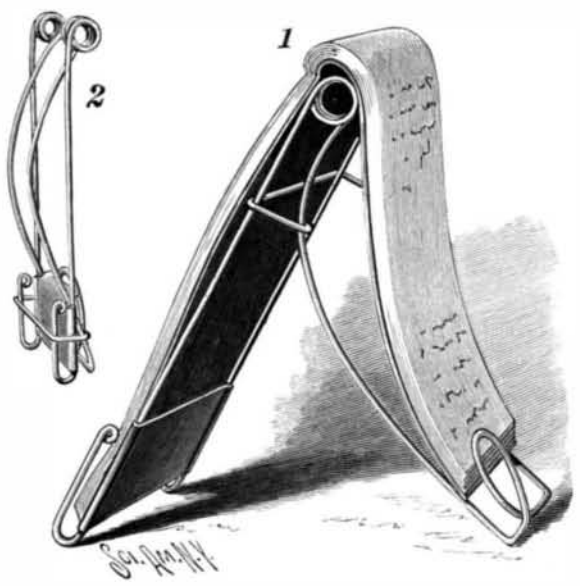
### A HANDY NOTE BOOK HOLDER.

The cut shows a simple little note book holder invented by W. T. Ives, of No. 41 Tompkins Place, Brooklyn, N. Y., and designed primarily for stenographers in copying their notes. It will also hold letters and many kinds of books very nicely. In the illustration Fig. 1 represents it with a note book in place for copying, Fig. 2 representing the device




IVES' NOTE BOOK HOLDER.

folded. It is practically made of a single piece of wire coiled to form a spring connection between the front and rear standards. The front standard wires are turned up at the base to keep the leaves of the note book from flying up, while the wires of the rear standard are connected at the base by a single coil, to form a clip which holds all or a part of the leaves firmly. A keeper, which slides easily on the rear standard when the tension of the springs is released, regulates the inclination of the book. When not in use, the device folds into a small space, and can be conveniently carried in the pocket. It weighs but two ounces, which is a great improvement over the heavy, bulky holders on the market to-day.

### A HORSELESS FIRE ENGINE.

There is now being constructed for use by the Boston Fire Department a horseless steam engine, of great size and power, having a contract capacity of 1,350 gallons of water per minute, but the builders, in view of recent tests, are confident that this engine will throw 1,850 gallons of water per minute. For some time past the fire commissioners of nearly all the great cities have had under consideration the question of adopting a specially powerful steam fire engine for use in portions of the city in which the great office buildings are located. A fire in one of the upper stories of the tall office buildings renders the ordinary methods of fire fighting futile.

From experience gained in recent fires, it became evident that one of two things must be done, if the constant menace of a disastrous fire were to be avoided. Either a limit must be placed on the height of buildings, or more powerful engines, capable of throwing higher streams of water, must be obtained for use in the districts containing the lofty structures. The heaviest fire engine for horses weighs 10,000 pounds, and requires three horses to get it about the city It has a guaranteed capacity of 1,100 gallons per minute. A heavier engine would be almost unmanageable, if horses were used as a means of moving it about from place to place, and in the narrow streets of Boston and lower New York it is even difficult for an engine with three horses to make rapid progress, and the liability of some of the horses becoming injured is also very great.

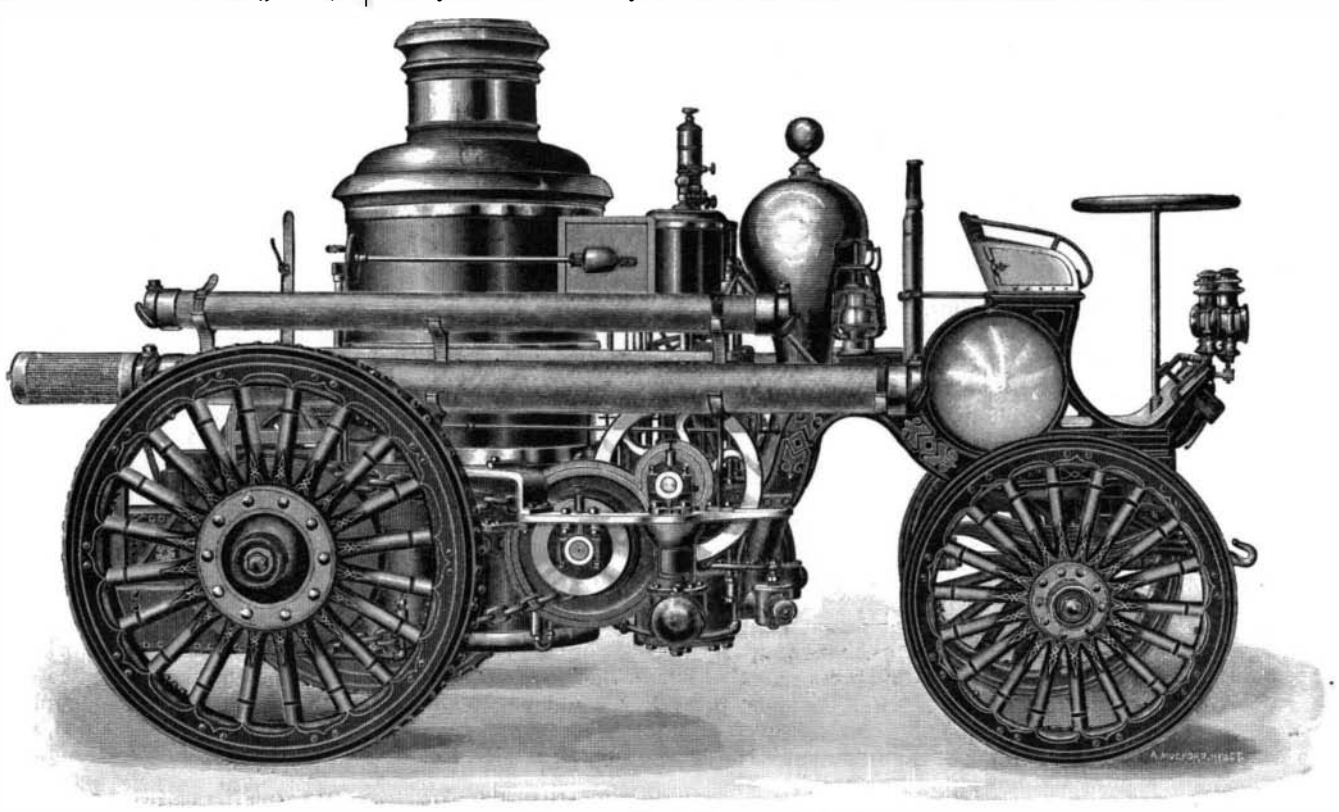
In view of these facts, it was decided by the Boston Fire Department that a "double extra first size self-propeller," as it is called, should be ordered, having steam for a motive power. There have been many attempts in the past to build and put into practical service steam-propelled fire engines. Among the first was one constructed in 1840 by Capt. John Ericsson, of Monitor fame. In the main his engine was a success, but the opposition was so strongly against it that, after a brief period of service, the engine was abandoned.

The horseless fire engine which we illustrate is built by the Manchester Locomotive Works, Manchester, N. H., and is one of the Amoskeag type. From the ground to the top of the engine is 10 feet; its length over all is 16 feet 6 inches, and the width over all is 7 feet 3 inches. The weight equipped for service is 17,000 pounds. The boiler is upright and tubular in style, with a submerged smoke box, and is expanded at the lower end to increase the grate surface. It is made of the best quality of steel plate, with seamless copper tubes, and is thoroughly riveted and stayed. It is jacketed with asbestos and has a lagging of wood which supports the metallic jacket. The connections with the steam cylinders are simple and have the advantage of being entirely unexposed to the air. The steam cylinders are cast in one piece. They are firmly secured to the boiler and framing and are covered with a lagging of wood, with a metallic jacket on the outside. The main shell of the pump is in one solid casting. It is a double acting and vertical pump and its valves are vertical in their action. The pump is arranged for receiving suction hose on either side and has outlets on either side for receiving the leading hose. The connection between the steam cylinders and water cylinders or pumps may be made by the old and familiar link motion and link block, or the equally familiar crosshead and connecting rod plan, both giving excellent results for ordinary steam fire engines; but in the self-propelling engine, where the engine power is transmitted to the driving wheel through the main crank shaft, which is not the case when this power is transmitted to the pumps, the crosshead and connecting rod plan has many advantages, and is therefore adopted for self-propelling engines. A self-propelling engine of the type we illustrate, made for the city of Hartford, Conn., at its first trial threw through fifty feet of leading hose, 3½ inches in diameter, horizontal streams as follows:

| | |
|---|---|
| 1½ inch nozzle | 348 feet. |
| 1¾ inch nozzle | 338 " |
| 2 inch nozzle | 319½ " |

The manner of handling the self-propellers is very simple. The chief engineer rides on the fire box of the engine and has directly under his hand the various levers and wheels which start, stop and regulate the speed of the machine. The assistant engineer rides on the driver's seat, and by means of the large steering wheel he steers the machine in exactly the same manner as the rear wheels of the long ladder trucks are governed through a system of bevel and worm gearing. The engine can be turned around in an ordinary street with ease.

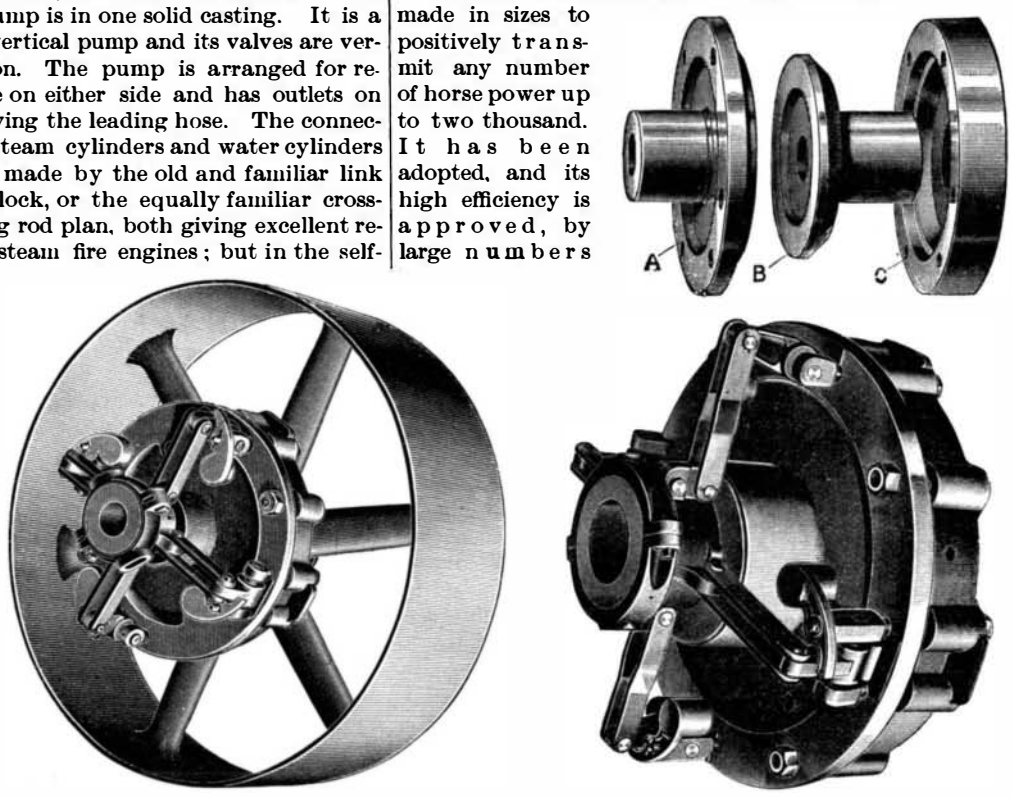
Very little machinery in addition to the ordinary mechanism of a fire engine is required to operate the self-propellers. The road driving power is applied from one end of the main crank shaft to an equalizing compound, and two endless chains running over sprocket wheels on each of the main rear wheels permit these rear wheels to be driven at varying speeds when turning corners. The driving power is made reversible, so that the engine may be driven forward or back at the will of the operator. When it is not necessary to use the power of the engine for driving purposes, the driving mechanism can be disconnected by the removal of a key, so that the pumps may be worked with the engine standing still. An extra water tank is carried at the rear of these engines to supply the boiler until connections can be made with a hydrant. The self-propeller can travel on a fair level road at a maximum rate of twelve miles an hour. It can climb any ordinary grade; in fact, any one that a team of horses can climb with a heavy load.



A HORSELESS FIRE ENGINE.

### AN IMPROVED FRICTION CLUTCH SYSTEM.

The illustration represents a strong and simple clutch, made in sizes to positively transmit any number of horse power up to two thousand. It has been adopted, and its high efficiency is approved, by large numbers of representative users for main lines of shafting, countershafts, pulleys, dynamos, generators, motors, fire pumps, and all classes of machinery. Perhaps its strongest recommendation is its capacity for long, continuous hard service, without repairs. It is manufactured by the American Twist Drill Company, of Laconia, N. H., and has self-adjusting and centering friction disks, and the friction may be applied to pulleys on main shafts, dispensing with loose pulleys on machinery and countershafts, stopping all pulleys, countershafts and belts when dynamos or other machines are not in use. It is operated with the engine running at full speed, and will gradually start or stop any connected shafting and machinery without sudden strain upon belts or gears. Holes are drilled through all parts of the friction, that it may be quickly bolted together and converted into a solid coupling in event of any accident to the clutch mechanism. The friction surfaces are flat, and when clamped together form a vacuum, having the pressure of the atmosphere in addition to that of the levers to force them together, each part of the friction being keyed solid to the shaft upon which it runs. Simple methods of adjustment are provided, and all parts of the clutch and shafts are automatically centered when in use, there being no friction upon the shipper or shaft bearings. When the shipper sleeve is thrown out to stop the clutch, the balance weights, shown in the engraving, overcome the centrifugal force ex-




WORRALL'S FRICTION COUPLINGS PULLEYS AND GEARING.