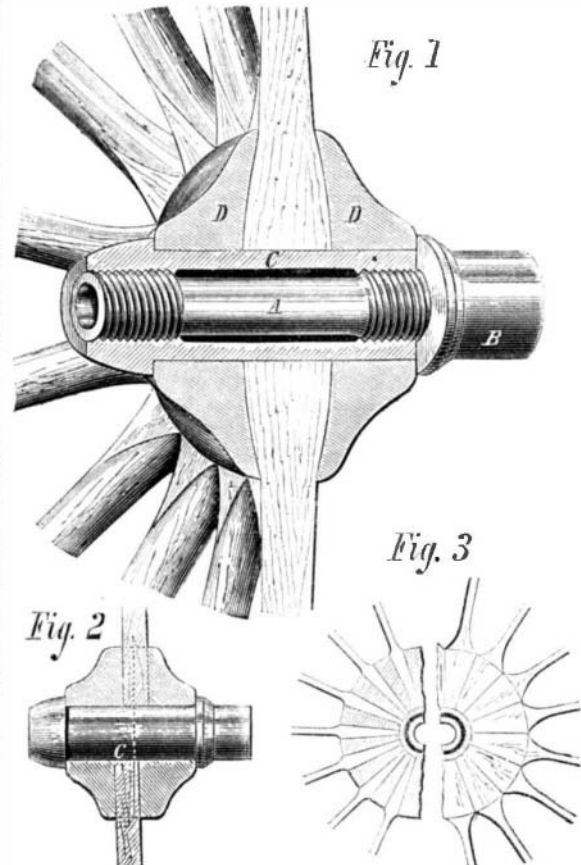
**The Requisites for Good Mortar.**

To obtain a good mortar, says Graham Smith, as much depends on the character of the ingredients and the manner of mixing them as on the goodness of the lime itself. It does not necessarily follow that, because a lime is good, the quality of the mortar will be good also. The best lime ever burnt would be spoiled by the custom, common among some builders, to mix with it alluvial soil and rubbish taken from the foundation pits of intended buildings. The sand should be hard, sharp, gritty, and, for engineering purposes, not too fine; it should be perfectly free from all organic matter, and with no particular smell. Good sand for mortar may be rubbed between the hands without sciling them. The water should also be free from all organic matter, and on this account should never be taken from stagnant ponds. The presence of salt in sand and water is not found to impair the ultimate strength of most mortars; nevertheless, it causes the work to "nitrate," or, as it is commonly termed, "saltpeter," which consists of white frothy blotches appearing on the face of the structure. It also renders the mortar liable to moisture, and for these reasons should never be present in mortar intended for architectural purposes, although for dock walls and sea works it may generally be used with advantage and economy.

Sand is used to increase the resistance of mortar to crushing, to lessen the amount of shrinking, and to reduce the bulk of the more costly material, lime. Water is the agent by which a combination is effected, and, as sand does not increase in volume by moisture, it necessarily follows that no more of the aqueous element should be employed than is absolutely necessary to fill the interstices between the sand, and render the whole into a paste convenient for use; and the greater strictness with which this is adhered to the more compact and durable will be the mortar.

**DAVIS' IMPROVED HUB.**

The invention, engravings of which in section we herewith present, is a simple and novel form of hub, composed of few parts, which may be quickly adjusted together so as firmly to retain the spokes. In Fig. 1, A is an inner metal tube forming the axle box and having a head at B. C is a larger and outer tube, into which tube A is screwed, as clearly shown. The middle portion of the hub consists of two collars, D, fitted on the tube head, at B, and binding the spokes between them. The spokes may be made large at the parts clamped between the collars, so as to fill the whole intermediate space, as shown to the right of Fig. 3, or the ends may be constructed smaller to enter grooves or mortises formed in the faces of the collars, as indicated at the left of



the same figure and in Fig. 2. The tube, A, is cored out on its middle portion to form an oil space, and the ends which form the axle bearings are cast in chills to render them hard, smooth, and durable.

The plain form of collar, the inventor states, will prefera

bly be used when the spokes are to be adjusted in a single plane, and the slotted faced when the wheel is to be built staggered. Patented through the Scientific American Patent Agency, June 30, 1874. For further particulars regarding sale of rights, etc., address the inventor, Mr. John W. Davis, Newton, Catawba county, N. C.

#### THE CHILIAN EXPOSITION.

The second International Exposition of the Republic of Chili, a brief mention of which has already appeared in these columns, opens at Santiago on September 16, 1875. The large South American trade which yet remains undeveloped, and the constantly increasing demand which the progressive republics of that continent are making for American productions and inventions, will, we think, offer great inducements for our manufacturers and inventors to contribute to this enterprise. Special arrangements have been made for the transportation of articles for exhibition, at low rates; and the passage of mechanics and special workmen, in charge of goods, will be in part defrayed by the Exposition Committee. No rent is charged for space, and storage and power

ence of the magnetic telegraph, and brings into bold view the feeble beginning of the marvelous progress of this peculiarly American work. After the patient but persistent efforts of Professor Morse for several years, Congress in 1843 made an appropriation of \$30,000 for an experiment with the Morse telegraph between Washington City and Baltimore, and it was this line that was completed in the spring of the following year. The money, grudgingly granted in the midst of scoffs and jeers and references to "animal magnetism," etc., has been frequently referred to as a munificent gift in the interest of Science and the diffusion of intelligence. Perhaps it was, but it may serve at once to illustrate the magnitude of the growth of the telegraph, and how greatly the government profited by its generosity, to say that quite recently, within a period of five years, the Western Union Telegraph Company alone paid to the Treasury in taxes \$850,000, and in gold duties, on imports of telegraphic wire, \$28,000 more. Thus the investment of that \$30,000 repaid itself in those two items alone, in those five years alone, and from one company alone, more than thirtyfold.

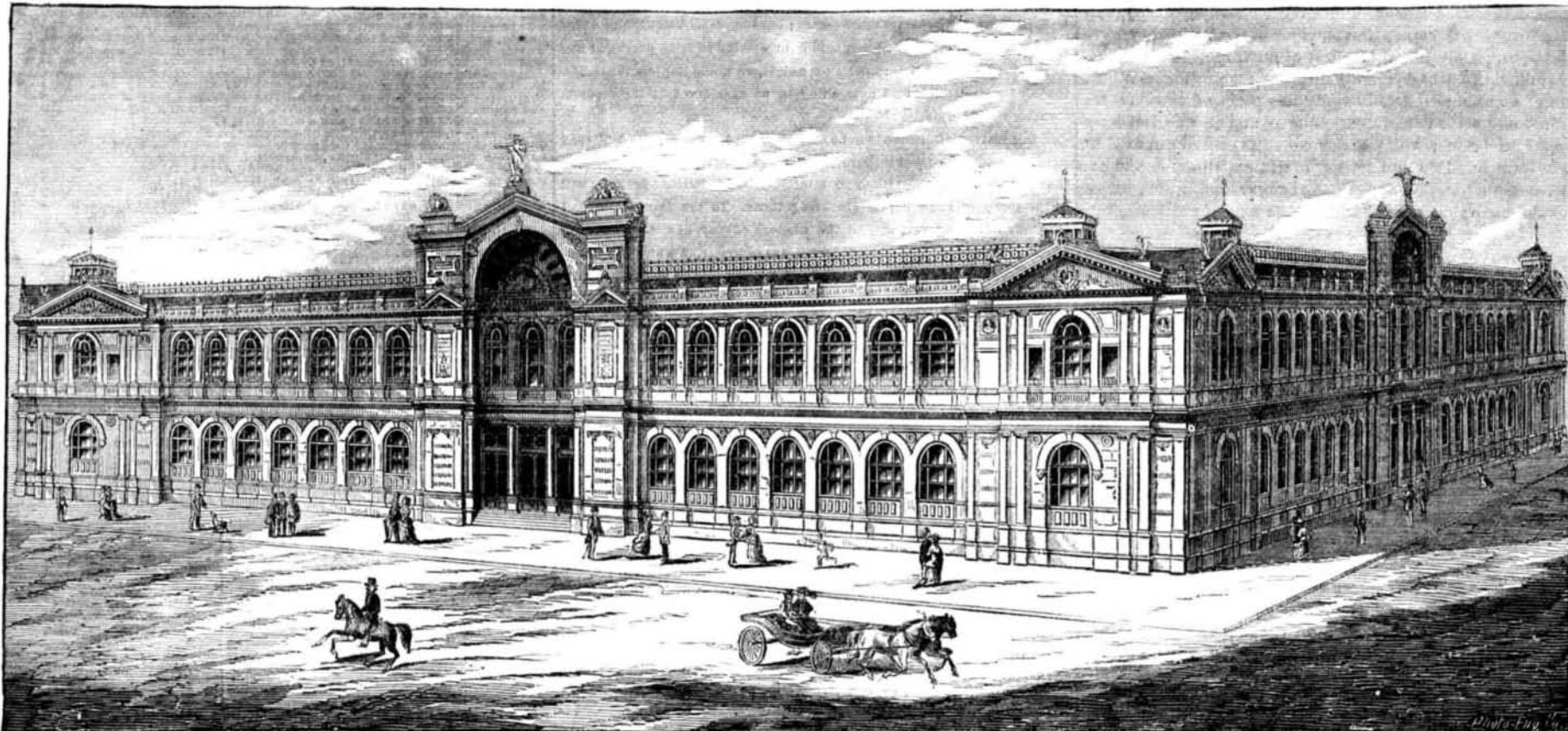
Going back to the forty miles of wire between Washington and Baltimore, which measured the whole dimensions of the

marvelous change and the vast and wonderful system that has brought it about is, as the decease of the builder of the pioneer line sharply reminds us, the growth of but thirty years.—*Public Ledger*.

#### A Wonderful Oil Well.

The Titusville (Pa.) *Herald* thus describes a wonderful oil well that has been opened recently in that vicinity.

The road leading to the Parker well from Petrolia is in moderately good condition; and soon after leaving Central Point, the traveler observes the words "no smoking permitted here" in conspicuous places. After about two and a half miles a ride, the top of a hill is reached, where a loud, roaring noise is distinctly heard, and eighty rods further on brings us in sight of the well. A dense fog or mist envelops the derrick, engine house and tanks, while fully one thousand persons are there, gazing on the wonder of Armstrong county. The derrick has conspicuously placed upon it, in large letters, "Boss Well," and "Creswell City." There are two 250 barrel tanks full of oil; also two 1,200 barrel tanks, one of which is full. Three dams, one below the other, catch the dripping; and the rivulet beyond, we are told, for ten miles



BUILDING FOR THE GREAT EXPOSITION AT SANTIAGO, CHILI, 1875.

are offered free. The Exposition closes December 31, 1875. The condition and number of general premiums have not, as yet, been determined, but three liberal special prizes are to be awarded as follows:

First. One thousand dollars, in gold, for the best style of narrow gage railroad, not exceeding three feet, shown by fixed and rolling stock, including locomotive and tenders sufficient to accommodate and carry 6 to 100 tons up gradients of 1 in 50, with curves of 164 feet radius.

Second. One thousand dollars, in gold, for the best system of measuring and distributing water for purposes of irrigation, in specified or proportional quantities. The invention must be accompanied by the necessary apparatus to demonstrate its applicability to the requirements of Chili.

Third. Five hundred dollars, in gold, for the best exploring drill, adapted to mining operations of coal, iron, copper, silver, gold, etc.

The city of Santiago in Chili is situated in a most picturesque valley at the foot of the Andes, and is adorned with beautiful parks containing lakes, gardens, fountains, theaters, libraries, amusements of all kinds, observatories, etc. In one of these parks, the size of which is two square miles, the Exposition will be held. The structures include several buildings, the main one of which covers over 60,000 square feet of ground. It is over eighty feet in height, is constructed of stone, brick, and iron, and contains many spacious galleries. An efficient fire brigade will be constantly in attendance during the Exposition. The street railways which pass round the park have branches extending within the edifice in order to facilitate the conveyance of heavy machinery and other cumbersome goods.

Full particulars can be obtained of the Chilean consuls at New York, Baltimore, Washington, and Philadelphia. We give herewith an engraving of the main exposition building, which is of considerable architectural beauty.

#### The Builder of the First Telegraph.

A few days ago a telegraphic despatch from Maine announced the decease in that State of Mr. G. E. Smith, who constructed for Professor Morse the forty miles of magnetic telegraph from Washington city to Baltimore, which constituted the original of the vast system of telegraphs now extended throughout the world. That line was completed for use in the last week in May, 1844, the first news despatch having been sent over the wire on the 29th of May. The quite recent death of the constructor of that line naturally carries the mind backward over the thirty years of the exist-

magnetic telegraph this day thirty years ago, we are better able to appreciate the two hundred thousand miles of wire which form the immense network of the telegraph over the United States to day. Of these two hundred thousand miles of American wires, which would encircle the globe more than eight times, about one hundred and seventy thousand belong to one company. In June, 1844, there were two operators at work; in June, 1873, there were nine thousand nine hundred and thirty persons employed by one American company, and about twelve thousand by all the American companies. In this exhibit of the growth of thirty years, we limit the figures to the statistics of our own country, leaving the Old World out of view altogether.

In some other respects, the change wrought by the telegraph in less than the period of one generation is still more striking. It requires no strain upon the memories of even the junior partners of some of our old business houses and offices to recall the anxious times when they were more or less at the mercy of shrewd and active men who used carrier pigeons, relays of fast horses with their hardy express riders, semaphore signals from hill top to hill top and along the coast, and other similar expedients for getting advanced views of important events, with all the resulting advantages. In those days fluctuations in the prices of commodities in the great markets of the world were frequently secrets known only to a few, who sold their knowledge to another few, and thus a small knot of men in every commercial center were enabled to buy the property of their uninformed neighbors for far less than its value, or sell their own for far more than its value. Now all business men get their information simultaneously, and, if they wish it, they can get it from all the markets and money centres of the world. The merchant at our Commercial Exchange is in immediate communication with corn, cattle, cotton, produce, shipping, and commercial exchanges everywhere in our own country and abroad. The banker on Third street has his wire extending from his office to New York, Chicago, San Francisco, New Orleans, London, Paris, Frankfurt, Berlin, Amsterdam, Constantinople, Bombay, Calcutta, Rio Janeiro and Shanghai, and all cities and countries between. He sits there with instant knowledge of the financial, commercial, political, and other important current events of Europe, Asia, Africa, Australia, the East and West Indies, and South America, as well as of his own country. The telegraph, the Associated Press, and the newspapers within that organization concentrate this universal intelligence, and lay it before the whole public simultaneously at least twice every day; and all this

of a circuitous route to the Allegheny River, is covered with oil.

There are two 2 inch pipes connected with the well, one of which is shut completely off, and out of the other flows a steady stream of oil with immense force. There is no perceptible intermission in the flow; and as it gushes into one of the 1,200 barrel tanks, the foam and spray envelop the whole surrounding atmosphere in a dense mist.

"A trustworthy gager informed us that he had gaged the well three times since the stream was turned into the 1,200 barrel tank, and he found it doing 1,750 barrels, and he estimated the leakage to be at least 50 barrels per day. He further stated that in his opinion the well started off out of the two 2 inch pipes at the rate of 2,500 barrels per day. He also claimed that, although this was almost incredible, he believed that, if the full stream were turned on now, it would do at least 5,000 barrels.

"The well is claimed to be the largest ever struck in the lower region. A farmer walked up to us and offered to sell his adjoining farm of 100 acres for \$100,000, which ten days ago, for farming purposes, would not have brought \$1,000. The surveyors are at work laying out Creswell City.

"The Parker well stands two and one eighth miles due east of the most eastern well of the fourth sand development, and about two and three quarter miles east of Petrolia. The number of wells drilling on this belt, east of the most easterly well on the McGarvey farm, are six, namely: Two on the Snow farm; one on the Steel farm; the Gushford well, 1,000 feet deep; the Crawford well, 300 feet deep, and the Prentice well, 1,450 feet deep. The latter is half a mile due west of the Parker well, and is due next week."

#### The Reason Why.

It is always desirable that facts should be supported by a reason. The editor of Arthur's *Home Magazine* give the following questions and answers, which are pertinent to this season of the year:

Why is fruit most wholesome when eaten on an empty stomach?

Because it contains a large amount of fixed air, which requires great power to disengage and expel it before it begins to digest.

Why is boiled or roast fruit more wholesome than raw?

Because, in the process of boiling or roasting, fruit parts with its fixed air, and is thus rendered easier of digestion.

Why are cherries recommended in cases of scurvy, putrid fever, and similar diseases?