

COMMISSIONER'S DECISION

OBVIOUSNESS: Swaging Tool

Force producing means using a recirculating ball nut and screw arrangement instead of the prior art hydraulic jack type is not patentable.

Rejection: Affirmed.

This decision deals with a request for review by the Commissioner of Patents of the Examiner's Final Action dated March 31, 1976, on application 152,573 (Class 26-79). The application was filed on September 26, 1972, and is entitled "Coupling Attachment Device." The Patent Appeal Board conducted a Hearing on December 13, 1976, at which Messrs. E. O'Connor and C. Upchurch represented the applicant.

This application relates to a hose coupling apparatus for swaging a fitting to the hose end. Figures 1 and 4 shown below illustrate the invention.

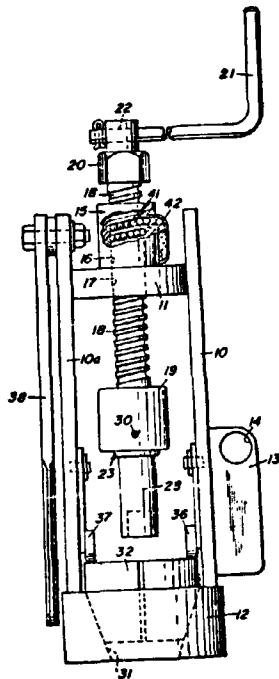


FIG. 1

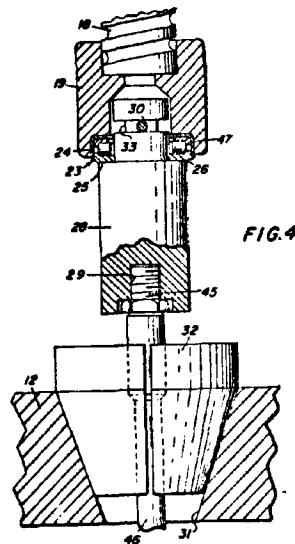


FIG. 4

A split die (32) holds the hose (46) in position for the ram (28) to press the fitting (45) and rigidly attach it to the hose. The swaging pressure is applied by rotating the crank 21 which in turn moves push holder (19) by means of the recirculating ball and screw nut arrangement indicated as 15 and 18.

In the Final Action the examiner rejected the application for lack of invention in view of the following patents:

United States

3,048,212	Aug. 7, 1962	Morrison
3,028,987	Aug. 10, 1962	VanHenke

The Morrison patent covers a hose-coupling apparatus for swaging fitting on hose ends. He uses a split die to hold the hose, and a hand operated hydraulic ram to apply the necessary swaging pressure. Figures 6 and 7 (below) illustrate the Morrison invention.

FIG. 6

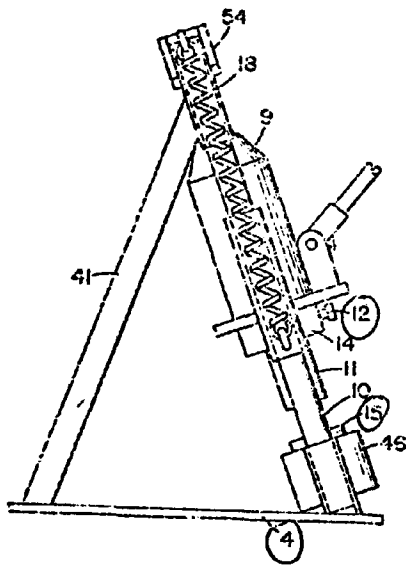
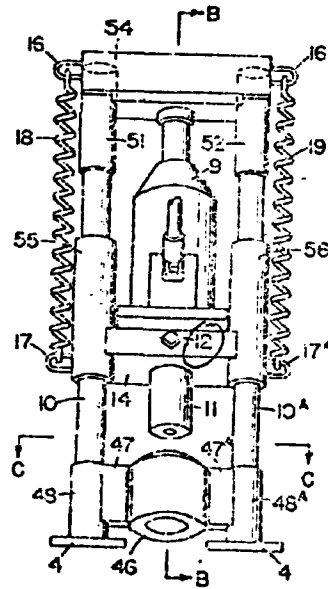
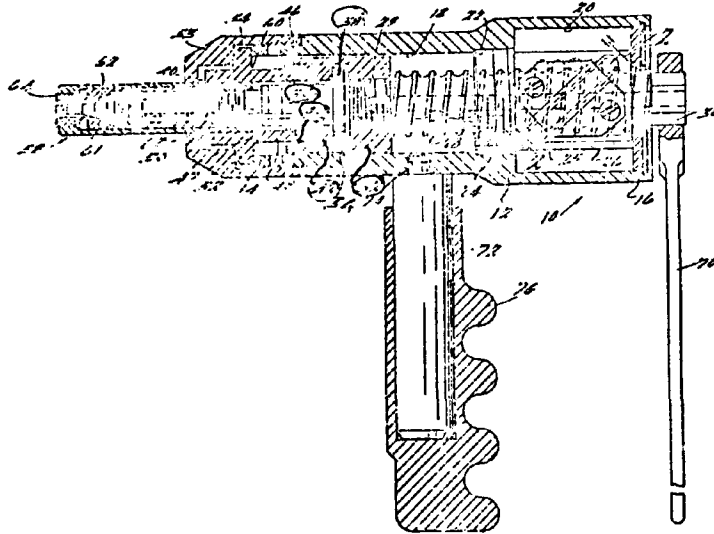


FIG. 7



The hose is held by the split die shown as 15 and the pusher assembly 11 is actuated by the hydraulic ram 9. Retracting springs (18, 19) automatically return the ram to its starting position when the bypass valve 12 is opened.

Van Henke discloses a hand operated tool for installing fasteners of the pin and collar type. Force is applied through a thrust bearing by a recirculating ball type nut and screw arrangement. Figure 1 of Van Henke is shown below.



In the Final Action the examiner stated (in part):

Morrison has disclosed a tool for swaging fittings on a hose comprising a frame, a pusher element, a die base to accommodate a split swaging die and a hydraulic-jack device to force the pusher element and a fitting into the die. In addition, at column 5, line 70, Morrison states that the operation by use of a hydraulic device could be performed by "a screw type operation". Thus, Morrison has disclosed the concept of providing his tool with screw operation. Applicant has chosen a particular kind of screw device in the form of a recirculating-ball cut and applied it to the Morrison disclosure. Ball nuts of this type are old and well known in the art, so too are the advantages of greater efficiency of operation in comparison to other types of screws and nuts. Screws operable through recirculating-ball nuts are well known mechanical equivalents of hydraulic jack-type devices. To substitute a screw and recirculating-ball nut, as defined in claim 1, for an ordinary screw and nut in the Morrison tool is obvious and is to be expected of one skilled in the art. The further provision of a thrust bearing is obvious and well known as a means to reduce the tendency of the rotating screw to turn the element which is to be moved by the screw. The Van Henke patent discloses such a thrust bearing serving this purpose.

Claim 2 defines clamping devices pivoted on the longitudinal bars to hold the swaging die in the die cavity. This is held to be an obvious expedient fully to be expected of one skilled in the art once it is known that the tool may be used in non-upright orientation.

Claim 3 refers to a bracket for securing the apparatus in a stationary position. As disclosed, this is a projection from the frame or from the base which may be screwed to a bench or held in a vise. The same feature is provided by Morrison in the form of a base 4 which "may be welded to a table or bench, or bolted to such..."

The split swaging die of claim 4, as mentioned above, is also illustrated by Morrison.

In his response to the Final Action the applicant stated (in part):

The applicants were faced with the problem of making a swaging apparatus adapted to be operated by hand without support on a bench or the like. There was a need in the marketplace for a hand swaging device which could be carried into the field and used to swage a fitting member on the end of the hose in the field without a supporting member. The jack-type apparatus disclosed by Morrison was too heavy to be used for this purpose and a similar apparatus provided with an ordinary screw type mechanism does not exert sufficient pressure to secure a fitting member on the end of a hydraulic hose which is to be used at high pressures. Hence, the applicants were faced with the problem of devising a swaging apparatus which would fasten a fitting member on the end of a hydraulic hose so securely that it would not separate from the hose while operating at high pressures and that also was a small light weight device so that it could be conveniently carried from place to place and operated by hand without requiring a bench or other supporting structure. The applicants solved this problem by providing the swaging apparatus of their claims.

...

A jack-type apparatus of the type disclosed by Morrison cannot be made at a weight which adapts it to be carried about from place to place and used as a hand tool on the job in securing a fitting member to the end of a hydraulic hose. There is no disclosure or suggestion in Morrison of any structure which would make it possible to provide a swaging device that could be made of such a weight that it could be used as a hand tool. The suggestion that an ordinary inoperable screw could be used does not suggest an operable ball nut and ball screw assembly. Moreover, the ball nut and ball screw alone will not be operable. It must be combined with a thrust bearing. Morrison does not disclose or suggest the use of a thrust bearing in the holder for the pusher element. Hence, the Morrison patent neither discloses nor suggests the structure of Claim 1. The rejection is based largely on the conclusion that one skilled in the art should know to use a ball nut and ball screw assembly and to use a thrust bearing. However, none of the references cited in rejecting the claims supports this conclusion because they do not suggest the combination of a ball nut and ball screw assembly in combination with a thrust bearing in a swaging apparatus.

The Van Hecke patent discloses a thrust bearing but this thrust bearing is not used with a ball nut and ball screw assembly in the manner it is used on the applicant's device. The Van Hecke tool is adapted for applying fasteners. The apparatus produces a pulling effect and is not adapted for pushing a fitting member and hose end assembly into a die for swaging the fitting to the end of the hose. One faced with the problem of swaging a fitting on the end of a hose could not be expected to learn anything from reading the Van Hecke patent that would be applicable to the swaging device.

The question to be determined by the Board is whether or not the applicant has made a patentable advance in the art.

Claim 1 of the application reads:

An apparatus for securing a fitting to a hose which comprises a ball screw and ball nut assembly, a swaging die having a die cavity adjacent one end of the screw with the cavity aligned with the screw, means for supporting said ball nut and said die against relative longitudinal movement and against rotation with the screw comprising laterally spaced longitudinally extending bars, a cross bar spanning and rigidly secured to the ball nut and to the spaced bars, a die base longitudinally spaced from the cross bar and spanning said spaced bars and rigidly secured thereto, means in the die base to support the swaging die, means carried by said end of the screw for pressing a fitting and hose assembly in said die cavity comprising a holder element secured to the said screw end for rotation therewith and having a cavity therein, a pusher element having one end in the cavity of the holder element and an opposite end adapted to support a fitting and hose assembly as it is moved towards the die cavity, means for transferring energy from the screw to the pusher element without rotation of the pusher element with the screw comprising a thrust bearing in the cavity of the holder element and about the said pusher, and means for turning the screw in the nut.

The use of a hand-operated swaging arrangement for coupling a hose end and fitting is shown in Morrison. This patent utilizes a split die to retain the hose end as well as a pusher assembly to apply the necessary force to attach the fitting firmly to the hose. A hand operated hydraulic ram is used to generate the required force. Morrison also has a pair of springs to automatically retract the hydraulic ram to its starting position when the bypass valve is opened after the completion of the swaging operation.

The present applicant uses a recirculating ball nut and screw arrangement to apply the necessary swaging force. In order to use this arrangement the applicant requires a thrust bearing so that none of the rotational thrust force of the of the advancing screw will be transmitted to the pusher (28). The applicant acknowledges that ball screw and nut assemblies are known, and also that the thrust bearing is readily available. Page 8 of the applicant's disclosure reads at line 1 ff.

Suitable ball screw and ball nut assemblies are available commercially. Any suitable one of these may be used. One of the type disclosed in U.S. Patent 2,836,075 or a similar assembly may be used, if desired.

Any suitable thrust bearing may be used. One which has been used to advantage is a Type TTSP, Number T-77 Tinken Bearing.

We note that Morrison suggests the use of a screw type pressure ram stated in column 5 line 70 ff:

It should be noted, however, that although a hydraulic ram or jack-type device is used to apply this pressure, it would be also adaptable to a screw type operation in which the pusher assembly is screwed down on a variable pitch ratio to provide enough force to swedge this ferrule through these die halves, so that I do not mean to limit the apparatus to the use with only a hydraulic ram, but have merely used that for purposes of illustration only.

At the Hearing Mr. O'Connor acknowledged that Morrison indicated the use of a screwthread, but argued there were problems in its use that had to be overcome. For example the applicant had to provide a leverage arm which is used to counteract the rotational turning force when the device is not anchored in a vice. However we do not find that the use of the known screw and ball nut arrangement required any inventive ingenuity. The applicant admits that the ball nut and screw are well known, as is the thrust bearing. This is clearly shown in the Van Henke citation used by the examiner. Similarly the use of a leverage arm to counteract the rotational force would be readily envisioned by a person skilled in the art.

By selecting a ball nut screw force-producing means the applicant required a thrust bearing. This choice of force means requires an arrangement to counteract the turning force applied to the ball nut, hence the applicant uses a pivoted leverage arm. There are other arrangements that can be selected to move the swaging pusher ram with the necessary force, i.e. a scissors-type jack as the force actuating member would also fulfil the necessary force requirement without a thrust bearing, a leverage arm or a pair of return springs.

Another argument advanced by the applicant is that his device is small, light and readily portable. As a result, he points out that his swaging unit can be used in the field, something which Morrison was unable to accomplish because his device must be mounted on a bench. But Morrison also recognized the advantages of use in the field when he said in column 2 line 23 ff.

Another object of this invention is to provide apparatus suitable for the repair of broken hose assemblies in the field without any additional equipment other than the simple device described herein.

Consequently, we fail to see anything new or unexpected in the applicant's device when we compare it to Morrison's invention.

In support of his arguments about obviousness, Mr. O'Connor cited excerpts from Commissioner's Decisions and related jurisprudence. To them we add:

The art of combining two or more parts into a new combination whether they be new or old, or partly new and partly old, so as to obtain a new result, or a known result in a better, cheaper, or more expeditious manner, is valid subject matter if there is sufficient evidence of thought, design, ingenuity in the invention, and novelty in the combination. (See Merco Nordstrom Valve Co. v. Comer (1942) Ex. C.R. 138 at 155). (emphasis added)

It is also settled law that the matter of obviousness is to be judged by reference to the "state of the art" in the light of all that was previously known to persons versed in the art (See Almanna Svenska Elektriska A/B v. Burntisland Shipbuilding Co. Ltd. (1952), 69 R.P.C. 63 at 69). While the applicants claims may relate to a novel structure, there must in addition be ingenuity in the invention (Vide Micro Nordstrom Valve Co. v Comer, Supra).

Pertinent to any determination on the question of ingenuity is the rationale of the Supreme Court in Crossley Radio v Canadian General Electric (1936) 551 at 559, where a test of obviousness was put forward from Lord Chelmsford in Penn v Liby (1866) L.R. 2 Ch. App. 127,

... the design does not appear to me to be so much out of the track of the former use as not naturally to suggest itself to a person turning his mind to the subject.

Or, from the same case, using the words of Lord Shaw in London General Omnibus Company v Bonnard (1920) 38 R.P.C. 1 at 15,

... the design might have well occurred to an intelligent person without any exercise of that invention (degree of ingenuity) which is necessary as the grant of a patent.

In our own view the structure recited in the claims comes within the interdiction expressed by Maclean J. in Niagara Wire Weaving v. Johnson Wire Works Ltd. (1939) Ex. C.R. at 273:

Small variations from, or slight modifications of, the current standards of construction, in an old art, rarely are indicative of invention; they are usually obvious improvements resulting from experience and the changing requirements of users.

And at page 276:

No step is disclosed there which could be described as invention. There is not, in my opinion, that distinction between what was known before, and that disclosed by Lindsay, that called for that degree of ingenuity requisite to support a patent. If those patents could be supported it would seriously impede all improvements in the practical application of common knowledge.

The applicant emphasized the commercial success of his device. We must remember, however, that commercial success by itself, without the solution of a problem in an inventive manner, is not sufficient to establish subject matter (See The King v Uhlemann Optical Company (1949) 10 Fox Pat. C.).

Reviewing claim 1 we find that it emphasizes the ball screw and nut assembly. In view of the above considerations we are not persuaded that claim 1 is directed to a patentable advance in the art over the Morrison patent, and the knowledge expected of artisans in this field. No new result has been achieved in the patent sense, nor a result which can be considered to have flowed from an inventive step.

Claims 2 to 5 which depend directly on claim 1 add the die, clamping means and supporting means. These features do not add anything of patentable significance over the subject matter of refused claim 1.

We have reached the conclusion that the claims, and the application as a whole, are not directed to a patentable advance in the art. We therefore recommend that the Final Action be affirmed.



G. Asher  
Chairman  
Patent Appeal Board, Canada



Having reviewed the prosecution and the recommendations of the Patent Appeal Board, it is my decision that the claims and the application are to be refused. If any appeal is taken under Section 44, it must be commenced within six months.



J.H.A. Gariépy  
Commissioner of Patents

Dated at Hull, Quebec

this 1st day of February, 1977

Agent for Applicant

Scott & Ayles  
170 Laurier Ave. West  
Ottawa, Ontario  
K1P 5V5