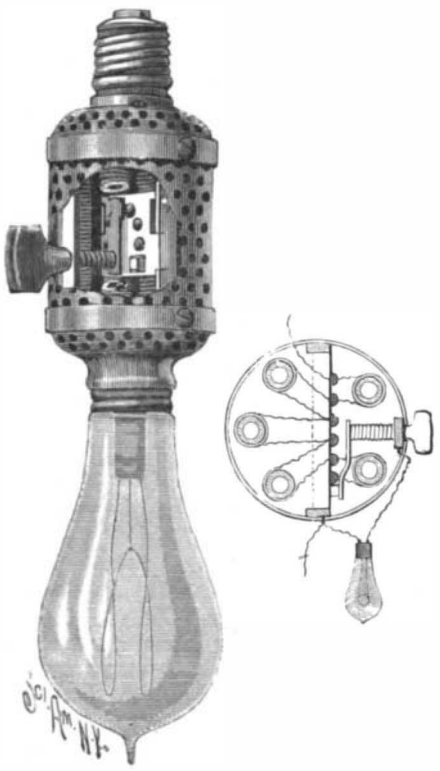
THE BRUNT IMPROVED REGULATING INCANDESCENT-LAMP SOCKET.

A well-ventilated socket containing a rheostat by means of which any number of resistances can be thrown into the circuit, so that the light can be modified as desired, can evidently be employed to no little purpose in sick-rooms, vestibules, and sleeping-apartments. Sockets of this character are so ingeniously and compactly constructed that we have selected for illustration the latest and most improved type, made by the Brunt Porcelain Works, of East Liverpool, Ohio.



A REGULATING-SOCKET FOR INCANDESCENT LAMPS.

Within a perforated brass casing, an upper and a lower disk of porcelain are mounted. The disks are connected by a rectangular metal frame, notched to receive the projections of a miniature switchboard of porcelain. The disk is provided with a brass plug, screwing into the usual electric light socket; and the lower disk is provided with a screw-socket to receive the lamp. On the switchboard are six contact-points wired with five resistance spools, extending from disk to disk. The switch-arm which plays over these contact-points is carried by a spring-controlled shaft turned by a vitrified key, held in a brass bar extending between the two porcelain disks. The brass rectangular frame in which the switchboard is mounted serves as a direct conductor for the current from the live wires to the lamp. When it is desired to modify the light, the key is turned to throw one or more resistance spools in the circuit.

Accurate tests of the Brunt lamp have been made. A test made with a 61½ watt, 110-volt lamp, of 16 c. p., showed that by throwing in the various resistance spools, from 37 to 57½ watts were consumed and from 6½ to 39 8/16 per cent of the current saved. With a 52-volt lamp of 16 c. p. and 3·5 watts efficiency, 29 watts were consumed on the first contact-point and a candle power of 0·2 obtained; 32·5 watts were consumed on the second contact, and a candle power of 0·4 obtained; 36 watts were consumed on the third contact and a candle power of 0·7 obtained; 41·5 watts were consumed on the fourth contact-point and a candle power of 1·8 obtained; 48 watts were consumed on the fifth contact-point and 4·5 candle power obtained; and 56 watts were consumed for the full 16 candle power. The figures speak for themselves.

A NOVEL ELECTRO-MAGNETIC BRAKE FOR STREET CARS.

The British Westinghouse Company have recently acquired the patents of a novel electro-magnetic brake, invented by Mr. Newell, for utilization on street tram-cars. It consists of a horse-shoe electro-magnet, suspended on spiral springs, so that the poles hang directly above the rails. When the magnet is excited, it forces down these poles, so that the shoes grip the rail in a similar manner to the ordinary track brake. But there is a wide difference between the effects of the application of the Newell brake and those of the conventional track brake. In the case of the latter, the braking effect is obtained at the expense of the weight of the car; that is, by reducing the grip of the car wheels on the rails, and therefore nullifying to a considerable extent the effect of the wheel-rim hand-brakes. In the case of the Newell brake, however, by means of a simple arrangement of levers connecting the electro-magnet with the shoes of the wheel-rim hand-brake, the reaction of the shoes on the track results in an increased thrust or pressure on the shoes of the wheel-rim hand-brake. By this means an increased braking effect on the wheel-rims is caused, and the effective weight of the car on its wheels is not changed by the application of the track-brake.

Another important feature of this brake is that it is not actuated by the current supplied by the conduit mains, but by power produced by the loading of the car motors as generators. The momentum of the cars, after the supply circuit has been interrupted, drives the motors as generators, and it is the resulting current which furnishes the power for the electro-magnetic brake. By this it will be realized that the action of the brake is entirely independent of the continuity of the main electrical supply, and any failure of the current does not interfere with the braking of the cars. In fact, the brake is practically automatic in its action, since, immediately the supply circuit is interrupted, the brake begins to act. The proportion of the braking effects on any car produced by the shoes gripping the track and the increase of pressure upon the wheel-rim shoes is adjusted to the weight of the vehicle and the gradients of the track, so that the maximum pressure which will not cause skidding of the wheels may be applied to the shoes of the rim-brakes. With the Newell brake, when the weight of the car is 8 tons, 60 per cent of the power is applied to the rails, and the remaining 40 per cent to the wheels.

The brake is actuated by a backward motion of the controlling handle. It has been subjected to several tests upon the Westinghouse tram-car in London, and has been proved to be so effective and quick in action that cars may be more readily brought to a standstill than by any other existing type of brake.

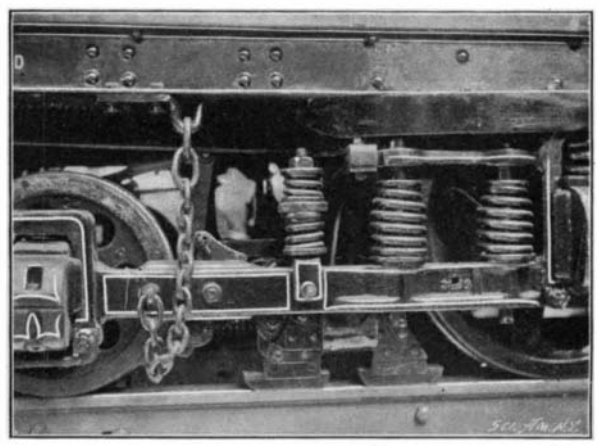
AMERICAN COAL BRIQUETTES.

Travelers in Europe are familiar with the coal briquettes which are used extensively in place of ordinary coal both in England and on the Continent, and the amount of smoke which they emit has probably impressed most Americans unfavorably, so that they would be slow to recognize their adoption in this country. The great amount of smoke which the briquettes yield when burned is due partly to the inferior sort of stoves in common use in Europe for heating purposes and to the fact that soft coal dust is used in their manufacture, with a large amount of pitch for binding material. If anthracite coal dust was used exclusively, with less pitch in the binding material, and the briquettes were burned in good American coal stoves provided with proper drafts and chimney flues, the smoking would be reduced to a minimum, and prove not much more annoying than when ordinary anthracite coal was used.

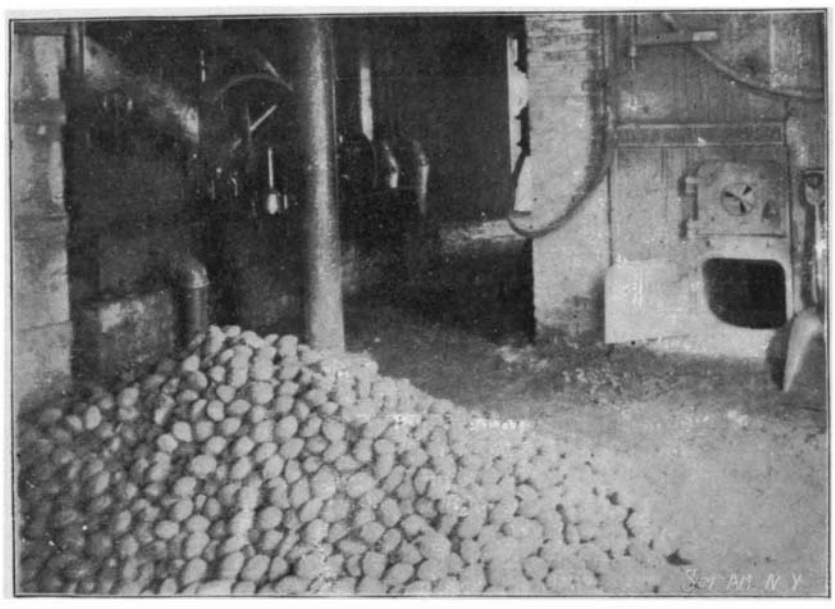
The advantages of coal briquettes are briefly their freedom from dust and dirt when handled, and their economy in utilizing coal dust and waste from the mines. The "slack" coal which is generally used can be worked up into briquettes and transported to any part of the country without much waste of any kind. Coal waste in this country has been enormous in the past. The vast culm heaps for years piling up at the mouth of every coal mine represented waste of natural material amounting to millions of dollars. It is only comparatively recently that this culm waste has been utilized for producing energy, and to-day mills and factories constructed with special grates and furnaces to burn this material have sprung up in the vicinity of the coal mines. With the cost of transportation reduced to nothing, these factories have found the fuel problem a simple one of solution.

Although these culm heaps were neglected for years, there were plenty of geniuses who realized that some day the waste fuel would be utilized; and since 1837 many patents have been taken out to make coal briquettes, most of them having in mind the culm that was accumulating at the mouth of every mine. The difficulties in the way of producing a handy, transportable fuel were many, and the attempts proved unprofitable for one reason or another. It was a foregone conclusion that coal briquettes would never be popular in this country without the elimination of the disagreeable features characteristic of the briquettes used on the other side.

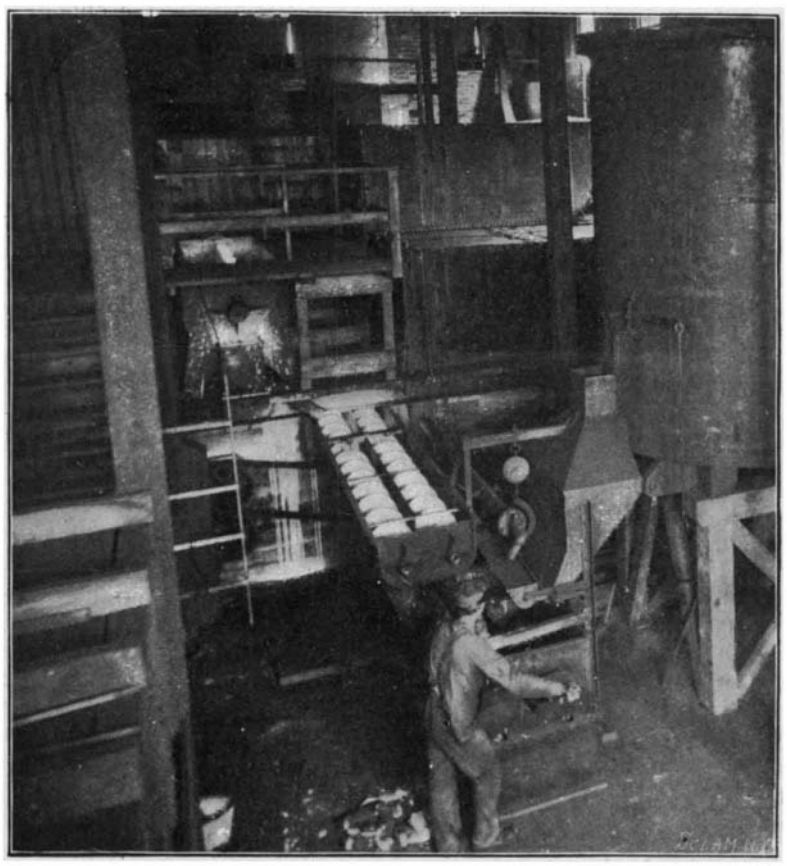
The successful manufacture of coal briquettes in the West to-day consequently proves of more than general interest as inaugurating a new era in our fuel problem that may have wide-reaching results. When we consider that the combined output of briquettes in Europe exceeds some 20,000,000 tons a year, and that they are used for house heating, for manufacturing purposes, and on the railroads and some of the ocean steamers, we can appreciate the extent to which a similar industry may develop in this country. In the American coal briquettes manufactured in the West to-day, the binding material has been mixed so that only five per cent of pitch is employed, with about two per cent of lime. The use of lime in the binding cement has made it possible to obtain good results with much less pitch



AN ELECTRC-MAGNETIC BRAKE FOR STREET CARS.



THE MANUFACTURE OF COAL BRIQUETTES—ENGINE AND BOILER ROOM.



THE MANUFACTURE OF COAL BRIQUETTES—THE MIXING MACHINE.