

JIS

JAPANESE INDUSTRIAL STANDARD

Assembling of bicycles

JIS D 9311—1994

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Assembling of bicycles

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1. Scope This Japanese Industrial Standard specifies assembling mainly of sports bicycles (hereafter referred to as "S system assembling"), and of light roadsters (hereafter referred to as "R system assembling"), out of bicycles for general use specified in JIS D 9111.

- Remarks 1. The standard cited in this Standard is as follows.
- JIS D 9111 Classification and essential characteristics of cycles
2. This Standard may be applied to assembling of bicycles other than the above-mentioned, as appropriate.
3. In this Standard the units and numerical values shown in { } are in accordance with conventional units and are appended for informative reference.

2. Assembling The assembling shall be specified as the systems in which a worker assembles each bicycle at a definite position (single stationary working system), for the case of using an assembling stand in S system assembling and for the case of not using an assembling stand in R system assembling.

3. Constitution of parts Constitution of parts⁽¹⁾ of bicycle to be assembled by S system and R system shall be as given in Table 1.

Note ⁽¹⁾ The constitution is an example to make clear the mutual relation between the specifications and assembling of parts of bicycle.

Table 1. Constitution of parts (example)

Classification of part	Name of parts	S system assembling (sports bicycle)	R system assembling (light roadster)
Body part	Frame-fork assembly	Diamond type, with forward opened rear fork end, brazed cable casing stops, pump pegs and dynamo bracket	Staggered type, with rearward opened rear fork end, provided with stoppers (convex part) for falling and rotation of lock
	Seat pillar	Straight type	
Steering device	Handlebar	Drop type	Brake lever combined type
	Handlebar grips	Bar tape (with back paste) and end caps	JIS 2 type
Driving device	Chainwheel and cranks	Double, cotterless nut fixing type	Single, cotttered type
	Pedal	Ordinary pedals	
	Chain	$\frac{1}{2} \times \frac{3}{32}$, endless type	$\frac{1}{2} \times \frac{1}{8}$, clip connecting
	Free-wheel	Multiple (5-speed) free-wheel	Single free-wheel

Table 1. (continued)

Classification of part	Name of parts	S system assembling (sports bicycle)	R system assembling (light roadster)
Running device	Front hub	Ordinary front hub (hereafter referred to as "front hub"), straight spoke holes, with cone lock nuts	
	Rear hub	Ordinary rear hub (hereafter referred to as "rear hub"), hooking spoke holes, with cone lock nuts	
		With offset for multiple free wheel	With screw threads for band brake
	Rims	Front and rear $26 \times 1 \frac{3}{8}$ WO, 36 holes	
	Spokes and nipples	No. $14 \times$ suitable spoke length ⁽²⁾	
	Tyres, tubes	Front and rear $26 \times 1 \frac{3}{8}$ WO	
Change gear device	Deraillleur control lever	Double lever, clamp attaching	No
	Front deraillleur	Low normal, clamp attaching	No
	Rear deraillleur	Top normal, hub axle bracket attaching	No
	Deraillleur cables	Cable guide clamp attaching	No
Braking device	Front brake	Side pull calliper brakes, drop handlebar lever, cable operating	Rim brake, rod type
	Rear brake		Band brake, rod type, front and rear cranks clamp attaching
Seat device	Saddle	Clamp mounting	
Loading device	Front baggage carrier	Brake center bolt and front fork ends attaching	No
	Rear baggage carrier	Stays screw thread fixing, seat clamp bolt and rear fork ends attaching	Riveted stays, seat clamp bolt and rear hub axle attaching
	Front basket	No	Stays front hub axle attaching
Standing device	Stand	Single stand	Double legs stand
Warning device	Bell	Chime bell, clamp mounting	Puller bell, clamp mounting
	Rear reflector	Rear mudguard attaching	
Lighting device	Dynamo lighting set	Block dynamo	Front basket stays attaching double head-lamp
Protective device	Mudguards	Front and rear fork ends attaching, single stay	Front and rear hub axle attaching single front and double rear stays
	Chain-guard	Circular chain-guard disc	Full gear case
	Spoke protector	Disc type	No
	Flap	No	Mudguard stay screw thread attaching
	Crank cotter pin covers	No	Push in type
	Dress guards	No	Hook and band attaching

Table 1. (continued)

Classification of part	Name of parts	S system assembling (sports bicycle)	R system assembling (light roadster)
Accessories	Lock	Wire lock ⁽³⁾	Box type side lock
	Frame pump	Made of aluminium alloy	No
Fastening parts	Crank cotter pins	No	Common type
	Chain adjusters	No	Exists
	Machine screws	One series	

Notes ⁽²⁾ It is the spoke length by which a suitable assembly can be obtained according to the wheel assembling system specified in this Standard. The lengths for right and left rear wheel of sports bicycle are distinct each other.

⁽³⁾ The wire lock is not assembled.

4. Process of assembling Processes of assembling shall be divided into wheel assembling and overall assembling of S system assembling and R system assembling, and respective processes are shown in Fig. 1 and Fig. 2. However, symbols to be used in this process drawing shall be as given in Table 2.

Table 2. Process drawing symbols

Symbol	Meaning
	While conducting mainly inspection on quality and also the inspection on quantity is conducted.
	Working
	Hand holding
	While conducting mainly working, also inspection on quality is conducted.
	While conducting mainly inspection on quality, also working is conducted.

Fig. 1. Wheel assembling process

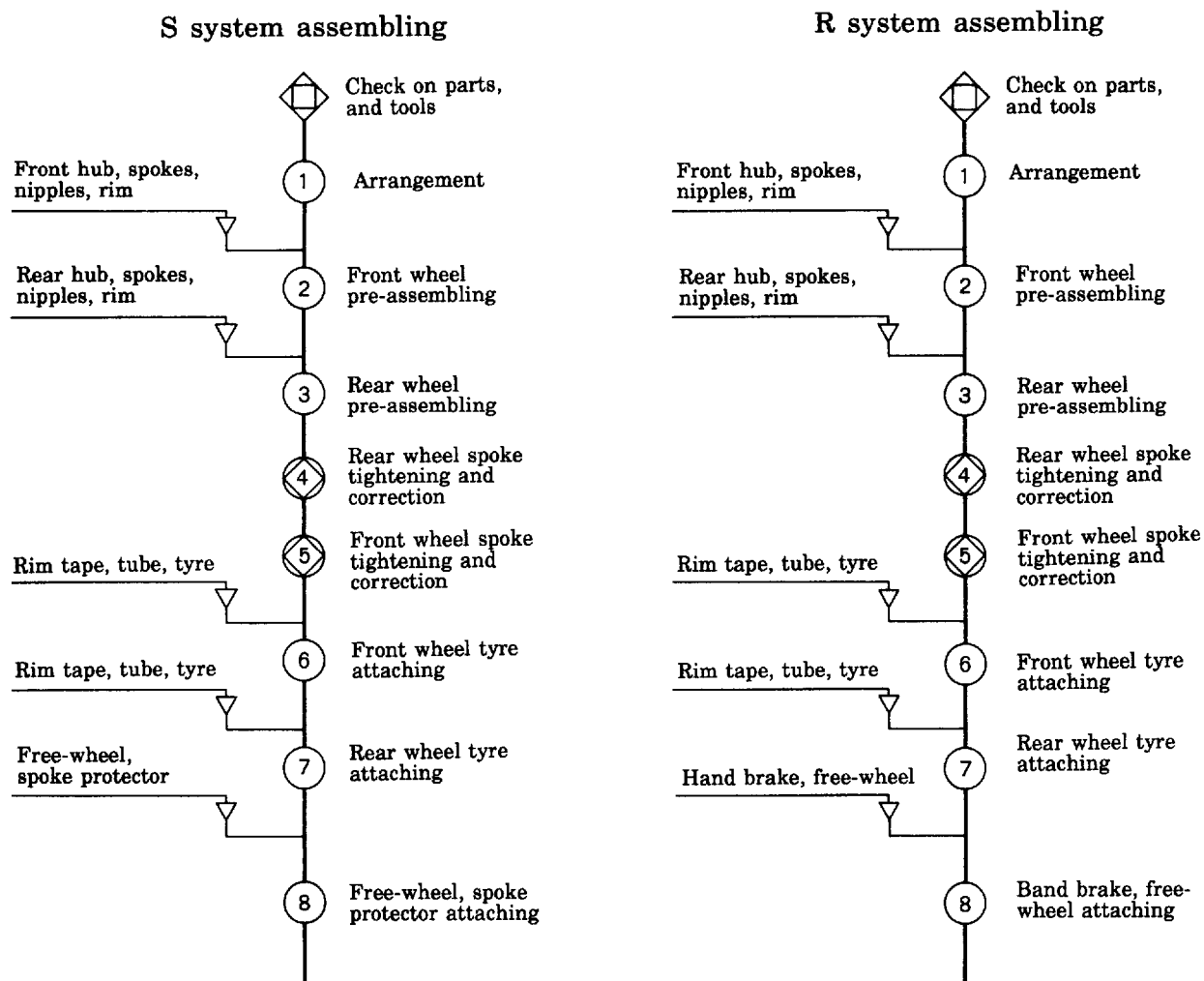


Fig. 2. Overall assembling process
S system assembling

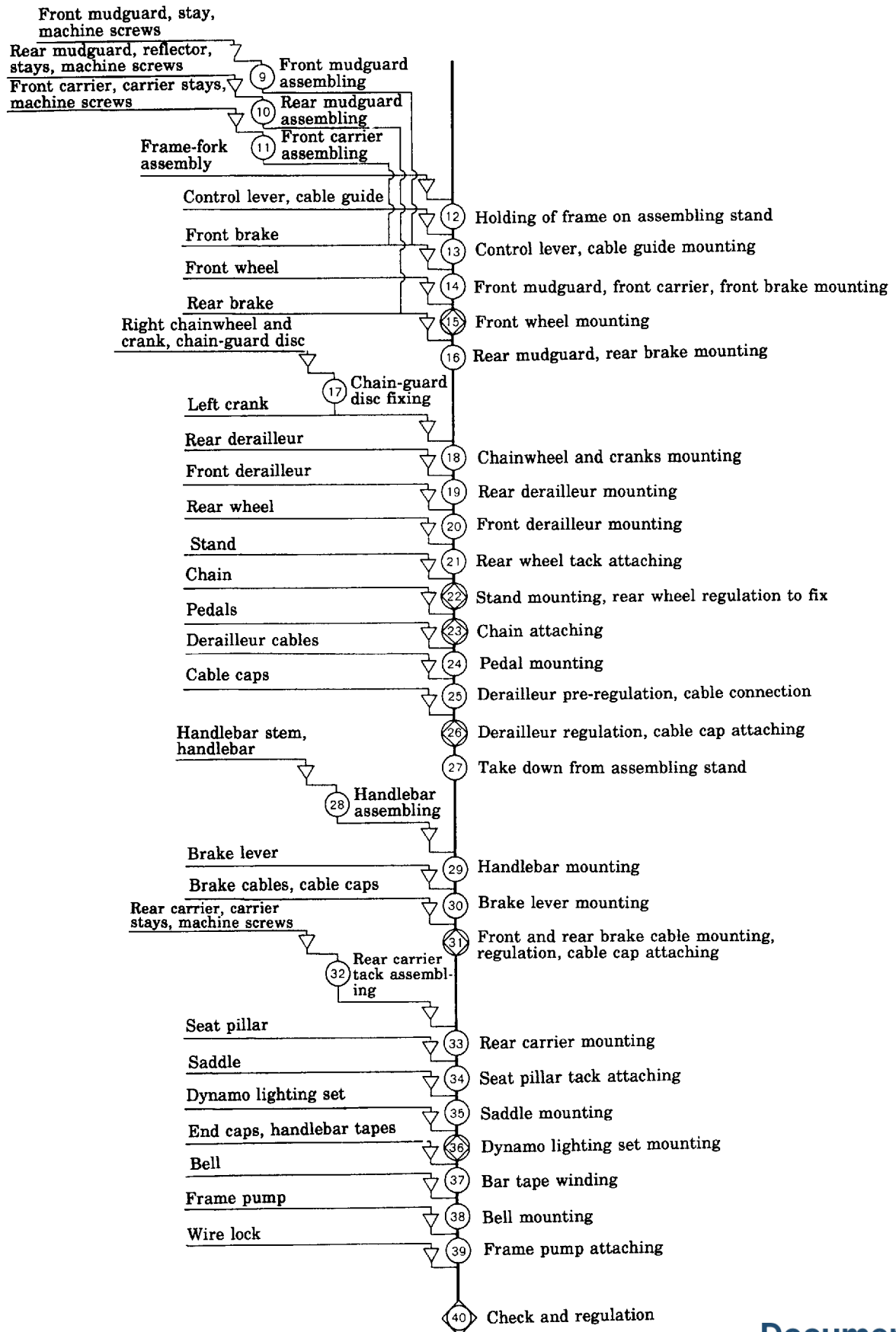
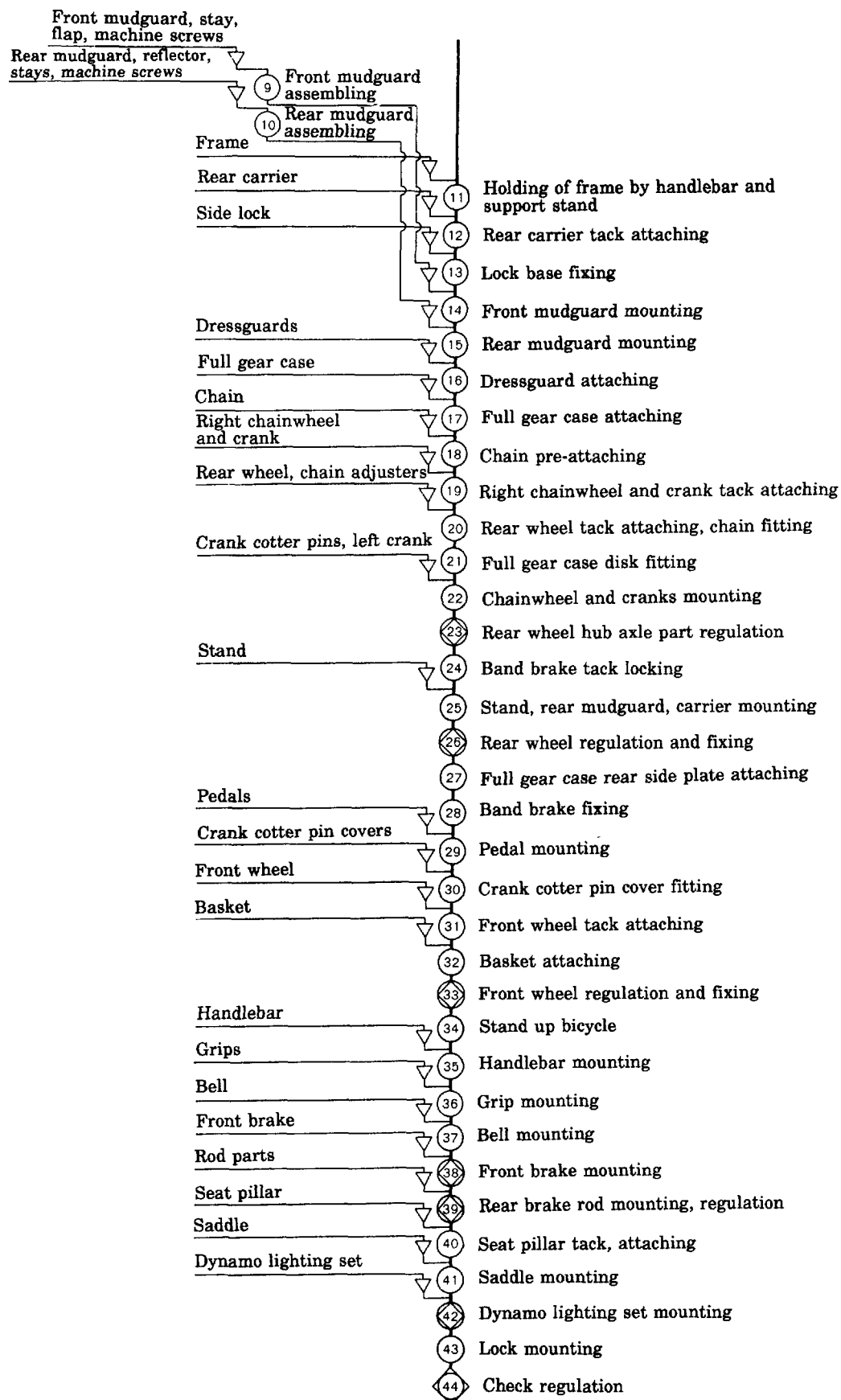


Fig. 2. (continued)

R system assembling



5. Assembling Assembling at each process shall be as shown in Tables 3 to 5.

Table 3. Wheel assembling

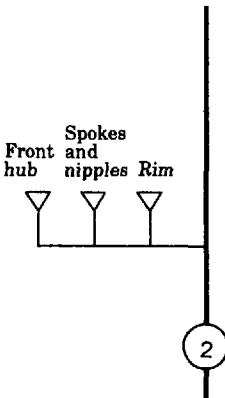
Name of process	Assembling	Remarks
Check and arrangement of parts and tools 	(1) While loosening the package of parts, affirm that the missing, abrasion, deformation and following harmful defects do not exist. (a) Basis exposure, wrinkle, spitting, sag, scattering (b) Unevenness, flaw, scar of plating surfaces (c) Flaws, and cracks of finished surface without exerting painting or plating (d) Clattering of rotary parts, etc. (2) Arrange the checked parts according to the process of assembling. Arrange properly the machine screws, nipples, etc. so as not to scatter. (3) Affirm that the tools and inspection devices have size and function suitable for specifications of assembling objective bicycle and arrange them so as to be convenient to working.	
Front wheel pre-assembling 	(1) Hold front hub vertically, and fall down spokes for front wheel into spoke holes of under side hub flange alternately. (2) Fall down the spokes for front wheel into spoke holes of upper side hub flange alternately. (3) Hold the spokes dividing into two parts, turn out the hub and fall down the spokes for front wheel into residual spoke holes similarly to (1) and (2). (4) Place the rim with the valve hole this side on the floor, and stand the front hub at the center of rim with handling the spokes. (5) Take 6 spokes on the upper side hub flange, cross ⁽⁴⁾ two spokes at both ends with reserving four spokes. Note ⁽⁴⁾ The crossing means overlapping the spoke passed from the outside of flange on the spoke from the inside to intersect. Further, in the case where the right spoke passed from the outside of hub flange and the left from the inside of hub flange, it is called to be left spoke head inside and in the reverse case, to be left spoke head outside. (6) Install the crossed spokes to the next spoke hole on the right side of the valve hole of rim and the next hole but one on the right and screw in the nipples by 3 to 4 threads by finger. (7) Cross respective alternate two spokes on the right side of (5), and tack respectively on the next rim spoke holes but one on the right side of (6) by nipples. Hereafter, similarly tack attach the spokes on upper side hub flange successively.	

Table 3. (continued)

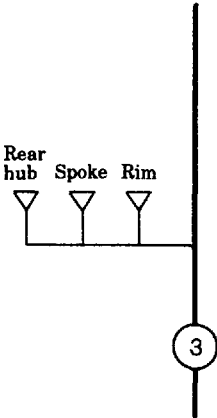
Name of process	Assembling	Remarks
(continued)	(8) Turn out the rim, take the next and third spokes on the right side of valve hole, cross similarly to (5) and (6) and attach in tack by nipples. (9) Similarly to (7) cross each two spokes successively, attach the spoke holes of rim, and tack attach by nipples. (10) Successively tack tighten by a spoke wrench to make the spoke tension approximately uniform.	
Rear wheel pre-assembling 	(1) Screw-in nipples uniformly to the spokes for rear wheel so that several screw threads of spokes can be seen. (2) Place the rim with the valve hole this side on a floor, and pass the spokes of (1)⁽⁵⁾ through holes of rim from the outside at each alternate hole starting from the next spoke hole on the right side of the valve hole. Note ⁽⁵⁾ In S system, take the spoke for free wheel side. (3) Hold the rear hub with standing at the rim center⁽⁶⁾. Note ⁽⁶⁾ In S system, stand with the free wheel side upward. (4) Take next two spokes on the right side of the valve hole, hook the right (left) of them on a spoke hole of upper side hub flange from the outside, overlap the left (right) spoke on the spoke from right (left) to intersect and cross, and hook on the spoke hole apart 4 holes from the inside. (5) Successively cross the spokes and hook on the spoke holes in the same gist as (4). (6) Tack tighten slightly the nipples by using a spoke wrench. (7) Turn out the rim with taking care so that the spokes does not get out of the spoke holes of hub. (8) Assembly the residual spokes (in the case of S system assembling, those for left side) similarly to (2) and (4) to (6)⁽⁷⁾. Note ⁽⁷⁾ The direction of spoke head and crossing may be reverse to (4). (9) Successively tack tighten the nipples by spoke wrench to make the spoke tension approximately uniform.	In S system assembling, spokes are divided into those for free wheel side (right side) and those for inverse side (left side) and so made not to be mixed. Crossing may be either left spoke head inside or outside, but the free wheel side should preferably be left spoke head inside.

Table 3. (continued)

Name of process	Assembling	Remarks
Tightening up of spokes and correction of rear wheel 	(1) Loosen the regulating screws of hub axle holder of wheel truing stand to insert both ends of hub axle of rear wheel and fasten. (2) Revolve the wheel lightly, and check the vertical and lateral run-outs. (3) Adjust the reference plate and reference bolts of wheel truing stand not to contact the rim and fix. (4) While viewing the clearances between the reference plate and the rim, regulate the tension of spokes by spoke wrench to reduce the vertical run-out. (5) While viewing the clearances between the reference bolts and the rim, regulate the tension of spokes by spoke wrench to reduce the lateral run-out. (6) Detach the wheel from wheel truing stand, and check the deviation of rim relative to the center of hub lock nut surfaces⁽⁶⁾ by using a rim center gauge according to the following gist. Note ⁽⁶⁾ In R system assembling, it shall be the outer surface fit with brake cover fixing nut on the left side. (a) Take the wheel left (right) side as the reference surface, apply measuring surface A, A' of rim center gauge to the rim side surface, and adjust the regulator of rim center gauge to be no clearance to the contacting surface of hub lock nut of middle B part and fix. 