

The founder of Holland Mechanics, mr. G.M.N. van Doornik.

## From the editor

Any questions about issues in this magazine? Please send these to the HM Today editing team: - Anecdotes on wheelbuilding in broadest context -historical, incidental, or in any sense instructive will be rewarded when published in this magazine. Send your contributions to: P.O. Box 373, 1440 AJ Purmerend, The Netherlands Fax: 31-299430674 E-mail: [Holland\\_Mechanics@compuserve.com](mailto:Holland_Mechanics@compuserve.com)

## 25 YEARS OF DEDICATION TO WHEELBUILDING

# Holland Mechanics' Silver Jubilee

Holland Mechanics' 50-man and woman-strong team last year memorized the fact that the company had been successful for 25 years in developing, building and selling wheelbuilding equipment to the bicycle industry. Where Dutch are known for their rather frugal habits in celebrations, many HM workers now cherish the memory of a 'life-time party'. The crew offered their management a fine replica of a 1880 Czech ordinary bicycle (made by Mesicek), with its 144 shiny nickel-plated spokes the archetype of a spoked wheel. Managing director Jos van Doornik: "Optimal results in any process can only be reached

in an atmosphere where people feel at home. Hi-tech or real teamwork cannot be done if people behave like soloists who happen to work in the same premises. By teamwork, I mean really needing each other, being dependent of the share of the work your colleague does. Companies like ours should be brimful with new ideas, it should be a place where creativity finds the warmth and fertility to breed. Where you can feel confident that thought is not ridiculous, and where bright ideas beyond your own job are not primarily met with the crack of the whip."

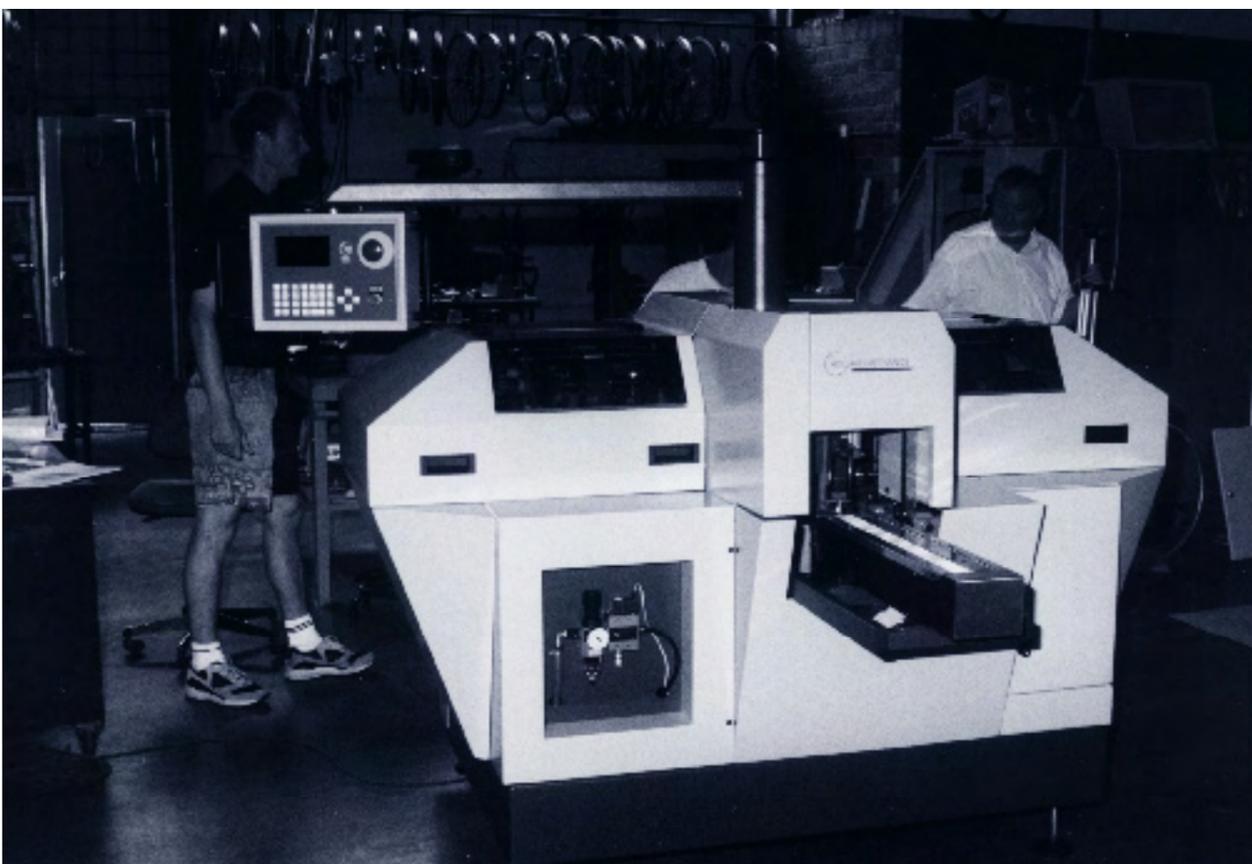
## The pride of the expert

Holland Mechanics have experienced that dedication to wheelbuilding is more than making a living by selling equipment. Trouble-free machinery means respect by cycle manufacturers. Gradually, the specialist provider is thus becoming an expert, and the expert who proves his skill will in time be considered an authority. And being an authority is not a nine-to-five matter: it is dedication, modest pride and the investigative mind which absolutely wants to hang on to this privileged state. So Holland Mechanics is consulted about any technical matter concerning spoked wheels. It means that Holland Mechanics simply has to have the expertise to give useful answers. To wheel builders. To cycle makers. To rim makers, hub makers and spoke manufacturers. No wonder Holland Mechanics work in close co-operation with several leading spoke and rim manufacturers. It's a French expression which says that: "Noblesse oblige", which literally means that nobility gives a commitment.

## INSERTION OF THE SPOKES IS NO SOPHISTICATED DARTS BOARD

# Filling the hubs

Inserting the spokes in the flanges of a hub is a particularly difficult operation to mechanise. Hub-filling stations have been built before, but their drawback was that the holes had to be rather large in relation to the spoke thickness, and spokes had to be very straight. These machines could cope with about 20% of all hubs (many had too narrow holes) and only selected spokes. Thus, these machines can only be used for mass-produced wheels (and bicycles), highly uniform and with rather wide tolerances between hub and spoke. The latest state of the art in scanning technology gave Holland Mechanics the opportunity to develop a new concept of a hub-filling station with substantial advantages over the previous generation. The team of development engineers estimate that more than 70% of all possible combinations of hubs and spokes on the European market can be handled by their new machine. The machine can cope with obstructions like ordinary brake levers on drum brakes and with coaster brakes. Spoke holes do not necessarily have to be countersunk. Hubs with different-size flanges (like ancient drum brake hubs) are outside the scope of the new hub filler.





## The Coolest

**23-year-old** Dolf Lok has only been with Holland Mechanics for a couple of months. It's his first job, with a 6-month contract. When still in technical college (studying information technology) Dolf worked for three months as a trainee with Holland Mechanics. This relatively short period was not only his first experience with technology outside the school, but was also meant to give an orientation on how it is to work in commercial surroundings. His second (and much longer) experience as a trainee was with a cooling equipment company, where Dolf wrote his thesis for his final examination. Both Holland Mechanics and the cooling firm offered Dolf a job. "But in my view Holland Mechanics was the coolest," Dolf says. "If you ask me why, it's in the first place that the planning of the work is perfect, every minute the machine you're working on, the parts and the tools you need are ready and at hand. Never have to wait or just doing chores to kill the time; it's just fun that you can work on the things you like. For me, this was the main reason to choose for Holland Mechanics. An additional asset is that I can have flexible working hours, which permit me to spend a good part of my evenings in the sports hall. I'm passionate in gymnastics on a high level. And I'm amazed that the first time there was a fair in nearby Volendam, you know: the village with the fishermen with the baggy trousers, the deafening music and the smoked eels, my colleagues just told me to join the party. Being the youngest, and having worked in the firm for only three weeks, I felt that they just accepted me as a colleague, and had me share their saturday night fun. In all modesty (I have hardly experienced other companies) maybe I can say that if ever there is a model company, this is one."



## Our man in Asia

Holland Mechanics now have their own office for sales and after-sales service in Asia:

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## Villum

A well-proven tool for which Holland Mechanics is a sole agent is the Danish Villum wheel truing jig. This instrument is more than nostalgic: it is in daily use by many manufacturers as an ultimate test bench for their top-end wheels. Smallest corrections can be made to a wheel by a skilled wheelbuilder, who make for instance a road racing wheel with a less than 0.2 mm tolerance in lateral alignment. Although modern mechanical wheelbuilding equipment gives a similar performance, many of the traditional craftsmen responsible for the finishing of the top line cycles do insist on a final check on the Villum. The mechanical measuring gauge gives a magnified indication of the misalignment of the wheel. Today's Villum is similar to the 50-year-old picture, except for the elegant cast iron pedestal.



### NEW MARKETS WITH HUGE POTENTIALS

## HM in Moscow

**Last August**, Holland Mechanics were on display at Moscow's 1st international motorcycle, bicycle and scooter event. "Bicycles have been made in Russia even before the revolution, says Holland Mechanics president Jos van Doornik, "but development has ceased for lack of emulation between the state-guided factories. Still, we sold a number of wheelbuilding machines to the old State factories. Rather solid transactions; they took their time to take the decisions, and the government paid us after taking their time as well. After the fall of the Berlin wall we saw the first tentative of a White-Russian bicycle manufacturer exposing in the 1990 IFMA. Their engineers were amazed about the possibilities of the western industry, but they had no longer the State to back them up, and were not in a position to invest. But the Russian industry is gradually coming out of their old shell, and we feel that going to Moscow may again open their markets for us. Russia is an immense country, and it is rather flat. That gives great opportunities for the bicycle as a means of transportation, comparable with what you see in China and India. There is a great lack in every-day commuting traffic which could be overcome by lots of bicycles. In Poland, for instance, which is a step ahead of Russia in modernizing its industry, we have appointed an agent who will act on our behalf in Eastern Europe."

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**Holland Mechanics visited** Anaheim (California) earlier this month, and will be at the EICMA in Milan from 16-20 september. "For Americans, our Dutch guilders have been particularly cheap during the last couple of months. Do tell your American customers that that is an extra reason why they should carry out any investment programmes they have in mind, if these investments must be done abroad" was the advice of a financial spokesman from Hollands leading bankers, ABN. "Similarly, updating production infrastructure, or buying material is a good idea as long as this high exchange rate of the dollar will last." So you know what the message of Holland Mechanics has been at the Anaheim Show.

## Servo motors instead of pneumatics

**Latest development in** Holland Mechanics wheelbuilding machinery is the extensive replacement of pneumatic drives (air motors and powder clutches) by servo motors. The reliability of these small electric motors is such that it justifies the application. The great advantage of servo motors over pneumatics is that they increase the accuracy of the machine.

## W H E E L - L O G I C

**Deep-V** When Moreno Argentin, Giorgio Furlan and Evgeni Berzin did their famous rush towards the finish of the 1994 Belgian classic the "Flèche Wallonne", they triggered a dream start for deep-V rims with their shiny 16-spoke Campagnolo Shamal wheels. The three team members had given an impressive team superiority show in this race that had seldom been seen before, and their Celeste Blue Bianchi's with the new, highly-reflective rims were an unspoken part in their success of that day.

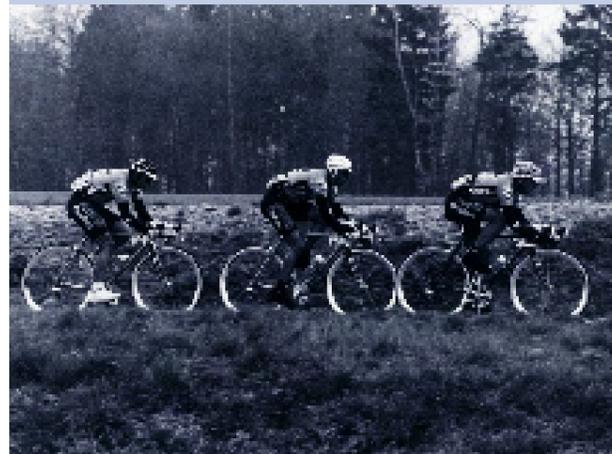


foto Cor Vos

Campagnolo's order books for the new deep-V rim wheels bulged, and other rim manufacturers launched theirs ASAP. And of course, spoke-and-nipple makers had to follow, and tire manufacturers suddenly had to include tubes with extra-long valves in their programme. The makers of wheel building machinery, having a good nose for the expected spread of the aerodynamic rims to a broader market share than the absolute race top, investigated the snags of the high rim. One of the snags is, that the sensor which has to find the spoke hole in the rim is an optical one. As the distance between the tyre bed and the spoke hole in the outer rim wall is much longer than in a flat rim, the light beam has to be very carefully positioned to reach the sensor opposite. The Holland Mechanics ISL High-end wheelbuilding machine can cope with 35 mm deep-V rims. The economic SL wheelbuilding machine takes up to 19 mm deep rims.

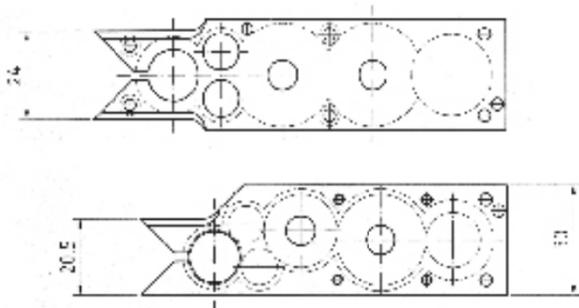
**12,5 inch** "Could your machines do 12,5" spoked wheels for children's bikes?" a German bicycle manufacturer asked his Holland Mechanics consultant. He told that his company had done a market survey. It had clearly shown that children want a bike very similar to that of their parents. Even 4-year olds choose the bike with the real spokes, not the welded spokes or the plastic moulded wheels. As real spokes clearly are considered a quality feature, the company insisted on spoked wheels for even their smallest size childrens' bicycles. No problem: from the hub-filling machine to the truing machine, Holland Mechanics can cope with all wheel sizes from 12,5" diameter on.

**14G standard?** Probably over 90% of all bicycles produced today use 14G spokes. But even so, some 1st class manufacturers in the Netherlands and Germany have a preference for the well-and-proven 13G spoke, notably in the rear wheel. It cannot be denied that the bigger diameter gives essentially a stronger spoke, which will result in an equally stronger wheel, provided that it can be built with similar tolerances as the more common 14G wheel, and that the rims and the hub flanges are strong enough to cope with the 13G spoke.

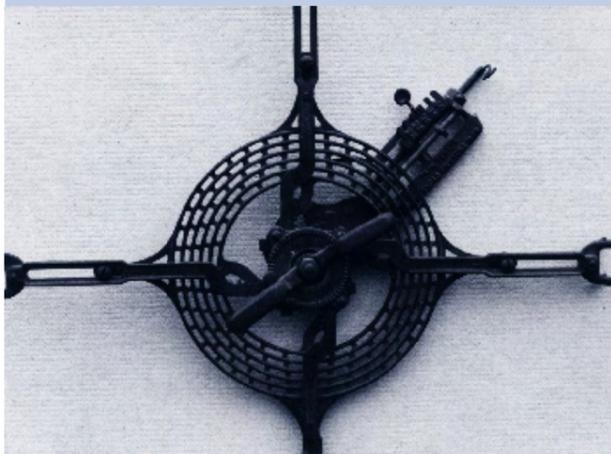
**27 holes** Ever seen a 27-hole rim? These also occur in the wheel-technology. When the drive side and the outside of the wheel are very unevenly charged, a manufacturer may opt for 18 spokes on the drive side, and only half that number on the outside (to save weight). The machine intelligence takes the different number of inner and outer flange holes into account. This line of Holland Mechanics machines have up to 500 different wheel-lay-outs and -sizes in their memory, and their basic layout with four simultaneously acting revolving heads can be tuned for odd requirements like a 27-spoke wheel.

**Wheelchair** Rims for wheelchairs have their even number of spoke holes, the valve opening (a different size) plus an additional number of holes similar to the spoke holes, but spoiling the line-up of the spoke holes. They seem to be drilled at random around the rim. These extra holes serve to bolt on the circular bar with which the wheelchair rider spins his wheels. The initial exploratory programme coupled to the sensors of the intelligent ISL wheelbuilding machine immediately detects which of the holes are for spokes and which do not fit in the evenly-dispersed pattern.

**A smaller hand was needed** Being “partners in business” with bicycle builders, Holland Mechanics was asked to investigate the possibilities of building wheels with a high number of spokes, say 48 for tandem wheels, or even more. To accommodate for shorter distances between the spokes, Holland Mechanics developed a “smaller hand”, seen in the drawing below. Right is the standard hand, with a 24 millimeter beak. The nipple key (gauge 13, 14 or 15) will fit in the top circle; other circles contain the driving devices). Left is the new, smaller hand with its 20.5 mm beak.



**Titanium spokes** DT Swiss Bike Technology has developed the DT Titanium MMC spoke, a metal matrix composite spoke which is the lightest on the market and is claimed to be the most durable. They will extensively be tried by DT-sponsored professional road racers and mountain bikers, who are not explicitly looking for durability towards atmospheric deterioration, but to mechanical strength. Anyhow, it is an interesting development to keep an eye on.



**Ancient tool** Know this wheelbuilding tool from ancient times? Imagine a plain rim around the four arms of the instrument, fixing it in position with the butterfly nut in the middle, and have the revolving index follow one track of slits in the cake grid. The index will mark the spots where the holes in the rim have to be drilled. The rim material was ash wood or steel. (Aluminum rims only made their appearance in 1935, when Belgian ace Romain Maes was the first to win the Tour de France on aluminum rims. Wooden rims, notably for track racing, have been made well into the ‘fifties). In the old days, front wheels with 32 holes and rear wheels with 40 holes were standard, but 24, 28, 36, or 48 spoke wheels were not uncommon. With this jig, the wheelsmith did no longer run the risk of ending up at 35 and-a-half holes when drilling his rim. It was made in 1904 by New England Cycle Supply Co from Keens, New Hampshire.

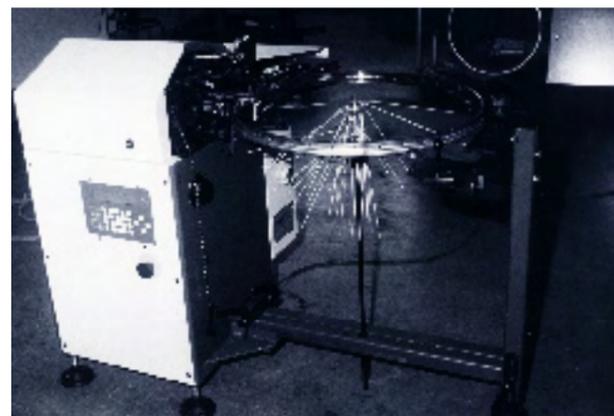


View of the Holland Mechanics headquarters in Purmerend, The Netherlands. Under the transparent roof is the “information-whizz-kids-floor” where new ideas take shape. The truck in front is collecting a complete line of wheelbuilding machines. Destination: a new factory in Manaus, Brazil, a mushroom city in the middle of the Amazonian jungle.

A FIRST STEP IN AUTOMATIC WHEELBUILDING

## Basic Laser wheelbuilding machine

**The Basic Laser** is the youngest and most simple of the Holland Mechanics wheelbuilding machines. Unlike its older and more sophisticated sisters, the Basic Laser does not tighten the spokes in the same treatment. Thus, Basic Laser will build about 50 laced and lightly-tightened wheels an hour. This makes the machine fit in a setup with separate tightening (by hand, or by machine). It will be sold to companies setting their first step in mechanical wheelbuilding. One of the advantages of this machine is, that it is not a huge investment in a gradual build-up of mechanisation.



## Preparation for Integral Information Technology

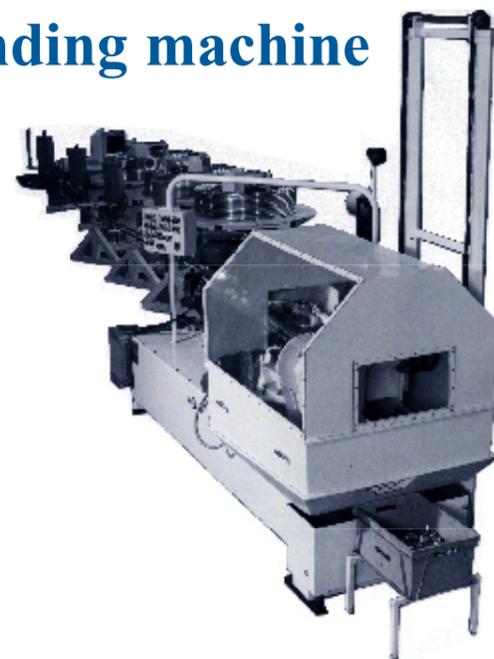
**What Holland Mechanics** has been doing during the past 25 years, is monitoring a technical action, and subsequently performing the act in a mechanical way. For instance, screwing a spoke nipple onto a spoke means: monitoring the initial situation, and establishing the exact position of the spoke makes it possible to guide the spoke nipple in an exact position and screw it on. The smaller the intervals in the monitoring sequence, the better the action can be performed and corrected during the process. Of course, a more complex technical process like truing a 36-spoke wheel requires a lot more measurements to control the nipple keys to perform their complex task. During the Holland Mechanics lifetime, the computer

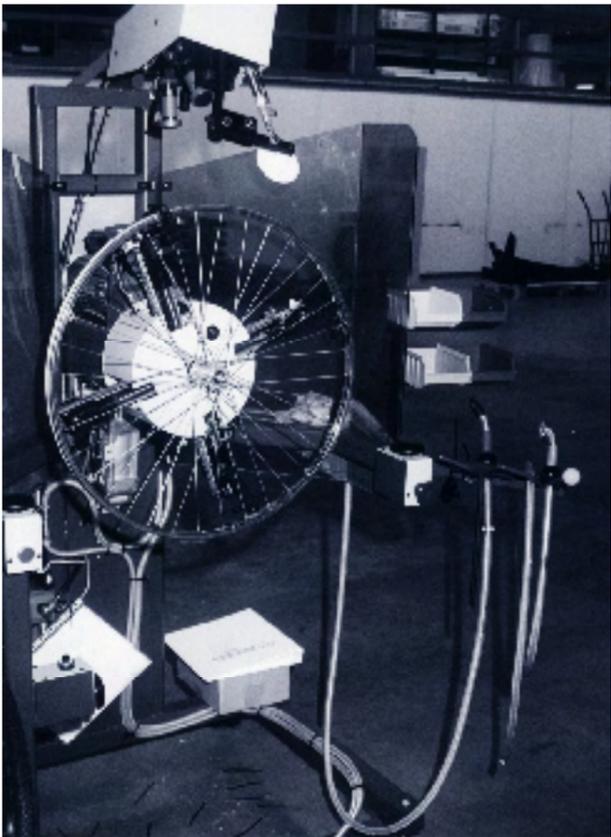
has taken over the processing of sensor measurements into mechanical actions. Instead of the former small mechanical steps towards the ultimate goal, the data from the sensors and the movement of the tools are now fully integrated. Next step, now under development, is the extension of the Information technology to the factory controlling. The complete wheelbuilding shop of a bicycle factory can already be controlled by a single monitor. From filling the hubs, via lacing and tightening, stabilizing and truing the wheel all the way to mounting the tyre. All results are available in a single database with relevant information for analysis in the factory Production Monitoring and Control System.

## The Elbowmatic bending machine

**The Elbowmatic bending machine** is a product of another Holland Mechanics division: the manufacture of cold-bending machinery. As a world-wide provider of wheelbuilding equipment the choice for a second line with a comparable world market was obvious.

So when the opportunity offered itself, Holland Mechanics took over activities of the Veenstra Bending Machines in nearby Burgerveen, with the intend to continue the development of fine machines for a world-wide market. By this take-over Holland Mechanics at once implemented the opportunity for product diversification, and acquired 55 years of knowledge and experience in this specialized field. Recently, seven machines bending short elbows for water piping have been sold to Germany.

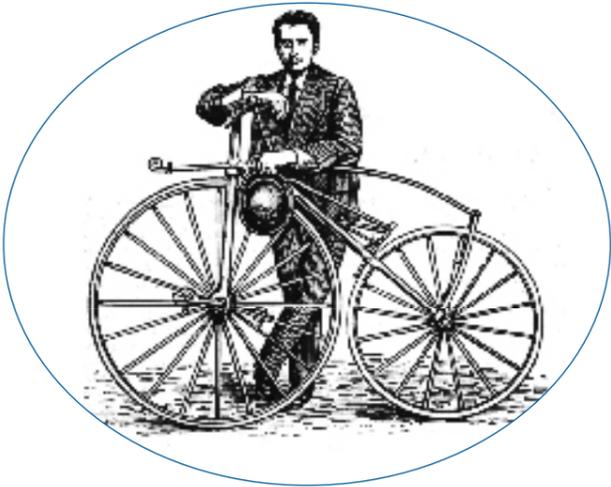




FOCUS ON ERGONOMICS AND SAFETY

## TMC Tyre mounting machine

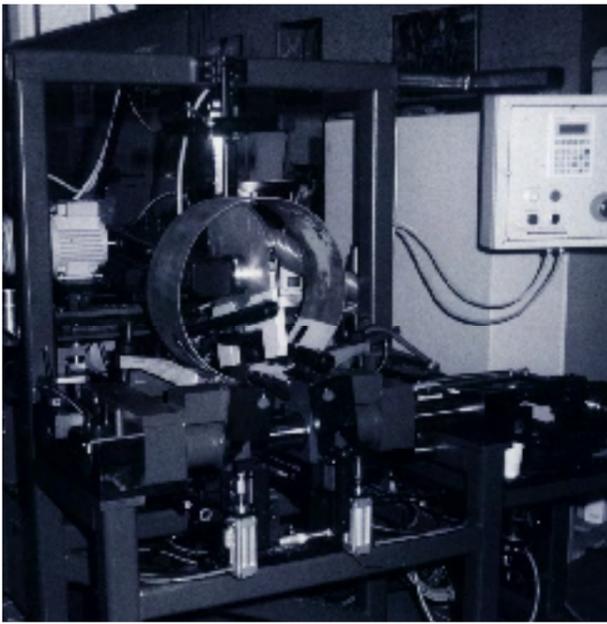
Fitting tyres by hand is extremely tiring when it comes to numbers. Mechanising the process is a relatively easy technical problem, but a basically sound tyre mounting machine can be extremely tiring as well. With this type of machine in particular, the ergonomics for the operator are of basic importance. Reaching over for each wheel to be handled will unavoidably cause back complaints and wrist fatigue. The TMC is actuated by a foot pedal plus two hand buttons to be pushed simultaneously). All tools, small pieces like valve inserts and compressed air are easily at hand. The TMC will handle even Kevlar-beaded tyres, and as the hub is not supported during the process, wheels do not run the risk of being pushed out of true.



A BASIS FOR WHEEL QUALITY IMPROVEMENT

## Spoke tension data computerized

Rob van Klaveren is sorting the bugs out of the computer programme HM has written to computerize the separate measurements of the spoke tension in one wheel. The well-known hand-held tensiometer (in Mitutoyo digital form) is coupled to a computer which automatically stores the data. After a full round the comparison chart (most logical form: a wheel) shows in a single view where the tensions deviate from average. Not only the intake of all tensions goes much faster, but analysing the results as well. The impact of a graphic is much faster than looking at tables of figures. A quality auditor in a bicycle company can thus scrutinize a far greater number of random samples, which enables him to achieve improvements at a higher rate than doing all tests by hand. For more statistical analysis the data can be downloaded in an Lotus or Excel spreadsheet programme.



## Making rims

With the acquisition of Veenstra bending machines, Holland Mechanics achieved more bending knowledge. A logical step was further developing machines to produce bicycle rims. Bending the aluminum profile into a circular shape being the first step, Holland Mechanics also developed a machine to saw and connect the spirally-bend rim profile to size, and have a machine which punches (rather than drills) the spoke and valve holes.

As can be seen in the picture above, various circular jigs can be used for different diameters of rims to be sawn and connected on this machine. The frame of the predeceasing prototype had appeared to be too flexible under hard use. The picture clearly shows how the support mechanism is beefed up in solid steel blocs and massive tool-quality steel axles.

## The punching machine

The punching machine is also suitable for double-wall profiles. With these rims, punching has an extra advantage over drilling: the shavings which can get into the inside of the rim profile are non-existent with the punching process.

This punching machine uses according to good Holland Mechanics practice four simultaneously-acting punching stands at equal distances around the rim. Other than a battery of 32 or 36 drills, the four punches can make any number of spoke holes being a multiple of four. A fifth stand punches the valve opening. The machine can make any size of rim and any hole number. The resulting punched holes have a cleaner finish than drilled holes, which makes a stronger rim that is less apt to shearing.



## ARAYA Japanese agent for Holland Mechanics and vice versa

15 years ago on the 1982 Osaka trade fair ARAYA, Japans' leading manufacturer of tube, rim- and wheel-building equipment, met with Holland Mechanics. Since, both companies are good colleagues. Holland Mechanics are agents for Araya's machinery products in Europe, and vice versa. Araya has equally been building lacing and tightening machines, but unlike Holland Mechanics they opted for separate treatments rather than the Holland Mechanics procedure of lacing and tightening in one step, which can give greater flexibility. But you cannot say that one of both systems is superior to the other, it's just: different ways to achieve the same goal.



Nardo Mimpen is a new member of the after-sales team. Actually Nardo is being trained as a technical trouble-shooter. That means that he has to know the machinery he is to deal with by heart. But he must also train in finding the most practical and viable solutions to any odd problem which may sometimes occur in a machine. A great asset in servicing the machinery is the in-built diagnosis system in the machine's electronics. Most of the high-end machinery are self-diagnostic.

