(No Model.) 3 Sheets—Sheet 1.

# G. A. FORD.

## METAL TACKLE BLOCK.

No. 368,144. Patented Aug. 9, 1887.

Fig. 1.

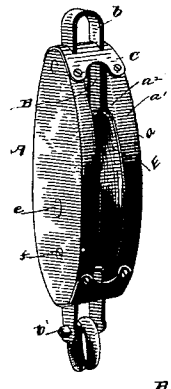
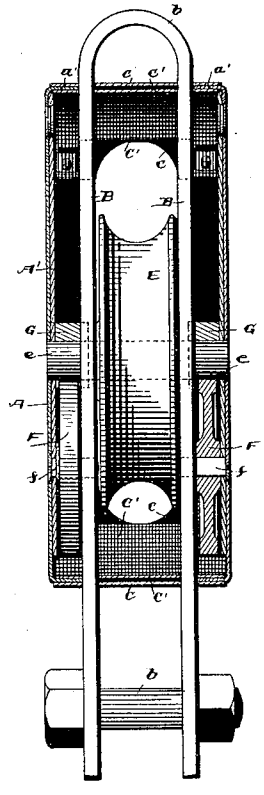


Fig. 2.



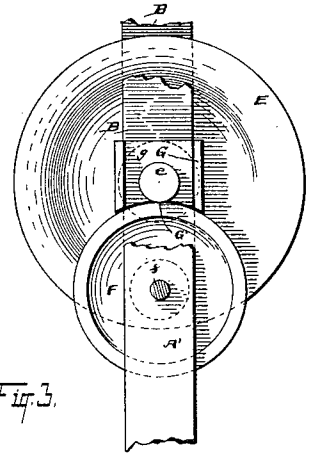


Fig. 3.

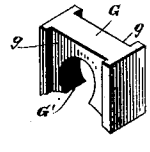


Fig. 4

WITNESSES

N. S. Amstutz

Geo. W. King

Geo. A. Ford INVENTOR

By Leggett & Leggett Attorneys

N. PETERS, Photo-Lithographer, Washington, D. C.

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# G. A. FORD.

## METAL TACKLE BLOCK.

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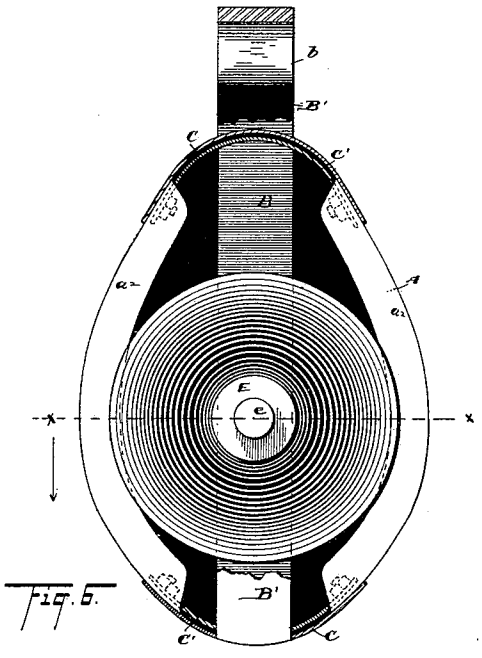


Fig. 6.

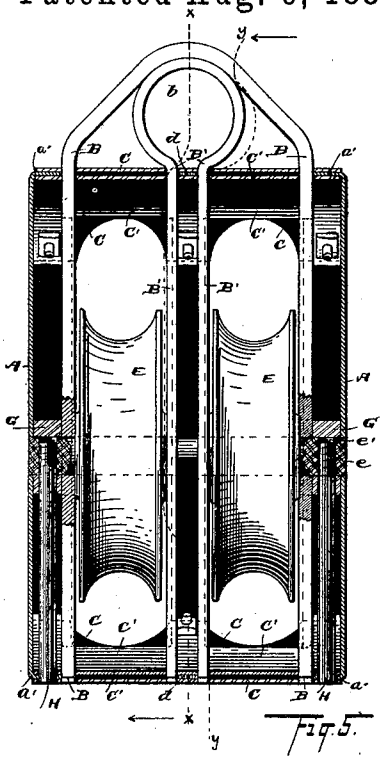


Fig. 5.

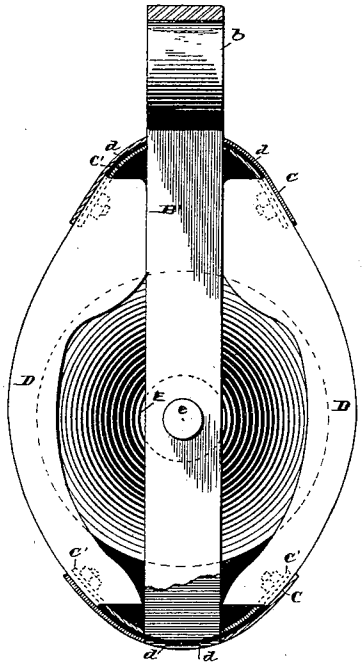


Fig. 7.

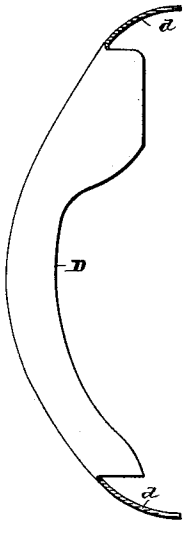


Fig. 8.

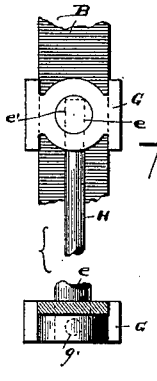


Fig. 9.

WITNESSES

N. S. Amstutz

Geo. W. King

Geo A Ford INVENTOR

By Iggett & Iggett Attorneys

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 3 Sheets—Sheet 3.

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## METAL TACKLE BLOCK.

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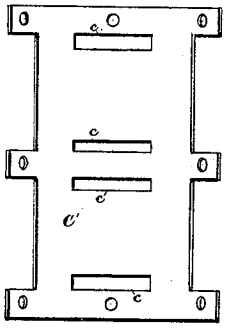


Fig. 10.

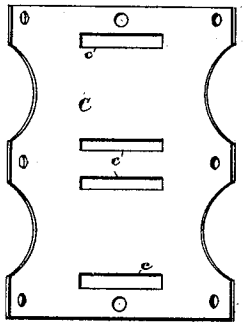


Fig. 11.

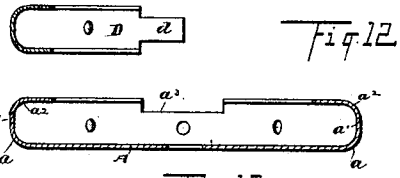


Fig. 12.

Fig. 13.

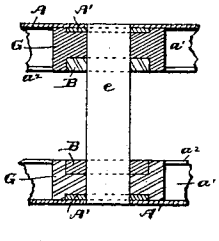


Fig. 14.

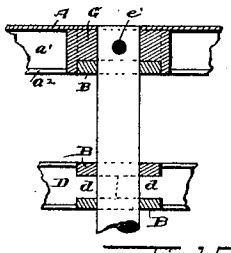


Fig. 15.

WITNESSES

N. S. Armstrong

Geo. W. King

Geo. A. Ford INVENTOR

By Leggett & Leggett

Attorneys

N. PETERS. Photo-Lithographer. Washington, D. C.

# UNITED STATES PATENT OFFICE.

GEORGE A. FORD, OF CLEVELAND, OHIO.

## METAL TACKLE-BLOCK.

SPECIFICATION forming part of Letters Patent No. 368,144, dated August 9, 1887.

Application filed February 4, 1887. Serial No. 226,530. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE A. FORD, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Metal Tackle-Blocks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in metal tackle-blocks; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

Heretofore in the construction of metal tackle-blocks cheek-pieces made of flat plates of wrought metal have been employed; but the thin edges thereof, that would cut or bruise any wood-work that they might come in contact with and would fray and injure the tackle-rope, rendered them so objectionable that they have generally been abandoned. Besides, it was found that a flat plate of wrought metal, unless made much thicker than was required for tensile strength, was not stiff enough to hold the parts of the tackle-block rigidly, and with thick plates the reduction in weight as compared with cheek-pieces of cast metal was not enough to compensate for the objectionable features aforesaid. Cast-iron cheek-pieces have been used in great numbers, but when made sufficiently strong to stand the rough usage they are likely to be subjected to they are heavy and cumbersome. As lightness is a desirable quality in a tackle-block, more recently malleable cast-iron has been employed for the purpose, by means of which a great reduction in weight has been effected. Malleable cast-iron, however, on account of its liability to oxidize, is not well adapted to marine or other uses, where the tackle-blocks are exposed to the weather. In view of the difficulties aforesaid I have devised and found means of making the cheek-pieces, center pieces, and end pieces—in fact the entire casing of the tackle-block—from thin sheets of wrought metal, preferably steel, the exposed edges being flanged and rounded to give strength to the parts and to avoid the objectionable features before mentioned, the result being a tackle-block of ample strength and minimum weight.

In the accompanying drawings, Figure 1 is a view in perspective of a single tackle-block embodying my invention. Fig. 2 is an enlarged elevation in transverse section through the center of the same. Fig. 3 is a side elevation of the internal mechanism, draft-straps, sheaves, &c., parts being broken away to show the construction. Fig. 4 is an enlarged view in perspective of a blocking that is mounted on the sheave-axle between the draft-strap and cheek-piece. Fig. 5 is an elevation in transverse section through the center of a double or two-sheave block. Fig. 6 is an elevation in section on the line $y\ y$, Fig. 5. Fig. 7 is an elevation in section on the line $x\ x$, Fig. 5. Fig. 8 is an elevation showing one of the center pieces of the casing detached. Fig. 9 is a detail of the blocking securing the sheave-axle. Figs. 10 and 11 show plan and end elevation, respectively, of the inner and outer end plates of the casing. Figs. 12 and 13 show, respectively, sections of the center piece and cheek-piece on line $x'\ x'$, Fig. 6. Figs. 14 and 15 are sections in detail, showing the manner of supporting and securing the sheave-axle and blocking the cheek-piece as against pressure or blows from the outside.

A represents the cheek-pieces, which are made from blanks of thin sheet metal, preferably steel. These blanks are first heated and pressed into a die to flange a rim around the edge thereof, the rim extending substantially at right angles to the body of the blank, except that the corners are rounded a trifle, as shown more clearly at $a$, Fig. 13. The blanks are next placed in a shallow die that fits the outside thereof, and a former is laid inside the blank, and a portion, $a^2$, of the rim is flanged or folded over the former by means of laterally-moving platens operating simultaneously from opposite directions, but leaving the portion $a'$ of the rim intact. The former is of course made in pieces, so that it can be removed after the edges of the rim have been turned inward, as aforesaid. The inwardly-projecting portion $a^2$ overlaps the sides of the sheave, but does not extend along the end portions of the cheek-piece for want of metal in the blank. (Shown more clearly in Fig. 6.) The notches $a^3$ are made in the blank. When the upturned rim is made by the first flanging operation, these notches are left on the edge of

the rim in position to receive the draft-strap B. The two flanging operations mentioned substantially complete the cheek-pieces, except drilling or punching a few holes. The steel plates from which these cheek-pieces are made need not, for tackle-blocks of ordinary size, be more than a sixteenth-inch in thickness, and consequently the weight of the same is quite insignificant—in fact, is usually less than the weight of the hook—while with cast-iron cheek-pieces the weight of the latter is usually more than the balance of the tackle-block. These steel cheek-pieces when flanged as aforesaid, are brought to substantially the same form as the malleable-iron cheek-pieces shown and described in United States Letters Patent No. 350,238, of October 5, 1886, but are much lighter than it is practicable to cast them. The steel from which these cheek-pieces are made can be bought in the market at a small advance over the price of cast-iron, and as they are quickly and cheaply made when suitable dies and tools have been provided, owing to their extreme lightness, they can be provided at a less initial cost than either the ordinary cast-iron or the malleable cast-iron cheek-pieces. The cheek-pieces are secured by thin wrought-plates C and C′, preferably of steel and made in pairs, with holes *c* punched for the passage of the draft strap or straps, as the case may be, according as the tackle-block has one or more sheaves. The plates are then pressed in a die and made to fit, respectively, outside and inside the rim *a′*, at the end portions of the cheek-pieces. The ends of the inside plates, C′, abut the bodies of the respective cheek-pieces, while the outer plates, C, are made to fit nicely outside and come flush with the outside of the cheek-pieces. The plates C and C′ of course overlap the rim *a′*, to which they are bolted or riveted through and through. These plates, as shown in Figs. 10 and 11, are for blocks with two sheaves, the inner pair of rectangular holes *c* being for the inner draft-strap, B′. By means of these plates the parts are secured in the most substantial manner without materially increasing the weight of the block, and the plates C′ give a good finish to the work. If the tackle-block has two sheaves, center pieces, D, are employed, the same being made of thin sheets of wrought metal, preferably steel, pressed into the form shown more clearly in Figs. 8 and 12, with tongues *d*, that pass between the plates C and C′, to which latter they are bolted or riveted through and through. The plates C and C′ may be of any desired length, according as the tackle-block has one or more sheaves, and according to the thickness of the sheave, the latter being determined by the size of rope that is required. If the sheaves E are to revolve on the pin or axle *e*, the sheaves are preferably of the variety shown in United States Letters Patent No. 323,136, granted July 28, 1885.

In case anti-friction rollers F are employed, the sheave, in case of a single block, and the one sheave in case of a double block, is made fast to the axle *e*, usually by means of a driving fit. Thin straps A′ are respectively riveted to the inside of the cheek-pieces to re-enforce the latter where the axle *e* and pins *f* pass, the latter passing also through the draft-strap B, and having the rollers F journaled thereon.

Blocks G are bored to fit the axle *e*, and are placed between the draft-strap B and the adjacent cheek-piece, thus forming a support for the latter as against blows or pressure from the outside. These blocks G are also utilized for other purposes. These blocks are notched at *g*, and made to embrace, respectively, the straps A′ and B, (see Fig. 4,) and are cut away at G′ to allow the roller F to come in contact with the axle *e*. (See Fig. 4.) The blocks G slide easily on the straps A′ and B, and consequently the draft on the sheave presses the axle *e* against the rollers F, causing the latter to sustain the entire draft, while the blocks G hold the axle laterally, so that no wear is had on the straps and cheek-pieces. In case rollers F are employed, the blocks G are preferably of suitable bronze or other anti-friction metal. Otherwise these blocks may be of cast-iron, and need not be cut away at G′. When the anti-friction rollers F are not used, the sheaves are of course journaled on the axle *e*, the latter remaining stationary, and some means must be employed for holding the axle endwise, and here again the blocks G are utilized. Corresponding holes, G′ and *e′*, are made in the block G and in the axle *e*, such holes being preferably screw-threaded to receive the threaded end of a small rod, H. The latter may extend through suitable holes made in the plates C and C′, coming flush with the outside of the plate C, or they may be cut a trifle shorter, so as to end just inside the plate C′. In either case the rod is accessible from the outside, and has a slot in the outer end to be engaged by a screw-driver in assembling or disconnecting the parts. These rods might be made in the form of pins or keys; but they would be more liable to lose out and could not so well be removed. With such construction, the axle *e* being rigidly secured between the draft-strap and the cheek-piece, the axle may be made flush with the outside of the cheek-piece, and as no wear would come on the latter nor any lateral strain on the axle, the re-enforcing-strip A′ might be dispensed with. I find that the better practice is to retain the strip A′ on the larger-sized tackle-blocks; but for smaller blocks I omit this strip, except as in cases aforesaid, where the anti-friction rollers are used.

In Figs. 5 and 15 the strip A′ is omitted. The loop *b* of the draft strap or straps receives the hook, (not shown,) and in one of the tackle-blocks the draft-strap extends through the block, and the ends thereof are connected by a pin or bolt, *b′*, that secures a becket, to which one end of the tackle-rope is fastened. (See Figs. 1 and 2.) The same cheek-pieces

may be used for a single or double block, and any thickness of sheave, according to the size of the rope used, may be had simply by making the plates C and C′ longer or shorter. For very small tackle-blocks the inside plate, C′, is usually omitted, the outer plate being sufficient to hold the parts. A cheek-piece might be made in halves and the abutting edges riveted to the re-enforcing strip A′; but such construction is not recommended. It is believed that the introduction of steel plates flanged and shaped in the manner herein described is a new departure in the art and one of great commercial value.

As an instance of the comparative lightness of my improved tackle-block, I will state that a double block made to carry a three and three-eighths inch rope, and such as I am placing on the market for heavy work, weighs but eleven and three-quarters pounds, including extra heavy hook and draft-straps, and of this the entire casing of the tackle-block, including cheek-pieces, center pieces, and the four end plates, weighs only two pounds and seven ounces. By comparing these figures with the weight of tackle-blocks of ordinary construction a more definite idea can be had of my improvement in this direction. Of course with tackle-blocks for light work these figures could be greatly reduced.

What I claim is—

1. The combination, with cheek-pieces constructed from wrought metal having inwardly-projecting flanges thereon and a sheave mounted therein, of metal end plates having holes for the passage of the draft straps or strap, said end plates being made to extend from one cheek-piece to the other and made to fit the rims of the cheek-pieces, to which latter they are attached, substantially as set forth.

2. The combination, with cheek-pieces of wrought metal and a sheave mounted therein, substantially as described, of end plates for connecting the cheek-pieces, said end plates being of wrought metal, in pairs, and arranged, respectively, inside and outside the flanges of the cheek-pieces, said end plates having holes formed therein for the passage of the draft-strap, substantially as set forth.

3. The combination, with cheek-pieces, end plates securing the latter together, and a draft-strap extending through slots in the end plates, of a sheave, a sheave-axle mounted in the strap and cheek-pieces, and a blocking mounted on the sheave-axle between the draft-strap and cheek-pieces, substantially as set forth.

4. The combination, with cheek-pieces, end plates, draft-strap, sheave-axle and sheave mounted thereon, and blocking mounted on the axle, substantially as indicated, of a securing-bolt for fastening the axle and blocks together as against end movement of the axle, substantially as set forth.

5. In a tackle-block, a suitable bolting device made to engage the sheave-axle and located between the cheek-piece and draft-strap to hold the axle endwise, substantially as set forth.

6. The combination, with cheek-pieces, re-enforcing strips, draft-strap, sheave-axle, and sheave, substantially as indicated, of a blocking mounted on the axle between the draft-strap and the re-enforcing-strip and made to embrace each and slide thereon, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 24th day of December, 1886.

GEORGE A. FORD.

Witnesses:

CHAS. H. DORER,

ALBERT E. LYNCH.