Jan. 12, 1932. H. W. BUTTERWORTH, JR 1,840,486

CLOTH CLAMP

Filed April 11, 1930

FIG. 2

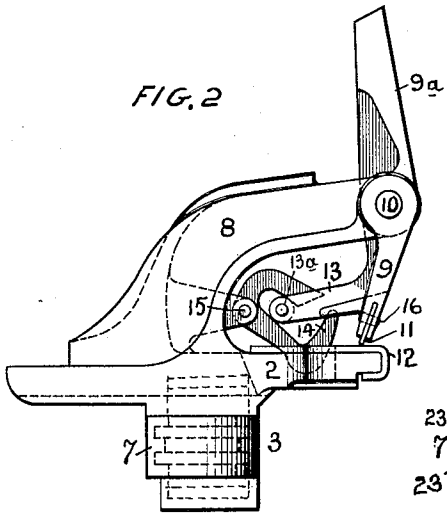


FIG. 1

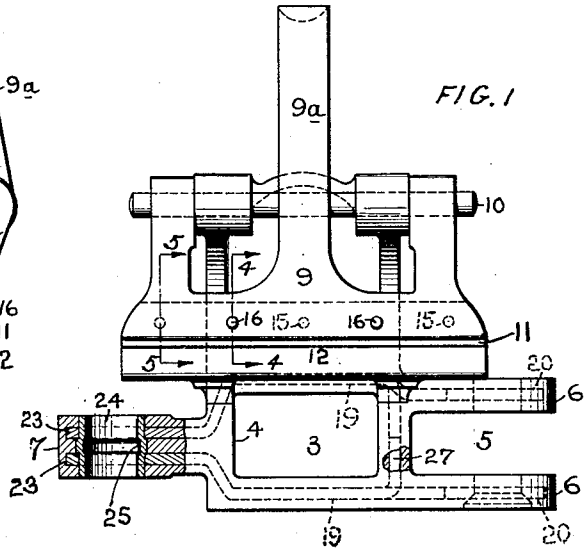


FIG. 4

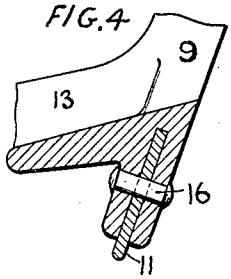
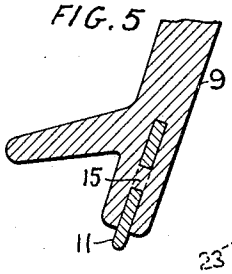


FIG. 5



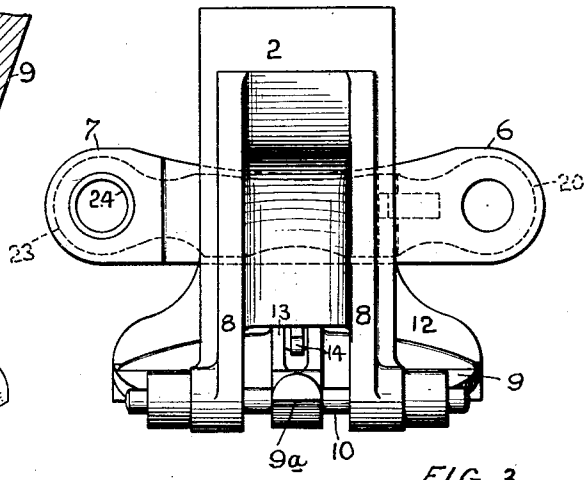


FIG. 3

FIG. 6

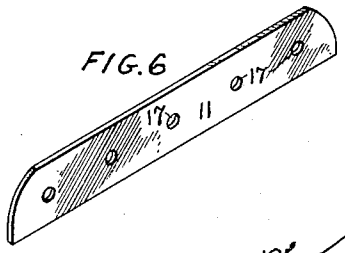
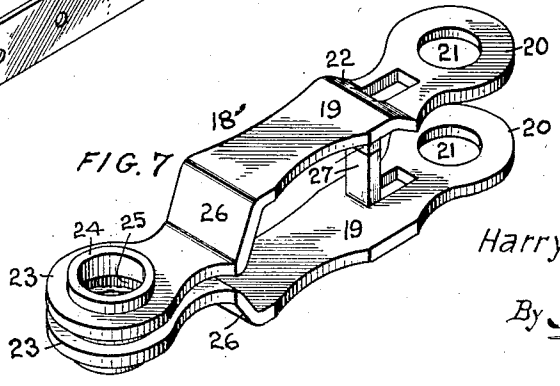


FIG. 7



Inventor.
Harry W. Butterworth Jr.
By
Attorney.

Patented Jan. 12, 1932 1,840,486

UNITED STATES PATENT OFFICE

HARRY W. BUTTERWORTH, JR., OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO H. W. BUTTERWORTH AND SONS COMPANY, A CORPORATION OF PENNSYLVANIA

CLOTH CLAMP

Application filed April 11, 1930. Serial No. 443,259.

Heretofore it has been customary to make cloth clamps for textile machines and more particularly for tentering machines, of malleable iron castings, the same comprising a link structure for connecting the clamps in chain-like arrangement, said link provided with a fixed jaw, a pivoted jaw hinged to a bracket extension above the link and fixed jaw and adapted to cooperate with the fixed jaw to provide a gripping action upon the fabric, and a pivoted link structure controlled by the fabric to be gripped and adapted to regulate the time of the gripping action of said pivoted jaw. The employment of malleable iron has been resorted to because of its tough nature and its proof against readily cracking under strain. Experience however, has shown that the use of malleable iron castings is undesirable because they are apt to be sufficiently ductile to become unintentionally bent or distorted in use to an extent sufficient to impair the gripping function between the pivoted and the fixed jaws, and moreover, the link structure itself was liable to breakage on account of the unbalanced strains produced in the process of imparting the malleable quality to the castings and by the sprocket wheels in driving the heavy chains of cloth clamps when loaded with fabric, particularly when a reciprocating action of the chain structures is employed. Furthermore, malleable castings are considerably weakened when the outer "skin" is removed by machining, drilling and other operations, and by reason of which the danger of distortion and rupture is considerably increased. Moreover, in the case of the fixed jaw, it has been necessary to provide a bronze or equivalent non-corrodible covering to the fixed jaw and upon which the fabric is clamped.

Aside from the defects inherent to the use of malleable iron in the making of cloth clamps, the cost of machining the castings is high and in view of the large number of clamps employed in each machine, the cost on this account is quite excessive.

The object of my invention is to eliminate the necessity of using malleable iron castings and also the objectionable cost of machining and the employment of skilled labor essential to that class of work, and in lieu thereof, to construct the working parts of the clamp of die-castings composed of suitable metals molded under pressure in metallic molds, and having sufficient toughness and resistance to distortion whereby the objectionable ductility of malleable iron is avoided; and my invention further consists in making the main link portion of a reinforced die-casting, the same including an interior steel skeleton about which the metal is so shaped that while the steel core or skeleton is shielded from view, it is nevertheless present in imparting the great strength necessary to the link-shaped body of a clamp. By forming the structure of the cloth clamp of reinforced die castings of this nature, the strength is secured with a minimum cost both for metal and finish since machine work upon such castings would be reduced to a very nominal cost.

Furthermore, the cloth clamps of my improved construction may be reproduced in quantity with great accuracy as to shapes, sizes, etc., and hence accuracy in the cooperative functioning of the several parts.

As a further refinement in the reinforcing feature of the present improvements, the unitary link extension is formed with a journal bearing for the pin, said bearing formed of a steel bushing extending through apertures in the steel reinforcing or skeleton portion of the link structure to form a hardened steel journal for the connecting pin between adjacent links.

I also provide the pivoted jaw with a nipping edge formed of a thin plate of stamped steel with holes punched through at intervals along its length, about the upper portion of which plate the metal of the pivoted jaw is die cast and so as to unite the steel plate by cast rivets through certain of the holes in the plate and preferably reinforced by a plurality of additional rivets through the pilot holes of the casting and plate after the same has been removed from the dies.

Because of the fact that the insert plate is of thin sheet steel and properly hardened by tempering, it provides a thin gripping edge which requires no special attention since it will always embody an excellent gripping

capacity and will thereby avoid any attention such as has heretofore been required in the case of gripping jaws where the gripping edge was an integral part of the jaw casting.

My invention also comprehends other details of construction which, together with the features above set forth, are more fully described hereinafter and pointed out in the claims.

Referring to the drawings: Fig. 1 is a side view of a cloth clamp embodying my improvements; Fig. 2 is a front view of the same; Fig. 3 is a plan view of the same; Fig. 4 is a perspective view of the reinforcing skeleton frame employed in the link structure; Fig. 5 is a cross section through the pivoted gripping jaw on line 5—5 of Fig. 2; Fig. 6 is a cross section on line 6—6 of Fig. 2; and Fig. 7 is a perspective view of the gripping insert plate of the pivoted jaw.

The general construction of the cloth clamp as a whole may correspond more or less to clamps as heretofore made and therefore the illustration is to be taken more as an example of the invention rather than as a limitation thereof.

The cloth clamp comprises the table part 2 constituting the fixed jaw and is provided on its under part with a link structure and on its upper part with the overhanging frame or housing 8 to which the pivoted jaw 9 is hinged upon a longitudinal pin 10, said jaw having at its lower part a gripping edge formed of a plate 11 and at its upper portion with an arm 9*a* adapted to be operated by cam devices for oscillating the pivoted jaw. The pivoted jaw 9 is of cast metal preferably of a die casting and moreover is cast about the gripping plate 11 and through one or more holes therein as indicated at 15 in Fig. 5.

In addition to these interlocking parts 15, there is cast in the jaw a plurality of pilot holes formed by pins which sustain and hold the gripping or nipping plate 11 in proper position within the mold, said pilot apertures being cast in alignment with the holes in the plate and occupied by the pins during the die casting operation. Subsequently, when the pins are removed, rivets 16 are extended through the holes in the casting and in the plate and upset or riveted in place, as will be readily understood by reference to Fig. 4. These rivets not only provide additional means of securing the nipping plate in position upon the casting but also clamp the cast portions tightly upon the nipping plate.

The nipping plate is preferably extended throughout the full length of the pivoted jaw and the nipping edge thereof may extend below the casting to insure proper nipping of the fabric upon the fixed jaw. The edge of the steel plate is preferably rounded in cross section and being tempered, will provide a very durable structure.

The pivoted jaw 9 is associated with a pivoted ling structure 14 which is adapted to rest upon the fabric when introduced between the stationary and pivoted jaws and to hold the said jaw upon or out of contact with the fabric until the selvage thereof just releases the link and permits the nipping edge of the jaw to grip the fabric adjacent to its selvage. When in such gripping relation with respect to the fixed jaw, the parts are as illustrated in Fig. 2 of the drawings.

The link 14 is shown as pivoted to the overhanging arms or housing at 15 and is suitably slotted to receive a transverse part 13*a* upon the end of a rearwardly extending arm 13 from the pivoted jaw. By means of this mechanism the fabric supports the pivoted link and the link in turn supports the pivoted jaw above and out of contact with the fabric in the customary manner; and when the fabric is adjusted outwardly and releases the link, the same drops and permits the gripping jaw to descend and nip the fabric. This controlling link structure may be made in any suitable manner and as heretofore employed if so desired.

A bronze or brass plate 12 may be fitted upon the upper surface of the fixed jaw if so desired, to provide a smooth and non-rustable gripping surface irrespective of the particular character of the metal from which the main working parts of the cloth clamp are formed.

Referring now to the link portion of the clamp and the reinforcing means employed therein, the casting provides a rectangular opening 3 with vertical walls 4 and adapted to receive the sprocket teeth of the driving mechanism of the tentering or other machine in which the clamp is employed. Extending longitudinally from one end of the rectangular portion of the link is a single arm 7 whereas at the opposite end of the rectangular portion of the link there is extended two such arms 6, 6 spaced apart to form a slotted opening 5 of a shape which would conveniently receive the projecting portion corresponding to part 7 of the next adjacent cloth clamp. By means of these projecting portions 6 and 7, the cloth clamps are connected or hinged together to constitute a chain of clamps.

In practice, vertical bolts or pins are employed for hinging the parts together but these hinge pins are not shown in the drawings. So far as general shape is given to the link portion of the clamp, there is nothing specially new but the manner of reinforcing the said link portions now to be described, and which constitutes an essential and important part of my invention.

The reinforcing structure is shown in assembled relation in Fig. 7 and its position

within the link portion of the clamp is indicated in dotted lines in Figs. 1, 2 and 3. Referring more particularly to Fig. 7, it will be seen that there are upper and lower plates 19 formed or stamped and shaped steel plates which constitute a skeleton structure 18 adapted to be placed within the die casting mold and about which the cast iron or other metal is cast so that in the finished articles, the rectangular portion of the link structure and the projecting parts 6 and 7 thereof are all reinforced by a steel cone or skeleton structure 18 illustrated in Fig. 7.

Referring further to this structure, the two plates 19 are in all material respects similar but are placed in relatively inverted positions. The plates at one end are angularly bent at 26 to provide the loop or hinged ends 23 arranged relatively close to each other and preferably secured together by a tubular bushing 24 which is expanded at 25 within holes in said plate portions 23, said bushing not only properly aligning the plate parts 23 but also providing a steel bearing for the hinge pin to be subsequently employed in coupling adjacent clamps together in chain-like formation. The expanded portion 25 of the bushing holds the plate portions 23, 23, sufficiently far apart to permit the cast metal to flow between them and whereby they are completely surrounded with such metal, as will be understood with reference to Fig. 1.

The opposite end of this skeleton structure has the lower plate 19 expanded into a loop portion 20 whereas the upper plate 19 is provided with a slight angular portion 22 and then extended into a loop portion 20 positioned directly above the corresponding loop portion 20 of the lower plate and said loop portions of the two plates are provided with apertures 21 ultimately forming bearings for the hinge pins employed in coupling the adjacent links in chain-like formation.

To enable the upper and lower plates to be properly spaced apart, I stamped from the metal thereof two lugs 27, one from each of the plates, and bent these lugs into alignment so that one abuts upon the other as will be readily understood from Figs. 1 and 7.

The skeleton structure shown in Fig. 7 may be made of steel of fine character and great strength and when placed in the die casting mold, said plate portions will be suspended or held in position by suitable studs extending through the bushing 24 and the holes 21. When this skeleton frame is so positioned within the mold, the cast iron or other metal to form the body of the casting is forced into the mold and completely surrounds the skeleton frame with the exception of the interior of the bushing 24 and the inner faces of the two holes 21. The position of this core within the casting is shown in Figs. 1, 2 and 3 by dotted lines.

It will now be understood that the reinforced casting will provide far greater strength than would exist from a casting made without the skeleton core and, because of the presence of the reinforced steel core, the metal may be cast either by die casting methods or otherwise and without the necessity of employing malleable iron as heretofore has been customary. By thus eliminating the use of malleable iron, losses from distorted castings and excessive labor for machine work are overcome and moreover, I am enabled to produce a more perfect cloth clamp with all the required strength at a lower cost than has heretofore been possible.

Furthermore, I am enabled to employ die casting methods thereby producing an accurate and finished product at a minimum cost due to the fact that light castings thus produced are strongly reinforced by my improved construction.

It will now be apparent that I have devised a novel and useful construction which embodies the features of advantage enumerated as desirable, and while I have in the present instance shown and described the preferred embodiment thereof which has been found in practice to give satisfactory and reliable results, it is to be understood that I do not restrict myself to the details as the same are susceptible of modification in various particulars, without departing from the spirit or scope of the invention.

I claim:

1. A cloth clamp for textile machinery comprising a fixed jaw, and a pivoted jaw hinged to and in gripping relation with the fixed jaw, wherein the fixed jaw and its immediately associated parts are formed of a metallic die casting having within the same reinforcing skeleton frame means of steel whereby the die cast metal is molded to accurate size and is strengthened by means of the steel reinforcing skeleton frame and the latter is enclosed within the cast metal and protected against rust thereby.

2. The invention according to claim 1, wherein further, the fixed jaw is formed integral with a chain link structure provided with two arms at on end and a single arm at the other end and with an aperture intermediate of the arms of the two ends, and the skeleton frame is formed of stamped sheet steel extending lengthwise of the link structure and having portions extended through the link arms and surrounding the intermediate aperture.

3. A cloth clamp for textile machinery comprising a fixed jaw, and a pivoted jaw hinged to and in gripping relation with the fixed jaw, wherein the fixed jaw and its immediately associated parts are formed of a metallic die casting having within the same reinforcing skeleton frame means of steel whereby the die cast metal is molded to accurate size and is strengthened by means of the steel reinforcing skeleton frame enclosed

within the die cast metal and protected against rust thereby, and wherein further, the fixed jaw is formed integral with a chain link structure provided with two arms at one end and a single arm at the other end and with an aperture intermediate of the arms of the two ends, and the skeleton frame is formed with two steel parts respectively arranged within the two arms of one end of the link and the corresponding top and bottom walls of the aperture in the link and also shaped into closer association to form a reinforcing within the single arm end of the link.

4. A cloth clamp for textile machinery comprising a fixed jaw, and a pivoted jaw hinged to and in gripping relation with the fixed jaw, wherein the fixed jaw and its immediately associated parts are formed of a metallic die casting having within the same reinforcing skeleton frame means of steel whereby the die cast metal is molded to accurate size and is strengthened by means of the steel reinforcing skeleton frame enclosed within the die cast metal and protected against rust thereby, and wherein further, the fixed jaw is formed integral with a chain link structure provided with two arms at one end and a single arm at the other end and with an aperture intermediate of the arms of the two ends, and the skeleton frame is formed with two steel parts respectively arranged within the two arms of one end of the link and the corresponding top and bottom walls of the aperture in the link and also shaped into closer association to form a reinforcing within the single arm end of the link, and in which also the two reinforcing steel structures having transverse portions extended toward each of the top and bottom parts as reinforcements for the end portions of the link aperture and intermediate of said aperture and the end arms of the link.

5. The invention according to claim 1, wherein further, the fixed jaw is formed integral with a chain link structure provided with two arms at one end and a single arm at the other end, and the skeleton frame is formed of stamped sheet steel whose length extends lengthwise of the link structure only and having portions embedded within the cast arms, and said arms with the reinforcing steel portions provided with apertures through them whereby said apertures are surrounded with reinforcing annular steel portions.

6. A cloth clamp for textile machinery having a link-shaped portion provided with a central aperture for receiving sprocket teeth and oppositely directed arms in alignment with said aperture, two of such arms extending from one end of the aperture and one such arm extending from the other end of the aperture and in which further the said link-shaped portion is formed of cast metal reinforced by a skeleton structure composed of a ductile metal of relatively greater strength than the cast metal and enclosed within the cast metal of the link-shaped portion only.

In testimony of which invention, I hereunto set my hand.

HARRY W. BUTTERWORTH, JR.