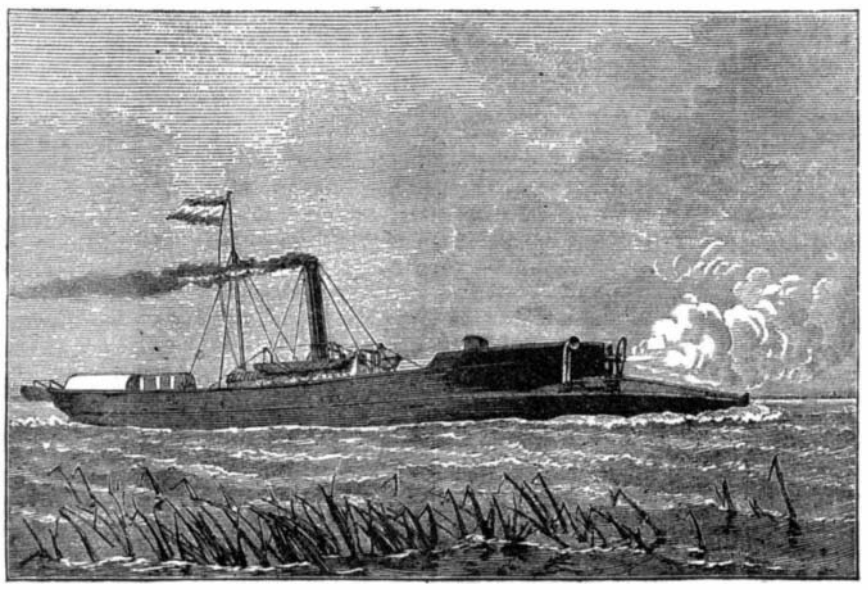
A NEW GUNBOAT.

Msesrs. J. and G. Rennie, of Greenwich, England, have recently launched a gunboat, the Bermejo, built for the Argentine Republic. She is intended to carry a 26½ tun, 11 inch Armstrong 600-pounder gun, and is after the Arrow and Bonetta type, now being constructed for the British navy by the same firm. She is of the following dimensions: Length, 105 feet; beam, 30 feet; and depth, 10 feet 6 inches, having a draft of water of about 7 feet 6 inches when loaded, with an intended speed of about nine knots per hour. There are two pairs of inverted compound twin screw engines, each driving a separate screw under the quarter. They are expected to give out, when at full working, an indicated power of about 400 horses. She is also fitted with a steam steering apparatus, enabling the gunner to point the gun by means of the rudder, without the necessity for separate means of training. The rudder is unusually large. A small temporary forecastle is to be fitted forward to enable the vessel to proceed with more comfort and safety to her destination, the River Plata.

The gun platform is movable, as in the British gunboats, and lifts and lowers by means of screws worked by a small engine for that purpose; the same engine is used to work a pair of hydraulic pumps, which will supply power to load and ram the gun.



NEW GUNBOAT THE BERMEJO.

Compass Variations on Iron Ships.

It is now believed that some of the sudden and hitherto unaccountable changes in the deviation of the compasses of iron ships—which are often unsuspected until alleged as the only conceivable cause of the vessels running ashore—are the effects of an unequal and varying distribution of heat over the iron hull. Sudden slight changes of compass deviation, not exceeding five degrees, have been noticed on board iron ships on our American coast, and these are now attributed to changes in the hull, occasioned by the vessel's passing from warm to cold water, and the reverse. The warm temperature of the Gulf Stream, taken in connection with the cold counter current, may account for many of the suspected compass errors on iron ships, and the devising of a remedy for this would be an excellent subject for study on the part of an enterprising inventor.

DRIVING PORTABLE TOOLS.

We illustrate herewith a mode of working portable tools for drilling, boring, sawing, polishing, etc., designed and patented by Mr. John Paterson Smith, of Glasgow, Scotland. As the arrangement will, says *Engineering*, probably at once remind our readers of hair-brushing by machinery, as the plans really consist in adaptations of the mode of driving a rotary brush, used by the hair-cutting fraternity, to the varied requirements of the workshop.

Fig. 1 of our engraving is a perspective view, showing one method of operating with a portable tool. In this figure, *e* i s an overhead shaft, driven from the prime mover by the belt, *f*, and pulley, *g*. The shaft, *e*, is carried on bearings, *h h*, and has planed on it a groove or key way, *i*, running its whole length. The pulley, *j*, is bored out for the shaft, and fitted with a key or feather to suit the key bed just mentioned, and it is, moreover, so mounted as to be easily moved or shifted along the shaft to any portion between the bearings, *h h*; this pulley, *j*, has formed in its periphery a V groove to receive the elastic or other endless band, *k*, which conveys the motion to the grooved pulley, *c*, of the portable tool. Z represents the work to be operated upon, held in the vise, *m*, attached to the workman's bench, *n*. The hands, *o*, of the operator grasp the handles on the movable tool, and guide and direct it when in operation, as shown.

Fig. 2 is a longitudinal vertical section of a tool suitable for drilling, boring, widening, or other purposes, similar to the modification delineated in Fig. 1. In Fig. 2, *a* is the center spindle, having one end formed as a socket to receive the drill or other tool, *b*, and on this spindle, *a*, is fixed the V grooved pulley, *c*, for receiving the driving band or power transmitter. Two tubular or loose handles, *d d*, are also mounted on the spindle, so that the latter rotates within them.

Fig. 3 is a side elevation, and Fig. 4 a sectional elevation of means for fixing drilling, boring, or other cutters in holders, when tools are arranged to be operated as portable hand tools. In these figures, *a* is the cutter holder, having one end formed to enter the socket of the portable tool spindle, while the other end is taper or cone-shaped, with a slit, *b*, to receive the small steel cutter, *d*, and the bridge of the taper thimble, *c*. The taper thimble, *c*, is bored out to fit the cone, and has a bridge at the wide end to pass up the slit. The steel cutter bears on this bridge; and the harder the cutter is pressed on the work, the more firmly the taper thimble compresses the slit cone and causes the slit cone to grip the cutter.

Fig. 5 is a sectional elevation of a bevel gear tool suitable for operating in a horizontal, vertical, or angular direction. In this view, *a* is the central spindle, having one end formed as a socket to receive the tool, *b*. The V-grooved pulley, *c*, runs loose on a stud handle, *d*, fixed in the frame, *e*, which latter is also bored out to receive the central spindle, *a*, and back center screw, *h*. The grooved pulley, *c*, has fixed on it a bevel tooth pinion, *f*, which gears into and actuates the wheel, *g*, on the center spindle, *a*. The adjusting screw, *h*, is fixed into framing, *e*, by cotter, *i*, and the box screw back center nut, *j*, is arranged in the usual way.

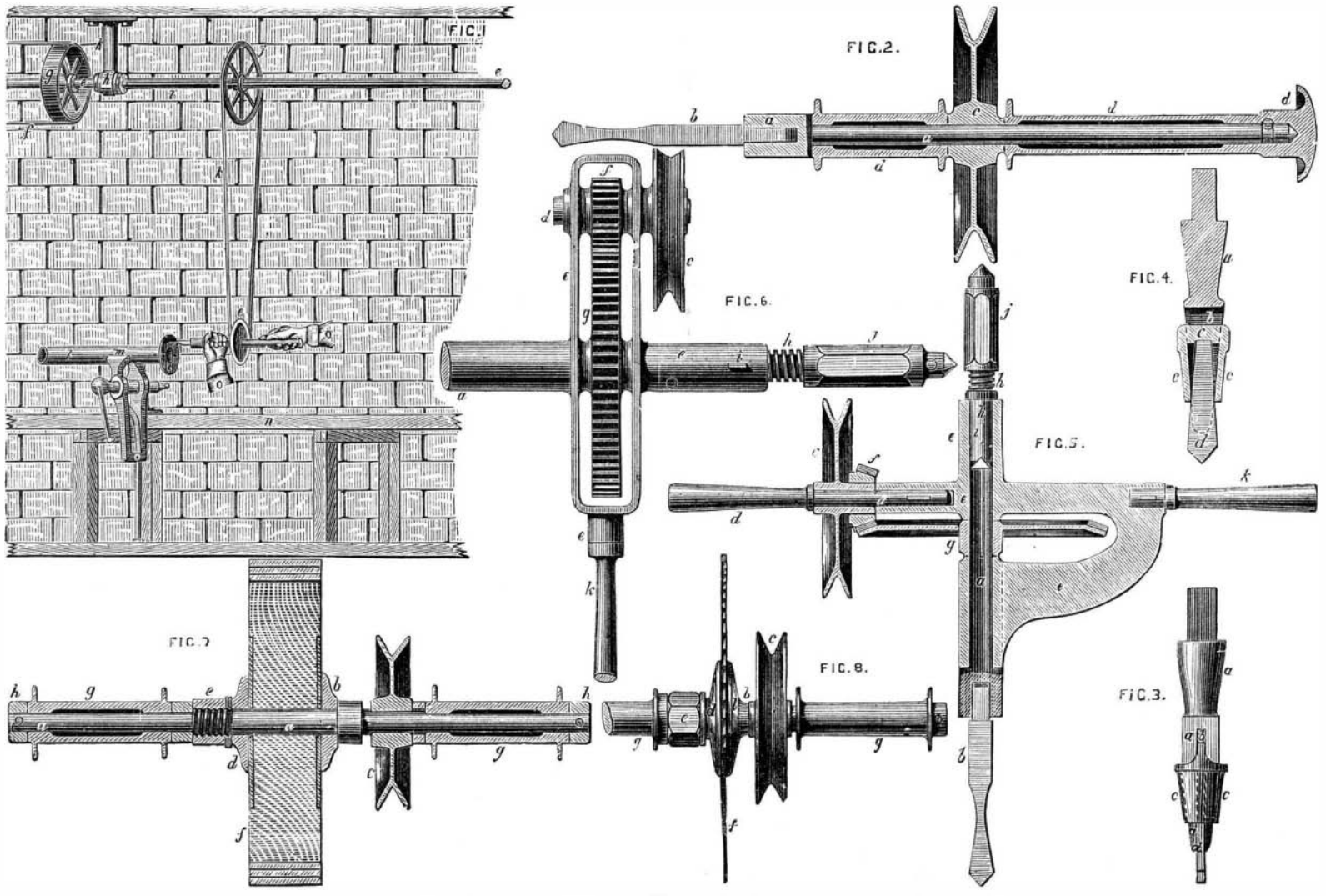
Fig. 6 is a plan of a single spur-geared boring, drilling, widening, or other tool, specially useful where the work to be done is of a heavier class than is suitable for the modification represented in Fig. 2. In this case, *a* is a central spindle having one end formed as a socket to receive the cutter, *b*. The V-grooved pulley, *c*, is fixed on a counter spindle, *d*, running in bearings in the frame, *e*, which is also bored out to receive the center spindle, *a*, and back center screw, *h*. The counter spindle, *d*, has keyed on it a tooth pinion, *f*, which gears into a wheel, *g*, fixed on the center spindle, *a*. The adjusting screw, *k*, is fixed into the frame, *e*, by the cotter, *i*, and the box screw back center nut, *j*, is of an ordinary kind; *k* is a handle fixed in the revolving frame, *e*, by means of which the driving pulley, *c*, and spur pinion, *f*, are carried round the periphery of the spur wheel, *g*, thus giving means for tightening up the driving band.

Fig. 7 is a section of a grinding or polishing tool, arranged to be worked in the same way as the drills already described. In this figure, *a* is the center spindle, on which are fixed the disk or collar, *b*, and V-grooved pulley, *c*. The disk, *d*, is free to slide longitudinally on the spindle, *a*, and to adjust closer to disk, *b*, by screwing up the nut, *e*. The cylindrical grinder or polisher, *f*, is held between the two collars, *b* and *d*. On the spindle, *a*, two loose guiding handles, *g g*, are mounted, so that the spindle rotates within them; the collars, *h h*, keep the handles in position on the spindle.

Fig. 8 is a front elevation of a sawing or cutting tool, also driven in the same way. Here *a* is the center spindle, on which the tubular bush, *b*, with enlarged collar, *b'*, for fixing saw, freely revolves. The V-grooved pulley, *c*, is keyed on the tubular bush, *b*. The collar or disk, *d*, is free to slide on the tubular bush, *b*, and the saw or cutter, *f*, is held between the collars, *b'* and *d*, by screwing up the nut, *e*. The guiding handles, *g g*, may either be fixed to or free to rotate on the spindle, *a*.

We need merely add that there is a variety of light work for which tools so driven might be advantageously employed.

A POUND of copperas dissolved in a pailful of soft soap, and, when thinned with water, applied to onions, is good to keep off the maggot and to promote the growth of the onions.



SMITH'S MODE OF DRIVING PORTABLE DRILLING TOOLS, ETC.