or other similar substance G, arranged and constructed substantially as herein specified, the same to be applied as buckets and valves for pumps."

(To be Continued.)

For the Journal of the Franklin Institute.

Harrison and Highfield's Adjustable Circular Saw for Cutting Grooves.

By H. HOWSON.

Although the present mode of cutting grooves in wood for building purposes, by means of revolving cutters of the same width as the desired groove, is most rapid as well as generally efficient in practice, it is nevertheless objectionable in many respects. The tendency of such cutters to become quickly dull, their liability to break, as well as the expense necessarily involved in preparing and fitting them up with due exactitude, are all evils which detract from the merits they undoubtedly possess.

The arrangement of circular saw and spindle adapted for cutting grooves, as represented in the annexed engraving, exhibits no little ingenuity on the part of the inventors and patentees, Messrs. Harrison and Highfield, of this city, and possesses as well the important qualities of simplicity, cheapness, and efficiency.

A is the spindle, of which *a a* are the journals, and *b* the pulley for receiving the driving strap. *c*, is a collar forged to, and turned perfectly true with the spindle. To a short distance beyond the collar, the spindle is continued plain, and the remaining portion *f*, is screwed for receiving the nut *d*. Against the collar *c*, rests the beveled

washer *E*, fitting easily on the plain portion of the spindle beyond the collar. *F*, is a second and similar beveled washer, having an orifice somewhat larger than the spindle; against the face of this second washer rests the circular saw *G*, outside which is a third washer *H*, having a concave recess for receiving the convex end of the nut *D*.

When the thinnest portion of the edge of the beveled washer *E*, is placed so as to coincide with the thickest portion of the edge of the washer *F*, the face of the saw will be at right angles to the spindle *A*; but when the relative positions of the two washers are changed, the saw becomes more or less oblique, with the spindle, the amount of obliquity being regulated by the turning of the washers; and consequently, the width of the groove cut into the wood submitted to its action may be regulated at pleasure.

On the edge of one of the washers is cut a dial, and on the edge of the other a notch acting as the pointer; the several marks on the dial indicating that when moved so as to coincide with the pointer, the saw will be at such an angle with the spindle, as to cut a groove of a stated width.

Hull designed by George Steers, Esq., and built at U. S. Navy Yard, Brooklyn. Machinery by Pease & Murphy, New York.

Extreme length from taffrail to figure head,	345 feet.
Length on deck, from fore part of stem to after part of stern post above the spar deck,	337 "
Breadth of beam at midship section, (molded)	53 " 8 inches.
" " " " (extreme)	55 "
Depth of hold,	23 "
" " to spar deck,	31 " 3 "
Length of engine and boiler space,	100 "
Draft of water at load line,	23 "
" " below pressure and revolutions,	23 "
Tonnage,	4750.
Area of immersed midship section at above draft,	911 sq. feet.
Contents of bunkers in tons of coal,	1000.
Ratio of length to breadth on load line,	5979.
Height of port sill above load line,	14 feet 10 "
Distance of dead flat abaft middle of length on load line,	7 " 3 "
Centre of buoyancy	8 " 7½ "
" of gravity of displacement below load line,	8 "
Molded displacement at 23 feet draft,	5110 tons.
Total,	5440 "
Area of load water line,	12,755 sq. feet.
Meta centre above load line,	5 feet 6 inches.
Moment of stability, ($S \bar{y}^3 d \alpha$),	2415560.
Weight of hull,	2750 tons.
" " iron bolts in hull,	400,000 lbs.
" " galvanized iron and spikes,	130,000 "
" " copper bolts,	25,000 "
" " composition bolts,	16,000 "
" " Diagonal iron braces,	189,000 "
Armament, 12 eleven-inch pivot-guns,	
probable weight of each,	2,700 "

Diameter of cylinders,	three of	72 inches.
Length of stroke,	.	3 feet.
Pressure of steam in pounds,	20.	
Cut-off at	$\frac{3}{8}$.	
Revolutions per minute,	40.	
Weight of engines, extras, tools, &c., <i>in tons</i> ,	315.	

Length of boilers,	11 feet. 6 inches.
Breadth "	21 "
Height " exclusive of steam chimney,	15 " 6 "
" " inclusive " "	18 "
Weight of " without water, <i>in tons</i> ,	285.
Number of furnaces,	6 in each.
Breadth of "	2 " 10 $\frac{1}{2}$ "
Length of grate bars,	7 " 4 "
Number of tubes in each boiler,	2040.
Internal diameter of tubes,	1 $\frac{3}{4}$ "
Length of tubes,	3 " 3 "
Heating surface, (fire and flues,)	17,500 sq. feet.
Diameter of smoke pipes, (two,)	7 feet.
Height,	60 "
Description of coal,	Bituminous.
Combustion,	Natural draft.

PROPELLER.

Diameter of screw,	.	.	.	18 feet 3 inches.
Length of blades,	.	.	.	4 " 8 "
Number	.	.	two.	
Pitch of screw,	.	.	.	29 " 6 "

Remarks.—Frame of live oak. Floors, *molded* 20½ ins., and 8 ins. at heads; *sided* 15 ins. Distance of frames apart *at centres*, 40 ins., and filled in solid to a line six feet above base line with live oak.

Weights.	Spar, rigging and sails,	225 tons.	
"	Armament,	257 "	
"	Stores,	326 "	C. H. H.

For the Journal of the Franklin Institute.

Particulars of the Steamer Persia.

Hull and Machinery built by Robert Napier & Sons, Glasgow. Intended service, New York to Liverpool.

HULL.—

Length on deck,	.	.	.	376 feet.	
“ load line,	.	.	.	360 “	
Breadth of beam at midship section,	.	.	.	45 “	3 inches.
Depth of hold,	.	.	.	22 “	
“ “ to spar deck,	.	.	.	30 “	
Length of engine and boiler space,	.	.	115 by	45 “	
Draft of water at load line,	.	.	.	23 “	6 “
“ “ below pressure and revolutions,	.	.	.	18 “	
Tonnage, English, engine-room, 1221,	}	3500.			
“ “ deck cabin, 200,					
“ “ hold, 2079,					
Contents of bunkers in tons of coal,				1400.	
Masts and rig—barque.					
Weight of vessel,	.	.	.	5400 tons.	
“ hull (launching draft),	.	.	.	2200 “	

ENGINES.—Side Lever.

Diameter of cylinders,	.	.	.	100 inches.
Length of stroke,	.	.	.	10 feet.
Maximum pressure of steam in pounds,	21.			
" revolutions per minute,	18.			

BOILERS.—Eight—Horizontal Tubular.

Number of furnaces,	.	40.	
Description of coal,	.	Bituminous.	
Combustion,	.	Natural draft.	
Consumption of coal per hour,	.	4½ tons.	

PADDLE WHEELS.

Diameter,	.	.	.	40 feet.
Length of blades,	.	.	.	10 " 8 inches.
Depth,	.	.	.	36 "
Number,	.	.	38.	

Remarks.—Frame of wrought iron plates $\frac{1}{8}$ to $\frac{1}{4}$ ths thick. Floors (I) molded 10. Sided $\frac{9}{16}$ and $6\frac{1}{2}$. Distance of frames apart *at centres*, 18 to 20 inches. Has six water-tight bulkheads. The frames do not rest upon the keel, consequently, the only connexion between the keel and frames, is that of the garboard strakes.

Has accommodations for 200 passengers; and carries 1200 tons freight.

The above dimensions differ essentially from any yet published. They are believed to be correct.

C. H. H.