

## A NEW CLUTCH.

The engraving shows a new clutch which has been recently patented by Mr. David Mackie, of 4062 Lancaster Avenue, West Philadelphia, Pa., in which all the advantages of a friction clutch and a positive clutch are combined. Fig. 1 is a perspective view of the clutch, Fig. 2 is a longitudinal section, and Fig. 3 is an end view of one-half of the clutch.

Upon the ends of the shaft sections to be connected by the clutch are mounted flanged collars, one of which is provided with a conical recess, while in the other is formed a cylindrical recess in which is placed a cone provided with arms projecting into mortises in the flanged collar. The cone is arranged to be moved forward into the conical recess of the opposite portion of the coupling by a pair of levers connected with a sliding circumferentially grooved sleeve, which is engaged by a forked lever provided with inwardly-projecting studs. The flanged collar having the conical recess is capable of sliding upon its shaft, but is prevented from turning thereon by slots and feathers. The flanged collar in which are pivoted the levers is furnished at its periphery, at diametrically opposite sides, with sockets for receiving sliding rods, which are provided with heads reaching inwardly over the movable flanged collar. Levers pivoted in ears projecting from the fixed flanged collar extend into mortises in these sliding rods, and are connected by links with the sliding sleeve by which the clutch is operated. The flanged collars on their adjacent faces are provided with lugs which are capable of engaging each other when the collars are drawn together.

The operation of this improved clutch is as follows: When the clutch lever is moved in a right-handed direction, the cone is pushed forward into the conical cavity by the action of the levers. By this means the driven shaft is made to gradually acquire the same motion as the driver. As soon as this is accomplished, the clutch lever is quickly moved in the opposite direction, thus withdrawing the cone from the conical cavity, and at the same instant carrying forward the movable flanged collar through the medium of the sliding rods, so as to bring the lugs into engagement with each other, thus securing a positive connection of the two shafts. When the shafts are to be detached, this operation is reversed.

It will thus be seen that in this device all of the advantages of the friction clutch and the positive clutch are secured.

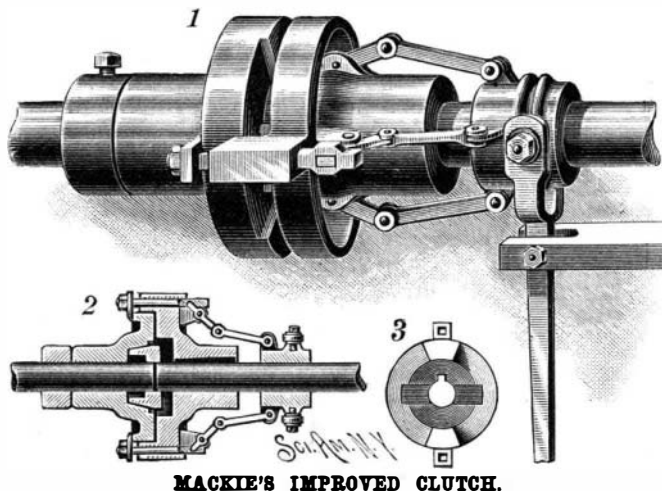
## NEW ELECTRIC CONDUIT.

The engraving shows in perspective and detail a new electric conduit patented by Mr. C. Edward Loth, of 88 Congress St., Troy, N. Y. This conduit is specially designed for facilitating the laying and adjusting of the wires, and for cheapening the construction of the lines, by doing away with the necessity of insulation except at or near the points of support. This system also provides means for gathering and removing water which may accumulate. At suitable intervals along the conduit are arranged manholes like that shown in the engraving, in which are placed supports for receiving the conductors. These supports are placed in a frame held in a vertical position in the manhole. They are capable of being moved in the frame to permit of introducing or arranging the wires. The wires are drawn through the conduit by means of the cable shown in the larger view, which carries a clamp for receiving the end of the wire. As the cable reaches the roller on the top of the frame in the manhole, the clamp is detached from the cable, the wire is passed through the frame, when the clamp is again attached to the cable upon the opposite side of the frame, and the wire is drawn forward as before until the next manhole is reached, when the operation is repeated.

It is desirable to maintain a certain tension on the wires during the operation of introducing them into the conduit, and for this purpose a right-angled lever is provided, having on its vertical arm a clamp for receiving the wire, and on its horizontal arm a weight for giving the wire the requisite tension. The wire is provided with an insulating covering for a short distance on opposite sides of the supporting frame in the manhole, and is furnished with a sleeve which rests in the support and serves to retain the wire in its position and under proper tension. The sections of the conduit incline toward the manhole, and each manhole is provided with a pipe leading to the suction pipe of the pump, several of the manholes being connected with a

single pump. It will be noticed that the pits for receiving the water at the ends of the sections are enlarged laterally to give them increased capacity. These pits are furnished with benches or platforms, upon which the linemen may stand while adjusting the wires.

Fig. 1 shows the inclination of the conduit, section of the water pit, and the float valve for closing the suction of the drainage pipe as the water is removed, so that the pump may act upon the water in the other pits. Fig. 2 is a sectional view of the fastening device for holding the wire in the support. Fig. 3 is a side



MACKIE'S IMPROVED CLUTCH.

elevation of the frame and the wire supports; and Fig. 4 shows a support provided with a roller, over which the wire is drawn while it is being introduced into the conduit.

This improved conduit has the advantage of affording free access to the wires, and it may be constructed at a minimum expense, as the wires for the greater portion of their length may remain uninsulated.

## Gem Mining in Siam.

Of late a good deal has been heard of concessions for gold and gem mining in Siam. The British Consul-General at Bangkok, in his last report, devotes some space to both subjects. As to gems, he says that the region in which rubies and sapphires have for the past ten years been found lies on the western side of the Cambodian peninsula, about 240 miles southeast of Bangkok, and covers approximately an area of 100 square miles. The center of this district is Chantabun, a seaport with a good harbor, connected with Bangkok by a line of three small steamers running at regular intervals. Within three hours, to the northwest, is Ban Kacha, where rubies of a very inferior kind are still sought by the local inhabitants, both Siamese and Chinese. Tongsoos, or natives of Pegu, and Burmese do not work here. Then, again, 12 hours from Chantabun, lying east by south on the western side of a

of these localities—Krun, Krut, and Phailin—have been, or shortly will be, conceded on mining leases, the last to an Italian and the two former to a Chinese British subject and an Englishman respectively. The method of obtaining the precious stones is identical at all the diggings in this region. The digger, on entering the district, pays 5s. 6d. to the headman, a Burmese British subject responsible to the local governors. Beyond this no further fee is exacted. The Siamese claim no right of pre-emption over gems found, or of purchase at market value of all stones above a certain weight, as was the case in Burma. The Tongsoo digger's first

object is to discover a layer of soft, yellowish sand, in which both rubies and sapphires are deposited. This stratum lies at depths varying from a few inches to 20 ft. on a bed of subsoil, in which no precious stones are found. A pit is dug, and the soil removed is taken to a neighboring canal or stream, where it is mixed with water and passed through an ordinary hand sieve. In his search for this peculiar alluvial deposit, which is generally free from any admixture of clayey earth, the digger has often to penetrate into the jungle that grows thick around, and combine the work of clearing with the occupation of gem digger. The Tongsoos do not appear to form themselves into companies for mutual assistance or division of profits. They work principally in twos or threes, and if chance lead them to discover a gem of any value, they either undertake a sea journey to Rangoon or Calcutta for the purpose of obtaining a good price for it themselves, or consign it to an

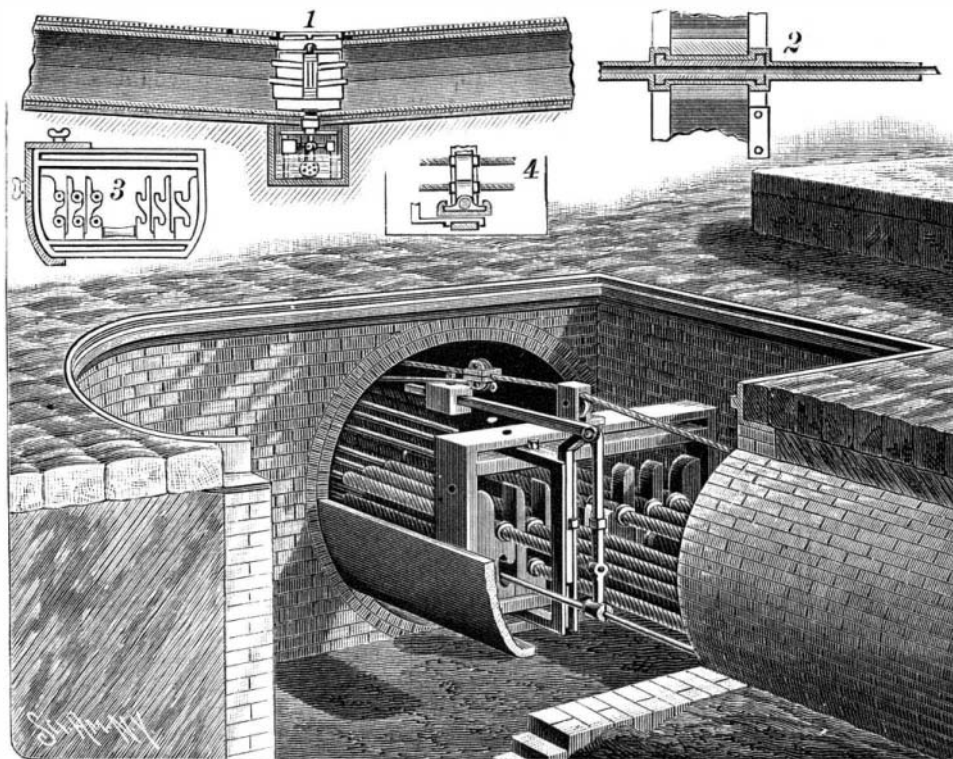
agent, while they themselves continue to search for more. No sapphire has yet been extracted of higher value than about £280, nor ruby of higher price than £960. A process of migration is continually going on among the Tongsoos of the different mines, the workers passing from one to the other, according to the reputation of a particular mine at certain periods. No artificial or mechanical processes for washing the soil have as yet been introduced. Rubies and sapphires are found at all the diggings, often deposited side by side in the same layer or stratum of sand. The ruby of "pigeon blood" color is rarely, if ever, met with. The color of the Siam ruby is usually light red of a dull hue. The sapphire is of a dark, dull blue, without any of the silken gloss which is the distinctive mark of the Burma and Ceylon stone. Stones resembling garnets rather than rubies are found in the dried beds of watercourses at Raheng, 200 miles north of Bangkok; and there is every reason to believe that rubies also, equal, if not superior, to those discovered in the southeast, exist throughout the Raheng district. Those hitherto obtained are the result merely of surface scratchings by Tongsoo seekers.

## Cremation at Milan.

Two systems of cremation are followed at Milan, by one of which the body is burned in a furnace surrounded by wood and charcoal, while by the other the combustion is brought about through a number of jets of gas which cast their heat upon the furnace from all sides. When wood and charcoal are employed, about six hundred pounds of wood and one of charcoal are found necessary, and the process lasts two hours. When gas is used, all that is consumable in the body is burned up in less than fifty minutes. The body may, in ordinary cases, be introduced into the furnace with or without the coffin. But if death has been caused by some infectious disease, the coffin and body must be burned together. The weight of the remains after cremation, in the form of bones and dust, is about four pounds. They are in color pure white, tinged here and there with a delicate pink; and it is a rule never to touch them with the hand. The bones and vestiges of bones (which are for the most part burned into powder) are taken up with silver tongs, while the ashes are removed from the furnace with a silver shovel, to be placed on a silver dish and then deposited in an urn for retention in

the cinerarium. Here the ashes are preserved in separate compartments, each with a suitable inscription beneath it. The cost of cremation is \$5 to a member of the Society for Extending Cremation in Italy, or \$10 in the case of non-members.—*Med. Record.*

MEDICAL students in London are compelled to go through a course of four years' study, hospital attendance and lectures before being qualified to appear for the final examination. By an order of the General Medical Council of England the term of preparation has been extended to five years.



LOTH'S UNDERGROUND ELECTRIC CONDUIT.

range of hills, are the mines of Muang Krun, with a mining population of about 100 in all, mostly Tongsoos, with a few native Siamese and Chinese. Two days from Chantabun, in a southerly direction, is the district of Krut, with mines from which rubies are extracted, and but few sapphires. The Tongsoo workers here number about 3,000. On the eastern side of the hill range, midway between Chantabun and Battambang, are the Phailin mines, the most extensive and the most frequented of all. Here there are between 4,000 and 5,000 gem seekers. Rubies and sapphires are both found, the latter being more abundant. All three