

# 自転車の製品イノベーションに関する参考図版

図1 ミショー型自転車[回転ペダル式前輪直接駆動型二輪車]  
[出典]Woodforde,John(1970), The Story of the Bicycle,p.30



19 Buell spruna velocipede (American). 1869

図2 回転ペダル式前輪直接駆動型 Ordinary Bicycle  
[出典]Woodforde,John(1970), The Story of the Bicycle,p.32



THE LINE OF BEAUTY.  
Athletic. "Don't you bicycle!"  
Aesthetic. "Er—no. IT DEVELOPES THE CALVES OF THE LEGS SO! MAKES 'EM STICK OUT, YOU KNOW! SO COARSE! POSITIVE DEFORMITY!!!"

図3 足踏みレバー式前輪直接駆動型 Ordinary Bicycle  
[出典]Woodforde,John(1970), The Story of the Bicycle,p.61



37 Facile rider in the tight-fitting uniform of the Facile Bicycle Club (headquarters: The Green Man, Blackheath), 1883

図4 Ordinary bicycle に乗った男女二人組の写真  
[出典]R.スタイン(1980)白井尚之訳『図説 大発明の歴史』小学館,p.145



図5 回転ペダル式前輪直接駆動型 Ordinary Bicycle の危険性に関する新聞記事[Family Doctor 1886 年 8 月 21 日号] [出典] David V. Herlihy (2004), *Bicycle*, Yale University Press, p.226



図6 スター型自転車による階段下り(1885)

[出典] David V. Herlihy (2004), *Bicycle*, Yale University Press, p.219

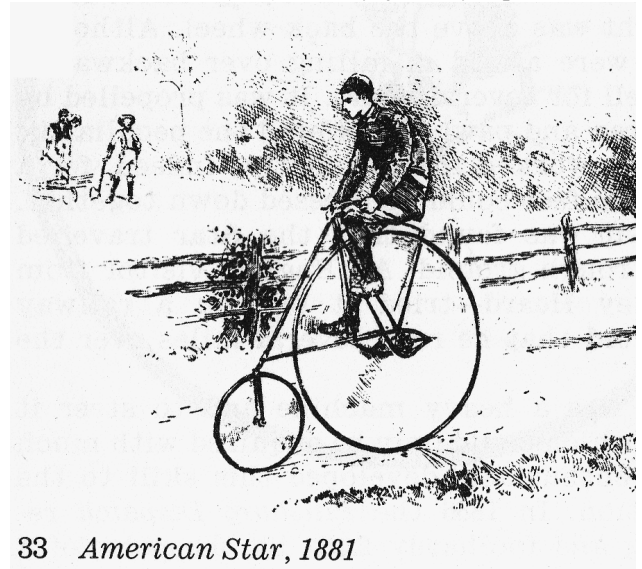


Will Robertson of the Washington Bicycle Club riding a Star bicycle down the steps of the United States Capitol in 1885, a stunt he reportedly performed in the wee hours of the morning to avoid an arrest. The Star became a favorite among tourists and racers for its enhanced stability.

図7 スター型自転車(1881)

[足踏みレバーによる後輪直接駆動型自転車]

[出典] Woodforde, John (1970), *The Story of the Bicycle*, p.56



33 *American Star*, 1881

図8 カンガルー型自転車(1884)

[回転ペダルによる前輪チェーン駆動方式の Ordinary 型]

[出典] D.アンドリッチ(古市昭代訳,1992)『自転車の歴史』

ベースボール・マガジン社,p.73(下図は原図から左右逆転した図)

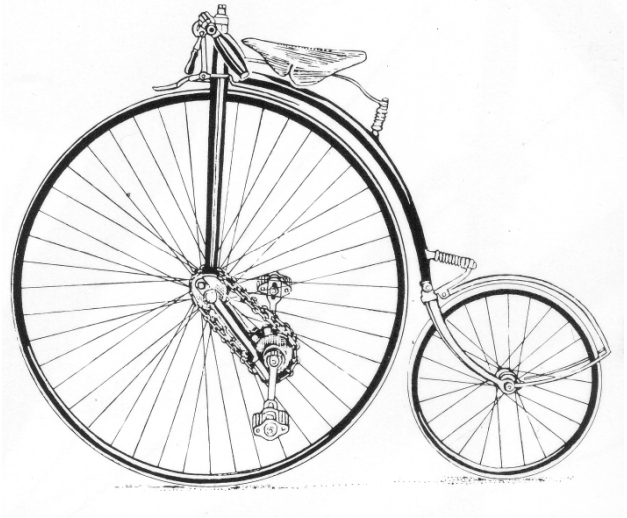


図9 前後両輪とも向きをコントロール可能な自転車(1868)

[出典]『自転車の歴史』p.48

1868年、キーストンのウィリアム・ローバック博士製作。両輪操縦可能なためカーブを同じ角度で回ることができる





図 10 三輪型自転車による階段登り(1883)

[出典]Woodforde,John(1970), *The Story of the Bicycle*,p.81

# The "DEMON" Hill Climber,

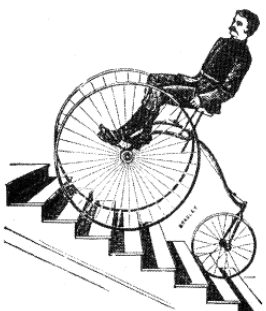
REGISTERED.  
IS THE PATENT ROYAL NATIONAL DIRECT ACTION.

## CHALLENGE TO THE TRADE.

As conclusive proof of the superiority of our Direct Action National Royal we hereby CHALLENGE ANY NOTED RIDER IN THE WORLD, of any kind of Tricycle now generally in use, not being a copy or infringement, to ride up the flight of stairs now in the SHOW ROOMS at our

Works, Spon St., Coventry, which we show to be easily practical on our NATIONAL ROYAL.

NOW GENERALLY ACKNOWLEDGED EASIEST FORM OF TRICYCLE.  
Best finish, with light tube frame, ball bearings to all wheels, and double brake; japanned black and gold, with plated parts; sent out in best style, complete with saddle, etc. ... 18 GUINEAS.  
No. 5, similar machine, strong and useful, guaranteed; now with tube frame ... 10 GUINEAS.  
Sole Makers of the only Front Steerer (Salvo Pattern) 12 Guineas. Cheapest full size Tricycles, 7 Guineas.



(Fresh Testimonials Daily.)  
Testimonial from W. Harrison, Esq., Vice President of Midland Union of Scientific and Natural History Societies.

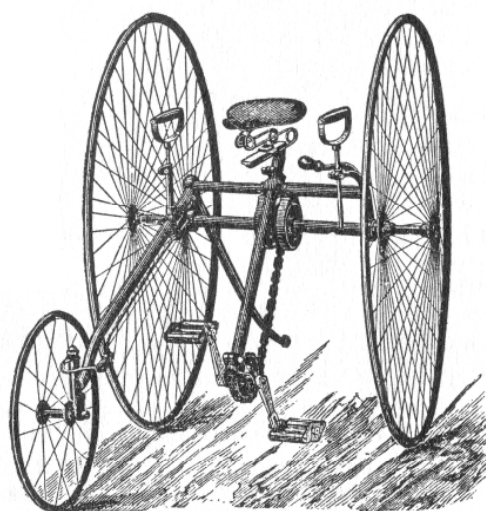
"I have now ridden a 'National Direct Action' for over a year, and must express my great satisfaction with it. . . . I find it has many advantages; the absence of chain and cogs lessens weight, does away with just those parts that are always getting out of order in tricycles, and a constant expense, while the machine is simplicity itself."

ALL MACHINES IMPROVED.  
NATIONAL WORKS, COVENTRY.

図 11 回転ペダル式後輪チェーン駆動型三輪自転車(1886)

[出典]E.R.Jones(1959),*Those were the good old days*, chuster,p.46

EVERY LADY SHOULD RIDE A



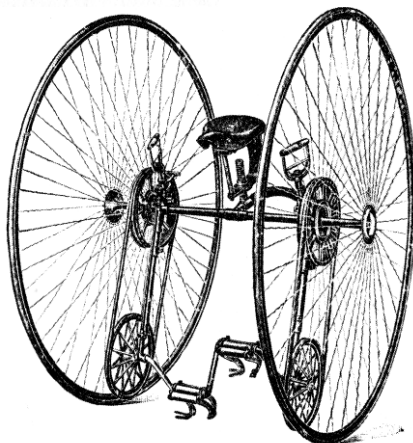
COLUMBIA TRICYCLE.

"I am of the opinion that no exercise for women has ever been discovered that is to them so really useful. Young and middle-aged ladies can learn to ride the tricycle with the greatest facility, and they become excellently skilful. The tricycle is, in fact, now with me a not uncommon prescription, and is far more useful than many a dry, formal, medicinal one which I had to write on paper."—B. W. RICHARDSON, M. D., F. R. S.

図 12 Otto Dicycle(1880)

[平行二輪型で回転ペダル式チェーン駆動タイプの自転車]

[出典]Woodforde,John(1970),  
*The Story of the Bicycle*,p.66



Otto Dicycle, 1880

図 13 回転ペダル式平行前輪チェーン駆動型三輪自転車(1886)[平行二輪+後輪タイプ]

[出典]Woodforde,John(1970), *The Story of the Bicycle*,p.71



The Earl of Albemarle, president of the National Cyclist Union, c. 1886

図 14 Coventry Rotary Tricycle(1878)

[出典]David V. Herlihy (2004), *Bicycle*, Yale University Press, p.211



Starley's novel two-track Coventry Rotary Tricycle, introduced about 1878, featuring a large driving wheel on one side and two smaller guiding wheels aligned on the other, along with a chain, conventional rotary pedals, and tangential-spoke wheels. To steer, the rider twists the outer handle; on the other side, by the big wheel, is a handle for the other hand and a brake lever. Women's models came with a seat rather than a saddle. The design helped spark strong interest in tricycles among the British upper classes.

図15 Humber Safety Bicycle(1885)  
[回転ペダル式後輪チェーン駆動型自転車]  
[出典] David V. Herlihy (2004), *Bicycle*, p.237



The Humber Safety Bicycle of 1884, introduced at about the same time as the Rover. It was one of the first frames to abandon a single-tube backbone in favor of the stiffer and more compact diamond pattern. A step was fitted just below the rear hub on the side opposite the chain to enable the rider to get a running start before stepping up into the saddle. Footrests were included at the base of the steering column, near the coil-spring suspension system.

図17 Ordinary 型と Safety 型の広告(1889)  
[出典] E.R.Jones(1959), *Those were the good old days*, chuster, p.46

**New 'ACME' BICYCLES**  
Rubber Tires.

	Factory Price.	Our Price.
52 in....	\$60 00.....	\$36 00
50 in....	55 00.....	33 00
48 in....	50 00.....	30 00
46 in....	45 00.....	27 00
44 in....	40 00.....	24 00
42 in....	35 00.....	21 00

All Wheels furnished with Tool Bag and Tools.

**SAFETY BICYCLES**  
SEND FOR CATALOGUE.

Small Boys' 20 in wheels, with parallel bearings.. \$16 00  
Large Boys' 24 in., with brake and mud guards... 28 00  
Ladies' or Men's 30 in., ball bearings to both wheels, 60 00  
Ladies' or Men's 30 in., ball bearings ALL OVER... 75 00

**ST. LOUIS, E. C. MEACHAM ARMS CO.**  
MO.

図19 Safety 型自転車(1898)  
[出典] E.R.Jones(1959), *Those were the good old days*, chuster, p.99

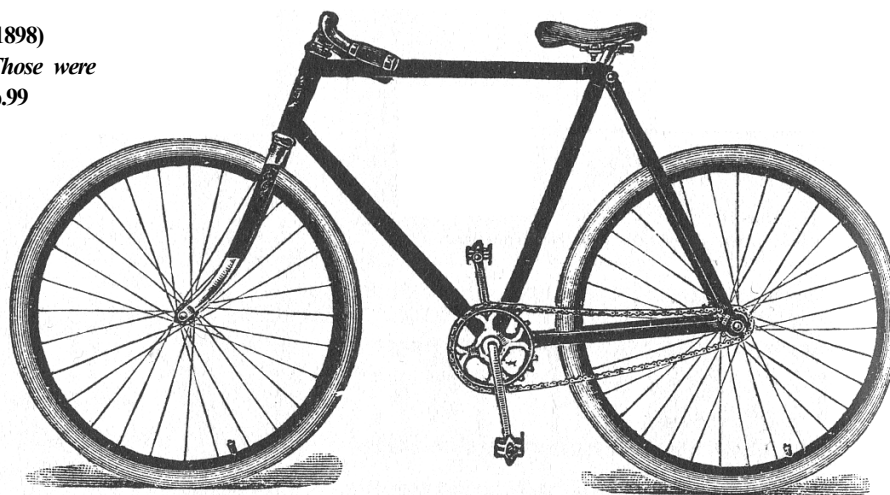


図16 Henry J. Lawson による Bicyclette(1879)  
[回転ペダル式後輪チェーン駆動型自転車]  
[出典] D.アンドリッチ(古市昭代訳1992)『自転車の歴史』ベースボール・マガジン社 p.75

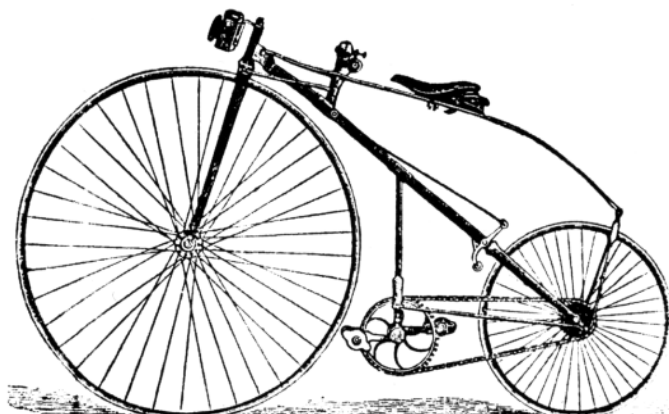


図18 Rover Safety Bicycle の広告(1885)  
[出典] David V. Herlihy (2004), *Bicycle*, Yale University Press, p.237

**THE ROVER SAFETY BICYCLE** (PATENTED).

Safer than any Tricycle, faster and easier than any Bicycle ever made. Fitted with handles to turn for convenience in storing or shipping. Far and away the best hill-climber in the market.

MANUFACTURED BY  
**STARLEY & SUTTON,**  
METEOR WORKS, WEST ORCHARD, COVENTRY, ENGLAND.

## 「変わり種」自転車(1)

図 20 前後両輪とも向きをコントロール可能な自転車(1868)

[出典]『自転車の歴史』p.48

1868年、キーストンのウィリアム・ローバック博士製作。両輪操縦可能なためカーブを同じ角度で回ることができる



図 22 アメリカの 1 輪車型自転車(1882)

[出典]Leonard de Vries(1971),*Victorian Inventions*,p.12

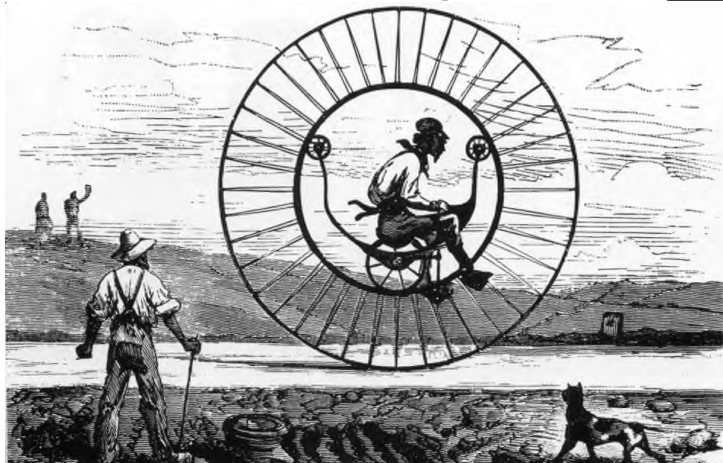


図 23 アメリカの 1 輪車型自転車 (1884)

[出典]Leonard de Vries(1971),*Victorian Inventions*,p.12



図 21 Pedespeed(1870) — ローラースケート型の歩行車

[出典]Leonard de Vries(1971),*Victorian Inventions*,p.9



図 24 アメリカの 1 輪車型自転車(1894)

[出典]Leonard de Vries(1971),*Victorian Inventions*,p.19

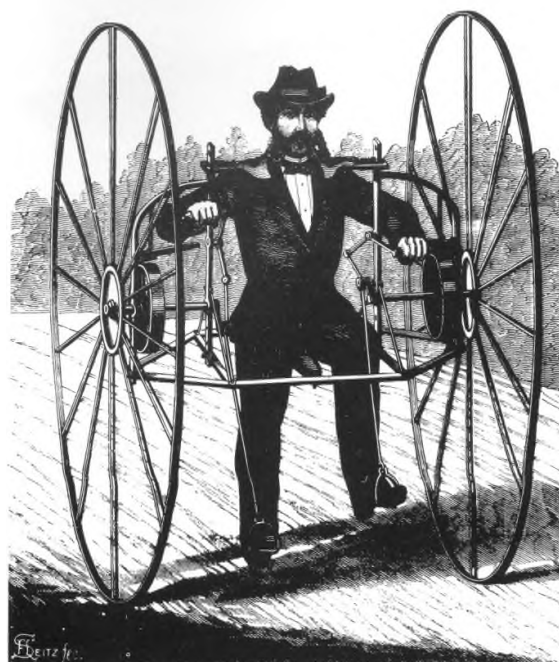




## 「変わり種」自転車(2) --- 手の力を推進力として利用する自転車

図 25 手こぎの2輪型自転車(1869) --- White

[出典]Leonard de Vries(1971),*Victorian Inventions*,p.10



*White's improved bicycle [1869]*

図 26 手こぎの三輪型自転車(1869) --- Samuel

[出典]Leonard de Vries(1971),*Victorian Inventions*,p.10



*Samuels' patent hand crank velocipede [1869]*

## 「変わり種」自転車(3) --- 複数人乗車用自転車

図 27 2人乗り2輪型自転車(1869) --- 直結回転ペダル型

[出典]Leonard de Vries(1971),*Victorian Inventions*,p.11



*Bicycle for two persons [1869]*

図 28 2人乗り4輪型自転車(1883) --- 回転ペダル・チェーン駆動

[出典]Leonard de Vries(1971),*Victorian Inventions*,p.13



*The 'Cooly' tricycle [1883]*

図 29 2 人乗り 3 輪型自転車(1883)—回転ペダル・連結ギア駆動  
[出典]Leonard de Vries(1971),*Victorian Inventions*,p12



図 30 3 人乗り 3 輪型自転車(1883)  
[出典]Leonard de Vries(1971),*Victorian Inventions*,p11

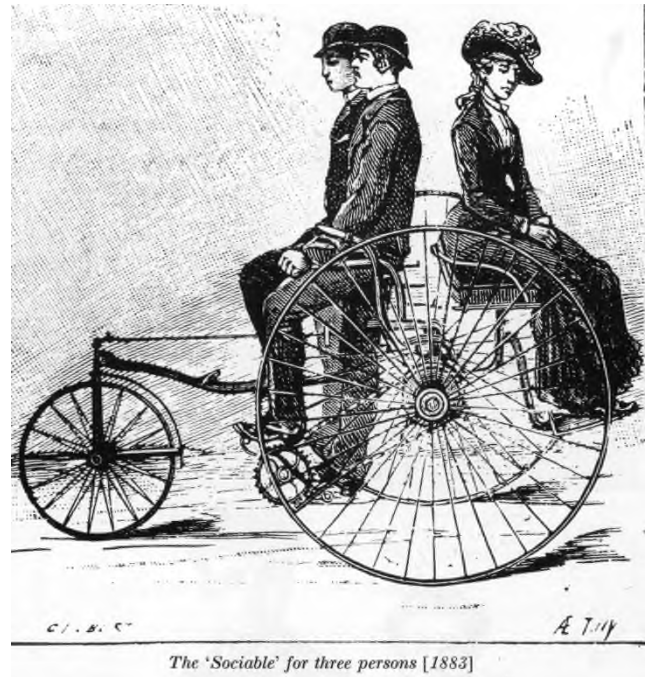
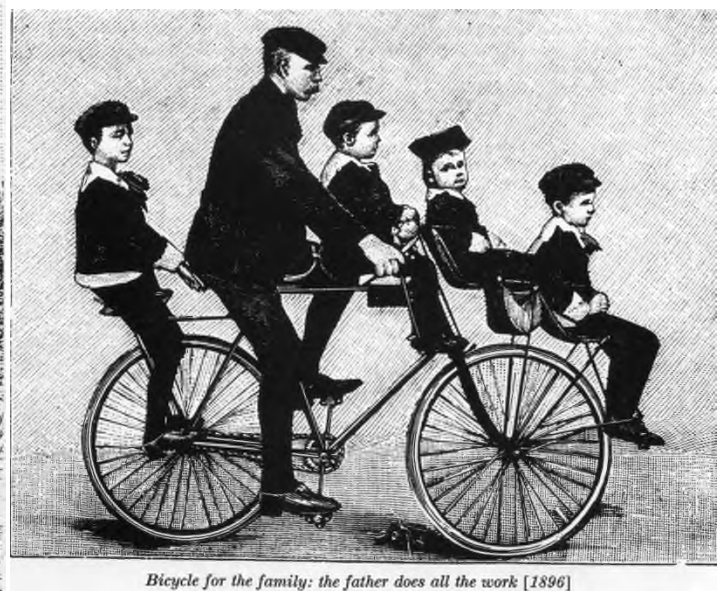


図 31 2 人乗り 3 輪型自転車(1883)—回転ペダル・チェーン駆動  
[出典]Leonard de Vries(1971),*Victorian Inventions*,p11



図 31 5 人乗り 2 輪型自転車(1896) – safety bicycle 型  
[出典]Leonard de Vries(1971),*Victorian Inventions*,p1



## 技術的シーズとしての自転車技術

— 自転車技術を利用した製品としての「足こぎボート」と「オートバイ」 —

図 32 足こぎボート(1881)[出典]Leonard de Vries(1971),*Victorian Inventions*,p13

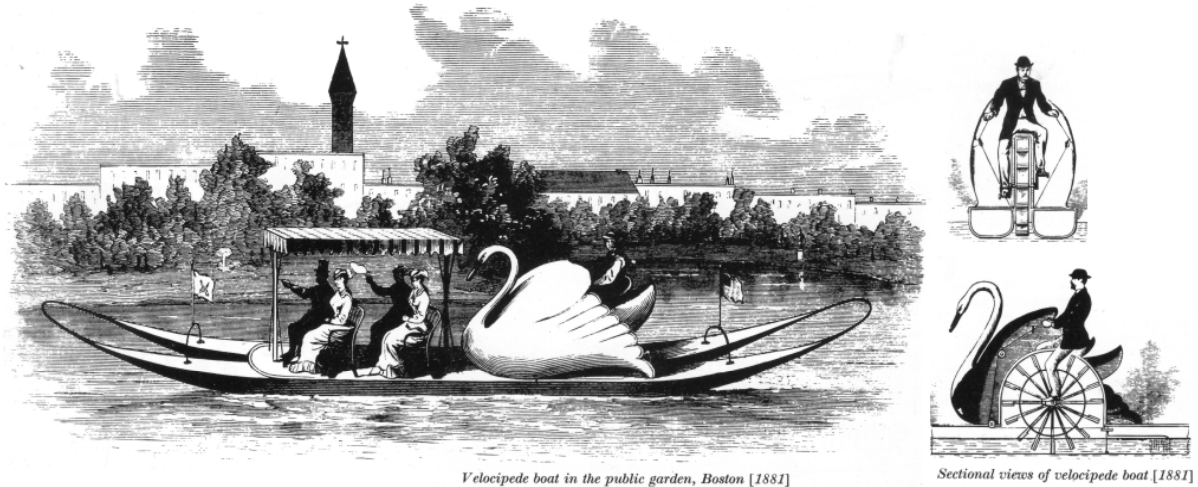


図 33 Piere Michaux と技術者 Perreaux による  
蒸気機関駆動の2輪型オートバイ(1869)  
[出典]『パリ夢機巧展 — 技術発明の 200 年』,p44



前輪の上に取り付けられているペダルは、最初にこれをこいで前方に進むことで蒸気機関がうまく始動するようにすることを目的としたものである。蒸気機関はサドルの下方部に置かれており、蒸気機関で発生した動力は、2 枚のベルトによって後輪に伝動される。

図 35 Félix Millet による 2 輪車型 5 気筒オートバイ(1893)  
[出典]『パリ夢機巧展 — 技術発明の 200 年』,p45

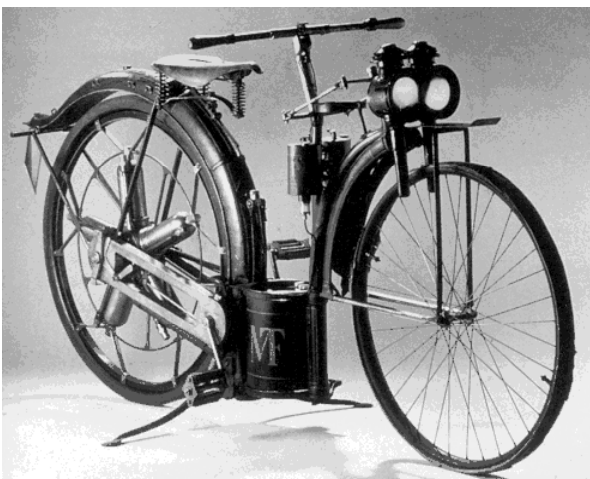


図 34 Félix Millet によるガソリン・エンジン駆動の 3 輪型オートバイ(1887)  
[出典]『パリ夢機巧展 — 技術発明の 200 年』,p44

自らのガソリン三輪車の前に立つフェリクス・ミレ  
(技術博物館, CNAM)

Félix Millet devant son tricycle à essence.  
(Musée National des Techniques, CNAM)

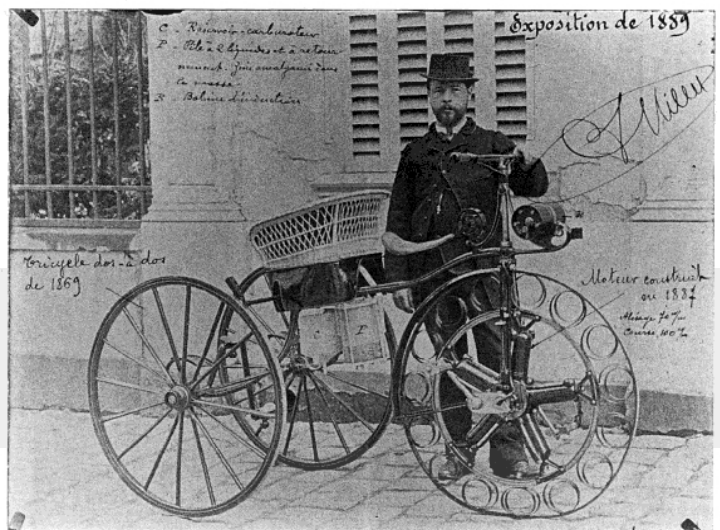


図 36 Félix Millet によるガソリン・エンジン駆動部の拡大図  
[出典]『パリ夢機巧展 — 技術発明の 200 年』,p45

自転車の車輪の中に5つのシリンダー・ピストン部が収納されている。いわば、「インホイール・エンジン」型になっている。

