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M. A. FLORIO
ORTHOPEDIC CLAMP

3,469,573

Filed May 4, 1966

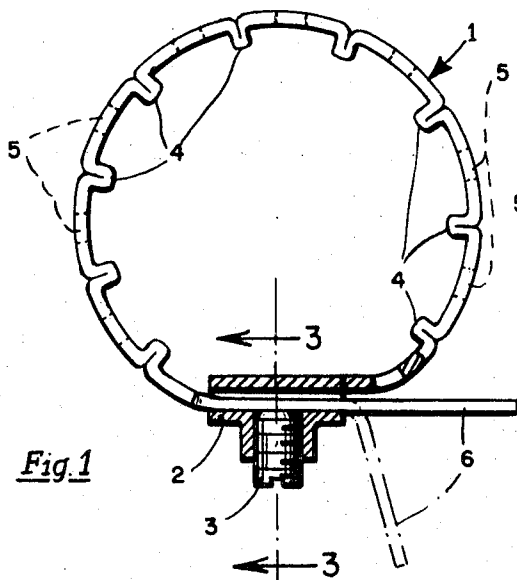


Fig. 1

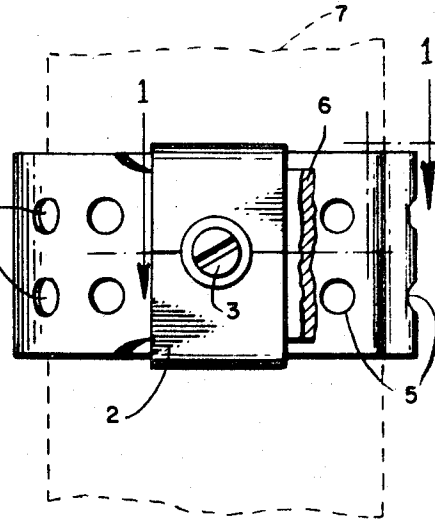


Fig. 2

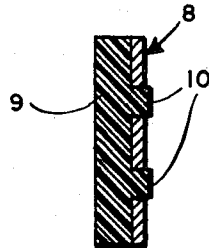


Fig. 6

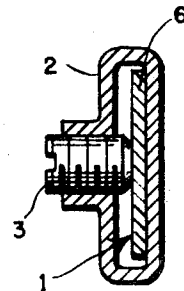


Fig. 3

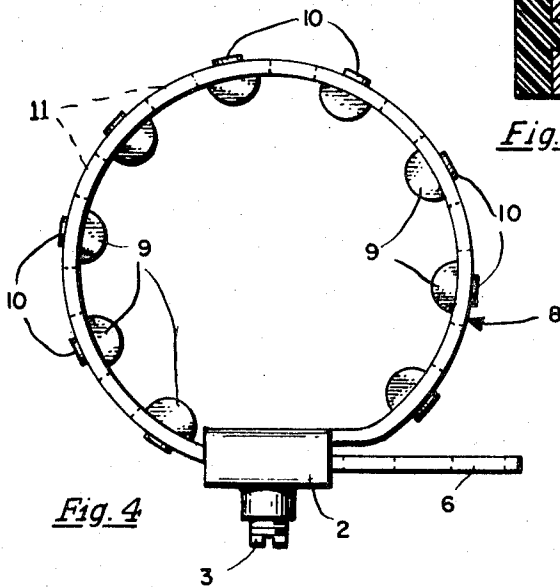


Fig. 4

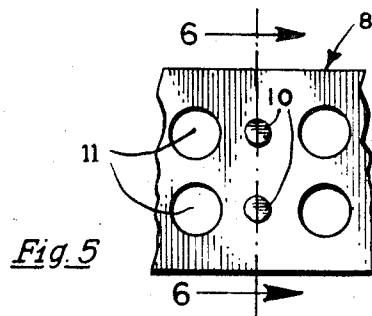


Fig. 5

INVENTOR.

Michael Angelo Florio

BY

Irving Noyes

ATTORNEY

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3,469,573

ORTHOPEDIC CLAMP

Michael A. Florio, 180 E. Delaware,
Chicago, Ill. 60611

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1 Claim

ABSTRACT OF THE DISCLOSURE

A clamping device for use by orthopedic surgeons in connection with the fixation of bone fractures and which serves to not only perform the main function of securing the portions of the fractured bone together during bone growth, but which enables a reduction in the area of pressurized conduct between the clamp and the bone.

My invention relates to orthopedic devices and more particularly to those types of devices which are employed in fixation of certain types of fractures.

One object of my invention is to provide a new orthopedic band which can be easily inserted and securely fastened into final place with the desired tension.

Another object of my invention is to provide a device of the character described which will permit the surgeon to not only clamp the band around the bone to the desired tightness by means of a screw, but which will further enable him to double-lock the device into its final position without any danger of slippage or loosening during the latter operation.

Another important object of my invention is to provide a device of the character described which will enable the bone growth to develop with the continuation of a relatively normal bone metabolism and in a more normal pattern than possible with other devices.

Another important object is to provide an orthopedic clamp having features which will, in comparison to devices in use heretofore, minimize if not completely eliminate the amount of dead bone lying directly under the band. Other objects and advantages of my invention will appear as the specification progresses and with reference to the accompanying drawing which illustrates a preferred form of my invention.

For a better understanding of my invention it should be mentioned that in devices used heretofore for the immobilization and stabilization of bone fractures, flat metal bands or one or more wrappings of wire have been used. It is common knowledge that these older devices frequently had to be removed within several months of their installation or they would produce ring-type sequestrum. This necessary removal requires additional surgery and if the removal is not affected in due time a new fracture may appear in the area of the sequestrum, incurring secondary complications. The intimate contact of either a solid metal band or wire does not permit nourishment to reach the underlying bone. To overcome the objections of the former orthopedic encircling devices it will readily appear from the description to follow that my invention, while stabilizing the fracture, permits nourishment to flow to the bone lying underneath the

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major portion of the device. In addition I have made provision for the growth and development of soft tissue, such as fibrous tissue, blood vessels, etc., to grow in and through the device.

For a better understanding of my invention reference is made to FIGS. 1 and 2 in which a band 1 is disposed circumferentially about a bone structure indicated by broken lines at 7. One or more fractures, not shown, may extend longitudinally or even diagonally of the bone and the purpose of the annular clamp is to enable the surgeon to set the bone fragments back into normal position and to cause the band to act as an annular clamp to retain this position enabling the fractures to heal and the bone growth to continue to develop in a relatively normal manner.

The clamp is made of a straight band of metal which will permit the surgeon to wrap the same around the bone in a circular manner shown. The clamping action must be sufficiently firm to prevent movement between the fractured parts and to this end a locking buckle comprising a clamp member 2 is provided through which the free end 6 of the band 1 is inserted. To secure the desired tension the free end 6 is made sufficiently long to enable grasping same while it is being pulled firmly through the buckle, immediately following which a set screw 3 is tightened firmly to prevent loosening of the clamp. To further secure the clamp into locked position, the free end 6 is bent to extend radially of the annular clamp to the position indicated by the broken lines and following this any excess portion of the thus formed free end may be sheared off and discarded. In order to reduce or prevent the formation of a ring-type sequestrum occasioned by plain curved metal bands or wires in use heretofore for this purpose I have provided the band 1 with a series of inwardly-extending corrugations or ribs 4. This improvement enables a tremendous reduction in the area of pressurized contact between the clamp and the bone, permitting normal development and growth particularly in the areas between the projections 4. My invention embodies a further step in this direction by providing the band with a series of relatively large holes 5.

From the above it will be obvious that I have not only minimized the area of contact between the bone and the band but have also made provision for the growth and development of soft tissue, blood vessels and the like to grow under the major area of the band and also through the same by virtue of the presence of holes 5.

While the above described structure may be made of a desirable material such as stainless steel, in the modification of my invention shown in FIGS. 4, 5 and 6 I have provided a series of inwardly-extending ribs 9 made of a material different from that of a metal band 8. In this arrangement large holes 11 for growth of tissue and the like are provided between the ribs while the ribs themselves are permanently assembled in advance to the band. This is accomplished by providing each rib 9 with a pair of studs 10 made integrally therewith and which studs are pressed into smaller holes disposed between the larger growth holes 11. The ribs 9 may be made of plastic or any material sufficiently strong yet suitable for permanent contact with bone, tissue, body chemicals and the like.

I claim:

1. An orthopedic device comprising an annular metal

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band adapted to be applied as a clamp around a fractured bone, said band being provided with a plurality of inwardly-disposed bone-contacting members made of a plastic material of sufficient strength yet suitable for permanent contact with bone, tissue and body chemicals, said members are each elongated laterally across the width of said band to lie parallel to one another and sufficiently separated from one another circumferentially to provide areas between adjacent members devoid of bone contact to permit the continuation of relatively normal bone metabolism and a series of openings in those portions of said metal band which occur between said bone-contacting members, said openings being of sufficient size to permit the growth of soft tissues there-through.

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RICHARD A. GAUDET, Primary Examiner

15 J. D. YASKO, Assistant Examiner