COMMISSIONER'S DECISION

UNOBVIOUSNESS (on Reissue): Prior art Concerned with a Different Problem.

The invention is for dies for short metal screws which overcome the problem of blank misalignment at the start of the rolling operation. The prior art was not concerned with the special problems connected with short screw manufacture and did not disclose special modifications, e.g. ratio of type to length, adapted for that purpose.

FINAL ACTION: Reversed.

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This decision deals with a request for review by the Commissioner of Patents of the Examiner's Final Action dated August 20, 1973, on application 123,589 (Class 10-4). The application was filed on September 24, 1971, in the name of Roger W. Orlomoski and is entitled "Thread Rolling Die With Stabilizing Portion." The Patent Appeal Board conducted a Hearing on February 26, 1975, at which Mr. G.W. Hodson represented the applicant.

This application relates to thread rolling dies capable of producing screws from blanks. They are particularly adapted to making very short screws.

In the prosecution terminated by the Final Action the examiner refused the application for lack of invention over the following patent:

Japanese patent publication number 18,217, dated 1963

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

> The rejection of claims 1 through 3 as obvious and therefore lacking patentable subject mat er in view of the cited Japanese patent is maintained. It is held that the thread rolling die disclosed in the said patent is substantially the same as the die defined in the claims of this application. The differences that do exist between the die as defined in the claims and the die disclosed in the cited patent are dimensional in nature. Such dimensional differences are held to be within the scope of a person skilled in the art. It is to be noted that the dimensions were added to the disclosure only in the

reissue application and included in the claims. This again shows that such dimensional differences are merely inferable for a person skilled in the art and therefore not inventive. Furthermore, it is not acceptable to measure drawings to arrive at dimensional interrelationships. The die set forth in the Japanese patent must be seen as a preferred embodiment open to various dimensional adaptations.

Applicant in the above letter and previous submissions has argued that the Japanese patent shows no threads below the heel line at the beginning of the die as shown in figure 4 of the said patent. It is conceded that there is an accidental showing, of threads in figure 5, section A-A'. The accidental showing, however, are those threads below the lowermost limit of threads. The threads shown between the heel line and the lowermost limit in section A-A' of figure 5 are proper. This is held to be sufficiently clear from figure 4 where threads are shown between the heel line and the lowermost limit of the threads. Section A-A' of figure 6 shows the screw threaded all the way and this is correct. The missing thread line(s) at section A-A' of figure 4 is seen as a draftsman's omission. There is no valid reason for supposing that there are no threads between the heel line and the lowermost limit of threads at section A-A' of the die as seen in figure 4. Each of figures 4, 5 and 6 show that there are threads below the heel line in advance of the escapement portion 9 which corresponds to applicant's diagonal edge 4.

There may be some inconsistency between the drawings as to the number and extent of the threads, but the fact that the threads extend below the heel line and in advance of the escapement portion 9 is clear from each of the above figures.

Furthermore, in the disclosure, part 2, it is stated "in the front end of the die plate, the shaft's (parallel portion) entire thread is rolled". In part 7, it is stated "from the start of this process at cross-section A-A' as shown in figure 4, shallow thread-channels are press rolled into the parallel portion of the screw shaft." The statement in the claims that the vertical grooved surface A is substantially wider at that area in advance of the diagonal edge 4 is therefore completely met by the Japanese patent.

In the above letter, applicant has argued that the thread rolling die disclosed in the Japanese patent is incapable of making short screws of the kind disclosed in this application. Such a view is held to place too restrictive an interpretation on the die disclosed in said patent. It is not difficult to see the die adapted to the forming of short screws. All that is necessary would be to reduce the number of threads above the heel line. It is held to be obvious to a person skilled in the art that the number of threads above the heel line (as well as below) is a matter of choice and recognized as a known variable to produce different length screws.

In his responses dated Jan. 17, 1971 and Feb. 5, 1974 the applicant stated (in part):

> The Examiner has said that it would be obvious to a person skilled in the art to reduce the number of threads above the heel line to give the required number of threads in the short screw. Applicant agrees, of course, that the number of threads above the heel line always represents the number of threads in the body of the screw above the point. But, the prior art has no recognition of Applicant's step forward of adding sufficient threads below the heel line so that the total number of threads above and below the heel line at the starting end of the die will produce stabilized rotation of the blank which would not be possible through the sole use of the threads above the heel line.
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> In further support of Applicant's position, the Examiner is requested to consider the following: Applicant has never intended to claim all dies which have a few threads below the heel line at the starting end of the die. On the contrary, the claims are directed to those dies designed to make very short screws. It is in the short screw field only that Applicant's invention is of significance because this is the area in which initial stabilization of the blank as it starts to roll between the dies has heretofore been virtually impossible.
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> In the case of screws of other lengths, that is, anything longer than short screws, extra threads below the heel line are unnecessary because the number of threads above the heel line are adequate to insure starting rotational stability.
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> The Japanese patent already referred to above teaches nothing about the problem of lack of stability in rolling short screws. In fact, it teaches nothing about the stability problem in any length of screw. It is concerned only with dies of the self-pointing type with means for cutting off the slug, all of which has been conventional practice for many years as evidenced by the Mau et al U.S. Patent No. 3,176,491.
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> Applicant's original Canadian Patent No. 843,654, was directed specifically to dies for the rolling of short screws. In the previous practice of rolling short screws the very few thread grooves above the heel line at the starting end of the die made it difficult, if not impossible, to obtain initial rolling stability. By the unobvious expedient of adding sufficient thread grooves below the heel line at the starting end of the die, rotational stability of the blank was obtained.

The invention is directed to a pair of die blocks which are movable relative to each other in a rolling machine for rolling threads on self-tapping screws. A headed cylindrical blank placed between the die blocks is formed into a screw by the grooved configurations on the working

faces of the blocks. At the starting end of each die the configuration includes thread-forming grooves above and below the heel line of the screw. As the slug moves along the die the configuration changes to include a tapering arrangement for forming the screw point, and a reverse sloping contour portion to remove excess blank material below the screw tip.

The Japanese patent shows a set of die blocks for forming self-tapping screws. A headed cylindrical blank placed between the blocks is formed into a screw by the thread forming grooves on the die blocks. The configurations include a screw tip-forming contour, and an escapement portion for removal of the excess blank material below the screw tip.

The application before us is one to reissue a patent. The petition for reissue specifies that the discovery of the Japanese patent is the reason for filing the new application

The question to be decided is whether the applicant has made a patentable advance over the cited patent.

There was considerable discussion at the hearing about whether the patent shows thread-cutting grooves below the heel line of the die, in advance of the escapement portion. The heel line of a screw may be defined as the point at which the screw body begins to taper to a tip. In the patent (drawings attached) the distance 1 in figure 4 represents the heel line or point of screw taper. In line A-A^1 of figure 4 the lower portion is shown to be flat, however the cross-sectional view of line A-A^1 in figure 5 indicates a full die width of thread cutting grooves. This inconsistency is further shown by viewing line B-B^1 at figure 4, and the cross section view in figure 5. These both indicate that there is no thread cutting groove near the bottom edge of the die. In viewing figure 6, section A-A^1, we find that the blank is threaded throughout

the entire length, and when scaling the drawing the blank length is found to be equal to the die thread length of figure 4 at A-A[1].

According to the patent the art prior to it required a blank having a sharpened end, and one of the major drawbacks was the splitting or pitting of the finished screw tip. By using an escapement arrangement the patent obtains accurate length screws with "precision thread crests and sharp nose points" from cylindrical blanks. The disclosure stated that "the possibility of mass production of self tapping screws is 1.5-2 times greater than by methods used heretofore."

The patent solved the problem of mutilation of the tip of the screw when there is simultaneous formation of point and threads. Since the objective of the patent was to form "accurate length screws," we conclude that the drawings are accurate in showing the distinctive features of the invention related to overcoming that particular problem.

The applicant emphasized that his device makes "relatively short screws" in which the tip (portion below the heel line) is equal to "1/3 of the length of the screw." A major problem encountered in prior attempts to produce such short screws was the lack of initial stability of the cylindrical blank when placed between the dies. Because they are so short they roll about, and get out of alignment. This resulted in a high number of rejects. Applicant contends that he has solved the instability problem for "short screw" production by using thread cutting grooves below the heel line at the starting end of the die. As a result these grooves "hold" the very short cylindrical blanks in the required position upon initial motion of the die. Further movement of the die relative to each other allows the die grooves or configurations to taper the blank end, remove the excess material adjacent the tip, and cut the threads so as to produce the final product.

The applicant also stressed that the patent was concerned only with the production of "longer" screws in which initial blank stability is of no concern. Upon looking at the proportions of the die shown in figure 4 of the patent, we would agree.

Figure 4 of the patent does show the finishing ends of a few grooves below the heel line in advance of the escapement portion. It may be argued that there was a drafting error, and it was intended that the full area was to be shown as grooved. However, since the patent was not concerned with stability (because of the length of cylindrical blank used) we conclude that the omission of grooves at this location occurred because they were not important to the intended operation of that device, and thus unnecessary.

An affidavit from a Mr. W.P. Carpenter has been submitted by the applicant. This affidavit was not available at the date of the hearing, so the examiner did not have an opportunity to evaluate its contents. Mr. Carpenter is the plant Manager for the American Screw Company located at Wytheville, Virginia, and has been employed by the company for thirty years. In his affidavit Mr. Carpenter stated (inter alia):

(a) That to his knowledge, thread-rolling dies for rolling the threads on screws of various sizes other than very short screws have been made for at least thirty (30) years.

(b) Prior to April, 1968, it was generally accepted common knowledge in the thread-rolling art that commercially acceptable short screws could not be economically made by the thread-rolling method because they rolled in an unstable manner.

(c) About 1968-69, the American Screw Company bought some dies from Reed Rolled Thread Die Co., known as the SCOS Die, designed to roll very short screws. They tried these dies and found them capable of producing short screws superior to any short screws they had previously made. They examined the SCOS dies and found that the reason they produced superior short screws was because of the addition of extra thread-rolling grooves at the leading end of the die below the heel line which grooves plus the few grooves above the heel line enabled the blank to commence rolling in a stabilized condition. Previous dies designed to roll short screws did not include the thread grooves below the heel line and, as

a result, stabilized rotation of the blank at the start of rolling was very uncertain. In his opinion the SCOS die of Reed Rolled Thread Die Company was a major step forward in the production of very short screws.

(d) In so far as he was aware, prior to April, 1968, there were no dies made to roll very short screws which included sufficient extra thread grooves below the heel line to insure initial stabilized rolling of the screw blank.

In the Final Action the examiner stated that a person skilled in the art could reduce the number of threads above the heel line in the patent to result in a "die adapted to the formation of short screws," just as the applicant has done. However, since the patent was concerned with other difficulties, modifications would doubtless be required in the thread area below (in advance of the escapement portion) as well as above the heel line to arrive at the applicants result. If this had been an obvious step to persons skilled in this art, we believe this method for manufacturing short screws would have been adopted at a much earlier date.

The state of the law on obviousness is well established. In Jack Sets Ltd. v Carlton (1963) Ex. C.R. 377 at 393 Cattanach J. stated:

> It has been frequently pointed out that what may seem obvious when you see the result, may not have been at all obvious at the beginning and it has always been held to be a good reason for rejecting a plea of obviousness that others failed to reach the solution discovered and set forth in a patent and adopted some other and different method.
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> It is well settled in patent law that a mere scintilla of inventiveness is sufficient to sustain a patent....
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> The mere simplicity of the device is not proof that it was obvious and that inventive ingenuity was not required to produce it.

Further in Steel Company of Canada Ltd. v Sivaco Wire 1973 11 C.P.R. (2d)153, at 195 Gibson J. after a review of cases relating to obviousness stated:

> Looking at the matter generally and in perspective, it is important while recalling that wire drawing in itself is an ancient art, to make the relevent quaere in this case of the type often made in the cases, namely, if the inventions of 711,590 and 695,015 were obvious at the material times, why were they not made sooner.

Claim 1 of this application reads:

> A thread rolling die of the type described for forming short screws comprising a vertical grooved surface A for forming screw threads on the body of a blank, a sloping grooved surface C intersecting said vertical grooved surface A along a heel line 3 for pointing and forming screw threads on the point, a bumper surface D intersecting and extending downwardly from said sloping grooved surface C, a reversely sloping slug forming surface E joining said sloping grooved surface C along a diagonal edge 4 which commences at said vertical grooved surface A and terminates near said bumper surface D, said vertical grooved surface A being substantially wider at that area thereof in advance of said diagonal edge 4, said die having the following dimensional characteristics:
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> (a) the vertical distance P from the extension of the heel line 3 to the bottom G of the vertical grooved surface A at the starting end of said die being not less than one-third of the vertical dimension J of the grooved surface A at the starting end of said die.
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> (b) the vertical distance L from the top B of the die to the line of intersection 26 of said bumper surface D and said sloping grooved surface C being not greater than four times the horizontal distance S from the vertical plane O defining the location of the roots of the grooves of said die to the line of intersection 26 of said bumper surface D and said sloping grooved surface C.

This claim distinguishes from the citation by the limitations set out in a and b. The Board is satisfied that there is present in the specific limitations claimed some degree of ingenuity which was the result of thought and experiment. (See Crosley Radio Corporation v Canadian General Electric Company 1956 S.C.R. 551 at 556). Claim 1, and also claims 2 and 3 which contain similar limitations, are allowable.

Proposed claims 4 to 7 which were submitted in response to the Final Action rely on the feature of "grooves below the heel line" at the starting end of the die. Since these claims do not include a

"short screw" limitation (as found in claims 1 to 3) we do not consider them as a patentable advance in the art. Consequently it is the opinion of the Board that the pages containing proposed claims 4 to 7 not be inserted.

The Board therefore recommends that the decision of the examiner to refuse claims 1 to 3 be withdrawn and that the pages containing proposed claims 4 to 7 not be entered.

Gordon A. Asher,
Chairman,
Patent Appeal Board.

I concur with the findings of the Patent Appeal Board. Accordingly the Final Rejection of claims 1 to 3 is withdrawn, and the application returned to the examiner. Since proposed claims 4, 5, 6 and 7 have not been entered, were only tendered for consideration as a possible replacement for the claims now found allowable, and in any event have been found objectionable by the Patent Appeal Board, the application should proceed on the basis of the existing claims 1, 2 and 3.

Decision Accordingly,

A.M. Laidlaw,
Commissioner of Patents.

Dated at Hull, Quebec
this 9th day of
April, 1975.

Agent for Applicant

Fetherstonhaugh & Co.,
Toronto, Ontario.